

KING CETSHWAYO DISTRICT MUNICIPALITY

TENDER DOCUMENT

TENDER REFERENCE: KCDM/RBIG/02/2021
TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER
NKANDLA LOCAL MUNICIPALITY

SITE/BRIEFING MEETING:	Wednesday, 26th January 2022 @ 11h00
TENDER CLOSING:	Tuesday, 8th February 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. Mdu Mkhize	Contact Name: Mr. Z Ndlovu
Telephone: 035-799 2715	Telephone: 035 – 799 2500

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T1.1 Tender Notice and Invitation to Tender



KING CETSHWAYO DISTRICT MUNICIPALITY TENDER REFERENCE: KCDM/RBIG/02/2021

TENDER FOR BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA LOCAL MUNICIPALITY

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 R8 877.19 (Incl. VAT) non-refundable, cash or EFT (Nedbank, King Cetshwayo District Municipality, Acc. 1454088885, Bank code 145405, 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.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 Wednesday 26th January 2022 at 11h00 at the Middledrift Water Treatment Works Gate 28°49'31.7"S 31°08'46.9"E from where the route will be travelled, 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 Tuesday, 8th February 2022. It must be noted that due to COVID 19 regulations, 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

Tenders 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 40% of contract value (with stipulated exceptions) 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 Mduduzi Mkhize at Tel. 035-799 2715, Technical queries must be directed to Mr. Zenzele Ndlovu at Tel. 035 799 2513.

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.

Mrs M. Ndlovu
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 indicated 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 Mdu Mkhize	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:		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/02/2021
Title of Tender	Tender for BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA LOCAL MUNICIPALITY
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 and LIC NQF 5 - No qualification or less than 1-year experience (Disqualification) - Qualified with less 1- 2 years' relevant experience in the position (7) - Qualified with more than 2-5 years' relevant experience in the position (14) - Qualified with 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 and Matric/N3 - 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

C.3.17 The number of paper copies of the signed contract to be provided by the employer is: One.

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

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

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

C.2.11 Alterations to documents

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

C.2.12 Alternative tender offers

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

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

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

C.2.13 Submitting a tender offer

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

- authorizes the employer to verify the tenderers tax clearance status from the South African Revenue Services that it is in order;
- 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;
- 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;
- 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
- 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
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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")
<u>Cash deposit of 10% of the Contract Sum</u> Attach a letter from the bank confirming availability of funds equivalent to 10 (ten) % of the tendered amount exclusive of VAT.	
<u>Fixed Performance Guarantee of 10% of the Contract Sum</u> 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).	
<u>Retention of 10% of the Works</u> 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.	
<u>Cash deposit of 5% of the Contract Sum plus retention of 5% of the value of the Works</u> • 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.	
<u>Fixed Performance Guarantee of 5% of the Contract Sum plus retention of 5% of the value of the Works</u> • 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)

PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS 2017

This preference form must form part of all bids invited. It contains general information and serves as a claim form for preference points for Broad-Based Black Economic Empowerment (B-BBEE) Status Level of Contribution

NB: BEFORE COMPLETING 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:

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

Where

- 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" or equivalent Quality Council for Trades and Occupations (QCTO) qualifications at NQF level 5 or 7.
- 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 <i>audi alteram partem</i> 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:		

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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 state¹.
2. Any person, having a kinship with persons in the service of the state, including a blood relationship, may make an offer or offers in terms of this invitation to bid. In view of possible allegations of favouritism, should the resulting bid, or part thereof, be awarded to persons connected with or related to persons in service of the state, it is required that the bidder or their authorised representative declare their position in relation to the evaluating/adjudicating authority.
3. In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.
 - 3.1 Full Name of bidder or his or her representative:
 - 3.2 Identity Number:
 - 3.3 Position occupied in the Company (director, trustee, shareholder²):.....
 - 3.4 Company Registration Number:
 - 3.5 Tax Reference Number:
 - 3.6 VAT Registration Number:
 - 3.7 The names of all directors / trustees / shareholders members, their individual identity Numbers and state employee numbers must be indicated in paragraph 4 below.
 - 3.8 Are you presently in the service of the state? YES / NO
 - 3.8.1 If yes, furnish particulars

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/02/2021 BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA LOCAL MUNICIPALITY

(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 consortium¹ 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 dayworks schedule is included in the Pricing Data.

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
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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](http://www.thedti.gov.za/industrial%20development/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	80%
Water meters	40%
Plastic Piping	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/02/2021

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/02/2021										
(C2)	Tender Description:	BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA LOCAL MUNICIPALITY										
(C3)	Designated Product(s)	Valves and Valve Products, Steel Pipes, Plastic Pipes										
(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		

Tender Item No's	List of Items	Calculation of local content						Tender summary			
		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)
B5.1.1a	oPVC 200Ø cl10										
B5.1.1b	oPVC 200Ø cl13										
B5.1.1c	oPVC 200Ø cl16										
B5.1.1d	oPVC 200Ø cl20										
B5.1.1e	uPVC 200Ø cl25										
B5.1.2.1	GMS 200										
B5.1.3.1	375Ø Conc										
B5.1.8.1c	HDPE 50Ø cl10										
B5.2.1.1.1.a.i	200Ø 90deg										
B5.2.1.1.1.a.ii	200Ø 45deg										
B5.2.1.1.1.a.iii	200Ø 22½ deg										
B5.2.1.3a	FA DN200 PN25										
B5.2.1.3b	FA DN200 PN16										
B5.3.1.1	IV DN200 PN16										

(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.

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 ATTACHED (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 must be completed in full, failure to do so may lead to disqualification

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 registered with CIDB with minimum grading of 2 CE to 4 CE, EME or QSE that is at least 51% Black owned. At least 40% of contract value less items listed in RS023.3 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

	Proposed extent of works to be allocated to subcontractor	Include value of works allocated to sub- contractor	CIDB Grading
1.			
2.			
3.			
4.			
5.			
	SUB TOTAL		
	ADD P&G		
	TOTAL SUB-CONTRACTING VALUE		

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

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 40% 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 SITAs.
8. The Main Contractor (Developed Enterprise) is strongly encouraged to choose relevant SITA accredited modules for training of targeted SMMEs in which case the SITA'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

RS023.3 DETERMINATION OF TARGETED PROCUREMENT

1. The targeted procurement ratio will be calculated based on the tendered sum of the works less the following:
 - 1.1 Preliminary & General
 - 1.2 Value of the deductible materials as listed in Table RS023.30 below:
2. Tenderers must provide the rates for quantities and value of items earmarked for exclusion from the targeted procurement calculation.

Failure to do so will lead to the assumption that all quantities contained in the BoQ are eligible for application of the targeted procurement.

Table RS023.30 Schedule of items excluded in the calculation of the Targeted Procurement

Section	Description	Amount
B	Water Meters	
B	Valves	
B	Pipes	
	Sub Total	

RS023.4 CONTRACT PARTICIPATION FOR TARGETED ENTERPRISES

Sub Total 1 value of Contract (excluding VAT, Contingencies and CPA),

Specialists Items (Deductible Materials):

Total value of contract participation by targeted enterprise:

Percentage (%) contract participation by targeted enterprise:

Broad description of work to be performed by the targeted enterprise:
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

Failure to complete the entire RS023 in full and may lead to disqualification.
Should percentage of sub-contracting not equal or exceed the specified minimum percentage of 40%, 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

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:

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

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

(Compiler to insert the target minimum percentage based on detailed calculations of the local labour component anticipated for each scheduled pay item, including the pay items contributing to the provisional sum associated with the construction Works carried out by Targeted Enterprise subcontractors appointed).

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

.....
Date

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

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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/02/2021 TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA LOCAL MUNICIPALITY.

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	18 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	Eyethu Engineers (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: 135 Musgrave Road, 8 th Floor, Berea, Durban, 4001 Postal Address: P. O. Box 70358, Overport, 4067 Tel No: 031 - 303 7630 E-mail: nirvanal@eyethu.co.za
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 Works is:	5.13.1	R5000.00/day
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.

Reference	GCC Clause	Data
The latent defect period is	5.16.3	10 years
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=0,40 b=0,10 c=0,35 d=0,05 x=0.10 The base month for CPA is: Month 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
Amicable Settlement	10.4	Dispute resolution by ad-hoc adjudication, failure of which will require to further the dispute through adjudication and thereof 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+

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 40% 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:

$$V = (Nw - Nn) + \frac{Rw - Rn}{X}$$

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 $(N_w - N_n)$ 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 $(R_w - R_n)/X$ 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 : 1 339 mm (1961-1990)

Average number of days per year with rainfall exceeding:

Y = 10mm

X = 20mm

MONTH	Nn (No)	Rn (mm)	MONTH	Nn (No)	Rn (mm)
January	6	213	July	1	38
February	5	183	August	2	58
March	4	130	September	3	91
April	3	86	October	5	156
May	2	52	November	6	156
June	1	31	December	4	145

“

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 cessations 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 cessations 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.
- ii) suitable tools, plant, transport, test equipment, spares and repair kits shall be available at all times to do the necessary emergency repairs.
- iii) 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, benchmarks, 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

Amend Clause 8.6

"Clause 8.6 of the General Condition of Contract will be superseded by a principle controlled construction insurance which is provided by the King Cetshwayo District Municipality on all contracts.

Tenderers are to specifically note the detail of insurances affected by the employer as depicted under Clause 8.6.1 as "insurance effected by the Contractor".

2.19.1 Insurance Effected By The Employer

Amend clause 8.6.1

a) Notwithstanding anything elsewhere contained in this Contract without limiting the obligations liabilities or responsibilities of the Contractor in any way whatsoever (including but not limited to any requirement for the provision by the Contractor of any other insurances) the Employer shall effect and maintain as appropriate in the joint names of the Employer the Contractor and where relevant, Sub-contractors, the following insurances which are subject to the terms, limits, exceptions and conditions of the Policy.

- i) CONTRACT WORKS AND SASRIA SPECIAL RISKS Insurance - which will provide cover against accidental physical loss or damage to the Works, Temporary Works and materials

- intended for incorporation in the Works.
- ii) PUBLIC LIABILITY Insurance - which will provide indemnity against legal liability in the event of accidental death of or injury to third persons and/or loss of or damage to third party property arising directly from the execution of the contract and occurring during the period of insurance with a limit of indemnity of R3 000 000.00 in respect of all claims arising from any one occurrence or series of occurrences consequent on or attributable to one source or original cause.
- b) The Employer shall pay the premium in connection with the insurance effected by the Employer. A provisional sum is included in the Bill of Quantity and will have to be paid over to the Insurance Brokers by the awarded contractor.
 - c) The Contractor shall not include any premium charges for this insurance except to the extent that he may deem necessary in his own interests to effect supplementary insurance to the insurance effected by the Employer. The Employer reserves the right to call for full information regarding insurance costs included by the Contractor.
 - d) Any further clarification of the scope of cover provided by the Policies arranged by the Employer should be obtained from the Employer or their Insurance Brokers, Sankofa Insurance Brokers, Telephone (011) 025 6566 e-Mail nngwenya@sankofaib.co.za.
 - e) In the event of any occurrence which is likely to or could give rise to a claim under the insurances arranged by the Employer the Contractor shall:-
 - i) in addition to any statutory requirement or other requirements contained in the Contract immediately notify the Employer's Insurance Brokers or the Insurers by telephone, telex or telefax giving the circumstances nature and an estimate of the loss or damage or liability;
 - ii) complete a Claims Advice Form available from the Insurance Brokers to whom the form must be returned without delay; and
 - iii) negotiate the settlement of claims with the Insurers through the Employer's Insurance Brokers and shall when required to do so obtain the Employer's approval of such settlement.

The Employer and Insurers shall have the right to make all and any queries on the site of the Works or elsewhere as to the cause and the results of any such occurrence and the Contractor shall co-operate in the carrying out of such enquiries.

- f) The Contractor will be liable for the amount of the Deductible (First Amount Payable) in respect of any claim made by or against the Contractor or Sub-contractors under the insurance effected by the Employer.

The Deductible (First Amount Payable) for which the Contractors are responsible and which are applicable in respect of each and every occurrence or series of occurrences attributable to one source or original cause giving rise to loss or damage or liability indemnifiable are as follows: -

- i) Under the Contract Works Insurance shall be:-

a. Elemental perils	R 5 000.00
b. Theft, Malicious Damage	R 5 000.00
c. Any other Cause	R 5 000.00
 - ii) Under the Public Liability Insurances in respect of loss of or damage to property shall be:-

a. Underground Services	R 5 000.00
b. Any Other Cause	R 5 000.00
 - iii) Under any other insurance shall be as specified in such insurance policy.
- g) Any amount which becomes payable to the Contractor or any of his Sub-contractors as a result of a claim under the Contract Works Insurance shall if required by the Employer be paid net of the Deductible to the Employer who shall pay the Contractor from the proceeds of such payment upon rectification repair or reinstatement of the loss or damage but this provision shall not in any way affect the Contractor's obligations and liabilities or responsibilities in terms of the Contract.

2.19.2 Insurance Effected By The Contractor

- a) The Contractor and Sub-contractor shall where applicable provide as a minimum the following:
- i) Insurance of Construction Plant and Equipment (including tools offices and other temporary structures and contents) and other things (except those intended for incorporation into the Works) brought onto the site for a sum sufficient to provide for their replacement;
 - ii) Insurance in terms of the provisions of the Compensation for Occupational Injuries and Diseases Act (COID) Act No 130 of 1993; iii) Employers Common Law Liability Insurance with a limit of indemnity of not less than R 1 000 000.00 (one million Rand);
 - iii) Motor Vehicle Liability Insurance comprising (as a minimum) "balance of Third Party" Risks including Passenger Liability indemnity of not less than R 1 000 000.00 (one million Rand) ; and
 - iv) Where the Contract involves manufacturing and/or fabrication of the Works or parts thereof at premises other than at the Contract Site the Contractor shall satisfy the Employer that all materials and equipment for incorporation in the Works are adequately insured during manufacture and/or fabrication. In the event of the Employer having an insurable interest in such Works during manufacture or fabrication then such interest shall be noted by the endorsement to the relevant Policies of Insurance
- b) The insurance to be provided by the Contractor and his Sub-contractor shall be effected with Insurers and on terms approved by the Employer (which approval shall not be unreasonably withheld) and shall be maintained in force for the duration required (including any period of maintenance). The Contractor shall within fourteen (14) days after the Agreement comes into effect deliver to the Employer the relevant Policies of Insurance.
- c) If the Contractor fails to effect and keep in force the insurances referred to then the Employer may effect and keep in force any such insurances and pay such premiums as may be necessary for that purpose and from time to time deduct the amount paid by the Employer from any monies due or which may become due to the Contractor or recover same as a debt from the Contractor.

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."

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 contract data provided by the Employer)
	 Months (Max as per Contract Data provided by Employer)

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 *ddth* day of *month* 2021 in respect of BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA LOCAL MUNICIPALITY : Phase 1a under Contract Number KCDM/RBIG/02/2021 at Middledrift SSA3.

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 of 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:

.....

.....

.....

.....

2. DEFINITIONS :

2.1. EMPLOYER : means any person who employs or provides work for any person and remunerates that person or expressly or tacitly undertakes to remunerate him, but excludes a labour broker as defined in Section 1(1) of the Labour Relations Act, 1956 (Act No 28 of 1956).

2.2. MANDATORY : includes an agent, a contractor or a sub-contractor for word, but without derogating from his status in his own right as an employer or a user.

3. ARRANGEMENTS AND PROCEDURES:

3.1. The MANDATORY as an employer in his own right, undertakes to acquaint the appropriate officials and employees of the MANDATORY with all relevant provisions of the Act and the regulations promulgated in terms of the Act;

3.2. The MANDATORY undertakes that all relevant duties, obligations and prohibitions imposed in terms of the Act and Regulations will be fully complied with;

3.3. The MANDATORY hereby accepts sole liability for such due compliance with the relevant duties, obligations and prohibitions imposed by the Act and Regulations and expressly absolves the EMPLOYER from itself being obliged to comply with any of the aforesaid duties, obligations and prohibitions; and

3.4. The MANDATORY agrees that any duly authorised officials of the EMPLOYER shall be entitled, although not obliged, to take such steps as may be necessary to ensure that the MANDATORY has complied with his

undertakings as set out more fully in paragraphs 1 and 2 above, which steps may include, but not be limited to, the right to inspect any appropriate site or premises.

3.5. The MANDATORY undertakes to furnish the EMPLOYER with a letter of good standing in terms of Section

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

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C2.1: 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
m ²	=	square metre
m ² -pass	=	square metre-pass
m ³	=	cubic metre
m ³ -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

1.3 Nett Measurement

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

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.

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

3. ADDITIONAL PAYMENT DESCRIPTIONS

3.1 For Trenchless Works

- a. Geotechnical Investigations..... Unit : Provisional Sum

The provisional sum will cover the cost of a geotechnical investigation at the 3 road crossings.

- b. Topographical Investigations..... Unit : Provisional Sum

The provisional sum will cover the cost of a topographical investigation at the 3 road crossings.

- c. Horizontal Directional Drilling Unit : Provisional Sum

The provisional sum will cover the cost of constructing the 3 road crossings by the horizontal directional drilling method.

- d. Contractors management and overhead on items a) to c)..... Unit : %

The rate tendered will include for the contractors arrangement, management and overheads to effect the works under items a) to c). This to include obtaining 3 quotes for each item for approval by the Employers Agent prior to the works being done. To include compiling a data pack from the output of items a) and b) to be used in obtaining quotes for item c).

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY
PART A : PRELIMINARY AND GENERAL

SECTION 1: PRELIMINARY AND GENERAL

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
A1	SABS 1200A/AB		SECTION 1 : PRELIMINARY AND GENERAL					
A1.1	8.3		FIXED-CHARGED AND VALUE RELATED ITEMS					
A1.1.1	8.3.1		Contractual requirements	Sum	1.0			
A1.1.2	8.3.2.2		Facilities for Contractor					
A1.1.2.1			(a) Offices and storage sheds	Sum	1.0			
A1.1.2.2			(b) Workshops	Sum	1.0			
A1.1.2.3			(e) Ablution and latrine facilities	Sum	1.0			
A1.1.2.4			(f) Tools and equipment	Sum	1.0			
A1.1.2.5			(g) Water supplies, electric power and Communications	Sum	1.0			
A1.1.2.6			(h) Dealing with water	Sum	1.0			
A1.1.2.7			(i) Access	Sum	1.0			
A1.1.3			Other fixed-charge obligations	Sum	1.0			
A1.1.4	PSA.8.3.4		Removal of Contractor's site establishment on completion	Sum	1.0			
A1.1.5	PSA.8.3.2.1		Facilities for Engineer					
A1.1.5.1			(a) Allowanance for refurbishment of existing facilities	Prov Sum	50 000.00	1.00	50 000	00
A1.1.5.2			(b) Contractors overhead and markup on (a)	%	50 000.0			
A1.1.5.3			(c) Name Board (1No.)	No	1.0			
A1.1.5.4			(d) Survey Equipment	Sum	1.0			
A1.2	8.4		TIME RELATED ITEMS					
A1.2.1	8.4.1		Contractual Requirements	Sum	1.0			
	8.4.2		Operation and maintenance of facilities on the site for duration of construction except where otherwise stated:					
A1.2.2	8.4.2.2		Facilities for Contractor					
A1.2.2.1			(a) Offices and storage sheds	Sum	1.0			
Total Carried Forward								

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY
PART A : PRELIMINARY AND GENERAL

SECTION 1: PRELIMINARY AND GENERAL

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
Brought Forward								
A1.2.2.2			(b) Workshops	Sum	1.0			
A1.2.2.3			(c) Ablution and latrine facilities	Sum	1.0			
A1.2.2.4			(d) Tools and equipment	Sum	1.0			
A1.2.2.5			(e) Water supplies, electrictric power and communications	Sum	1.0			
A1.2.2.7			(g) Access	Sum	1.0			
A1.2.3	8.4.3		Supervision and construction management for the duration of construction	Sum	1.0			
A1.2.4	8.4.4		Company and Head Office overhead costs for the duration of the contract	Sum	1.0			
A1.2.5	PSA.8.4.2		Facilities for Engineer					
A1.2.5.1			(a) Maintain Engineer's Offices	Sum	1.0			
A1.2.5.2			(c) Name Board	No.	1.0			
A1.2.5.3			(d) Survey assistants and Equipment	Sum	1.0			
A1.2.5.4			(e) Maintain Car Ports (4 No.)	Sum	1.0			
A1.2.5.5			(f) Toilets (Provisional)	Sum	1.0			
A1.2.5.6			(g) Maintain Conservancy Tank and Water Supply	Sum	1.0			
A1.2.5.7			(h) Training venue facility	Sum	1.0			
A1.2.5.8			Accommodation for the Engineer's Representative or travel in lieu	Prov. sum	750 000.00			
A1.2.6	8.4.5		Other time-related obligations	Sum	1.0			
A1.2.7	PSA.8.5.2		Principal Controlled Construction Insurance (PCCI)					
A1.2.7.1			(a) Cost of PCCI	Prov. sum	350 000.00	1.00	350 000	00
A1.2.7.2			(b) Overheads and mark-up	%	350 000.00			
A1.2.8			Seconded Staff					
A1.2.8.1			Provision for wages of allocated KCDM students	Prov. sum	252 000.00	1.00	252 000	00
Total Carried Forward								

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY
PART A : PRELIMINARY AND GENERAL

SECTION 1: PRELIMINARY AND GENERAL

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
Brought Forward								
A1.2.8.2	PSA.8.8.7		Contractors overhead and profit on A 1.2.8.1 %	%	252 000.00			
A1.3			Dealing with property owners					
A1.3.1			(i) Administration of property owners, access clearance and works satisfaction forms.	Sum	1.0			
			(ii) Detailed Digital Survey	Sum	1.0			
A1.4	8.8		TEMPORARY WORKS					
A1.4.1			Dealing with traffic					
A1.4.1.1	PSA.8.8.2		(a) Accommodation of traffic	Sum	1.0			
A1.5	PSA.8.8.4		Existing Services					
A1.5.1			(a) Penalty for late completion of emergency repairs, per event	Sum		-6 125.00	Rate Only	
A1.5.2			(b) Penalty for late completion of emergency repairs (per hour)	Sum		-1 225.00	Rate Only	
A1.5.3			(c) Supply and store on site, the following items for the emergency repair of the existing uPVC ND160 and ND250 rising main and handover to Employer after completion if not used:					
			(ii) ND160 class 20	m	12.0			
			(iv) ND160 VJ Sleeve Coupling PN20	No	4.0			
			(ii) ND250 class 20	m	24.0			
			(iv) ND250 VJ Sleeve Coupling PN20	No	4.0			
A1.5.4			(g) Penalty for illegal connection to water main	No		-6 125.00	Rate Only	
A1.5.5			(h) Penalty for interruption to existing water supply without permission	No		-6 125.00	Rate Only	
A1.6	PSA.8.8.1		Providing Access	Sum	1.0			
A1.7			COMMUNITY LIAISON					
A1.7.1	PA3.4		Provision of CLO and PSC	Prov. sum	525 000.00	1.00	525 000	00
Total Carried Forward								

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
 LOCAL MUNICIPALITY
 PART A : PRELIMINARY AND GENERAL

SECTION 1: PRELIMINARY AND GENERAL

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
Brought Forward								
A1.7.2			Overheads cost and mark up	%	525 000.00			
Total Carried Forward To Summary								

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA

LOCAL MUNICIPALITY

PART B : BULK AND RETICULATION MAINS:

SECTION 1 : SITE CLEARANCE

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
B1	SANS 1200C		SECTION 1 : SITE CLEARANCE					
B1.1			SITE CLEARANCE					
B1.1.1	8.2.1	LI	Clear and grub	ha	3.2			
	8.2.2		Remove and grub trees of girth					
B1.1.2			a) over 1.0m up to and including 2.0m	No.	50.0			
B1.1.3	8.2.10	LI	Remove topsoil to nominal depth of not greater than 300mm, stockpile and maintain	m³	960.0			
B1.1.4			Borrow topsoil from stockpile and place 150mm thick	m³	960.0			
B1.2			FENCES					
		LI	Take down existing fences					
B1.2.1		LI	Strand of plain <2.5mm Galv wire	m	585.0			
B1.2.2		LI	Strand of plain 3.15mm Galv wire	m	585.0			
B1.2.3		LI	Strand of barbed wire	m	585.0			
B1.2.4		LI	Mesh welded or woven	m	585.0			
B1.2.5		LI	Timber Posts in concrete	No	40.0			
B1.2.6		LI	Timber Posts in soil	No	40.0			
B1.2.7		LI	Droppers	No	150.0			
	PSC.8.2.5	LI	Re-instate fences previously taken down					
B1.2.1		LI	Strand of plain <2.5mm Galv wire	m	585.0			
B1.2.2		LI	Strand of plain 3.15mm Galv wire	m	585.0			
B1.2.3		LI	Strand of barbed wire	m	585.0			
B1.2.4		LI	Mesh welded or woven	m	585.0			
B1.2.5		LI	Timber Posts in concrete	No	40.0			
B1.2.6		LI	Timber Posts in soil	No	40.0			
B1.2.7		LI	Droppers	No	150.0			
	PSC.8.2.5	LI	Makeup deficiency in materials allow 15% loss					
Total Carried Forward								

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY

PART B : BULK AND RETICULATION MAINS:

SECTION 1 : SITE CLEARANCE

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT		
							R	c	
Brought Forward									
B1.2.1	PSC. 8.2.11 PSC. 8.2.12 PSC. 8.2.13	LI	Strand of plain <2.5mm Galv wire	m	88.0				
B1.2.2		LI	Strand of plain 3.15mm Galv wire	m	88.0				
B1.2.3		LI	Strand of barbed wire	m	88.0				
B1.2.4		LI	Mesh welded or woven	m	88.0				
B1.2.5		LI	Timber Posts in concrete	No	6.0				
B1.2.6		LI	Timber Posts in soil	No	6.0				
B1.2.7		LI	Droppers	No	23.0				
				Transplant, maintain and later reinstate					
B1.2.8		LI	Formal Hedges	m	100.0				
B1.2.9		LI	Temporary fencing closures	m	500.0				
B1.2.10				Demarcation of servitude by stakes (Provisional)	m	8 400.0			
				Demarcation of servitude by wire fence					
B1.2.11				a) Supply of materials	m	800.0			
B1.2.12		LI	b) Erection of fencing	m	800.0				
B1.2.13		LI	c) Take down fencing	m	800.0				
Total Carried Forward To Summary									

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY

PART B : BULK AND RETICULATION MAINS:

SECTION 2 : EARTHWORKS PIPE TRENCHES

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
B2	SANS 1200DB 1989		SECTION 2 : EARTHWORKS PIPE TRENCHES					
B2.1			EXCAVATION					
B2.1.1	8.3.2(a)		a) Excavate, in all materials for trenches, backfill, compact, topsoil and dispose of surplus material:					
B2.1.1.1			For pipes up to DN250, up to 850mm wide trench					
			i) Over 1,0m and up to 2,0m	m	2 400.0			
			ii) Over 2,0m and up to 3,0m	m	6 000.0			
B2.1.3	8.3.2(a)		b) Extra-over Item 8.2.3 (a) for excavation in :					
			ii) Hard rock excavation	m ³	2 300.0			
B2.1.4	8.3.2(c)	LI	c) Excavation and disposal of unsuitable soft material from trench bottom and replace with suitable (Provisional)	m ³	504.0			
B2.1.5	PSDB. 8.3.3.5	LI	d) Extra over Item 8.2.3 (a) for Soilcrete backfill (5% cement by weight)	m ³	100.0			
B2.2			EXCAVATION ANCILLARIES					
B2.2.1	PSD8.3.8.1	LI	Excavate by hand in soft materials to expose services	m ³	85.0			
B2.2.2			Make up deficiency in backfill material. (Provisional)					
	8.3.3.1(c)		c) By importation from commercial	m ³	2 300.0			
B2.2.3			Compaction in road reserves					
	8.3.3.3		i) Compaction under roadways and farm tracks to 95% MOD AASHTO density.	m ³	100.0			
B2.2.4	8.3.3.4		Long Overhaul:	m ³ km	4 285.0			
B2.3			SERVICES					
			Existing services that intersect or adjoin a pipe trench.					
B2.3.1	8.3.5(a)		b) Services that intersect a trench					
Total Carried Forward								

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY

PART B : BULK AND RETICULATION MAINS:

SECTION 2 : EARTHWORKS PIPE TRENCHES

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
Brought Forward								
B2.3.2	8.3.5(b)		i) Watermains DN25 up to DN160	No	60.0			
			ii) Watermains DN200 up to DN 450	No	4.0			
			i) Watermains DN500 up to DN1500	No	2.0			
			iii) Electricity cables (singly or in groups) (Provisional)	No	20.0			
			iv) Telkom cables (singly or in groups) (Provisional)	No	5.0			
			v) Stormwater pipe up to DN350 (Provisional)	No	2.0			
			vi) Stormwater pipes greater than DN350 up to DN600 (Provisional)	No	5.0			
			vii) Stormwater pipes greater than DN600 up to DN1200 (Provisional)	No	5.0			
			c) Services that adjoin a trench:					
			i) Watermains DN25 up to ND90	m	500.0			
			ii) Watermains DN110	m	1 770.0			
			iii) Watermains DN160	m	1 770.0			
			iv) Watermains DN250	m	325.0			
			v) Watermains greater than DN300 up to DN1000 (Provisional)	m	4 200.0			
			vi) Water connections (Provisional)	m	500.0			
			vii) Electricity cables (singly or in groups) (Prov.)	m	100.0			
			viii) Electrical Cables Overhead	m	2 000.0			
			ix) Telkom cables (singly or in groups) (Provisional)	m	500.0			
		B2.4			x) Stormwater pipes up to DN350 (Provisional)	m	10.0	
	xi) Stormwater pipes greater than DN350 up to DN450 (Provisional)			m	50.0			
	FINISHING							
Total Carried Forward								

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY

PART B : BULK AND RETICULATION MAINS:

SECTION 2 : EARTHWORKS PIPE TRENCHES

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
Brought Forward								
B2.4.1	8.3.6		Reinstate road surfaces complete with all courses					
		LI	a) Gravel shoulders	m²	1 128.0			
			b) Asphalt 40 mm thick in roadways	m²	12.0			
			c) Gravel road	m²	100.0			
B2.5			MISCELLANEOUS					
B2.5.1	PSDB.8.6		Supply and install sack-breakers/cross walls in trenches for depths (Prov.):					
		LI	a) 0m to 1,0m	No	10.0			
		LI	b) 1,0m to 2,0m	No	15.0			
B2.5.2	PSDB.8.5		Construct cross-embankments where required with excess material from trenches (Provisional)					
		LI	a) 300mm high	m³	70.0			
		LI	b) 375mm high	m³	15.0			
		LI	c) 450mm high	m³	15.0			
Total Carried Forward To Summary								

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY

PART B : BULK AND RETICULATION MAINS:

SECTION 3 : GABIONS AND PITCHING

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
B3	SANS 1200D, DK & G		SECTION 3 : GABIONS AND PITCHING					
B3.1	SANS 1200D		EARTHWORKS					
	PSD.8.3.2(a)		a) Excavation in all materials and use for embankment or backfill or dispose as ordered for:					
B3.1.1			i) Excavation for open drains, gabions and pitching as directed by the engineer on site (Provisional)	m ³	100.0			
B3.2			IMPORTED MATERIAL					
B3.2.1	8.3.3(b)		a) Extra over for imported backfill materials from commercial min G7 material (Provisional)	m ³	50.0			
B3.3			OVERHAUL					
B3.3.1	8.3.6		Long Overhaul	m ³ km	200.0			
B3.4	SANS 1200DK		GABIONS					
B3.4.1	8.2.1		Surface preparation for bedding of gabions, Cavities filled with approved excavated material or rock.	m ²	110.0			
	8.2.2		Construct gabions using PVC-coated galvanized wire mesh					
B3.4.2		LI	b) Foundation mattresses of depth 0,3 m with diaphragms providing 2 m x 1 m cells	m ³	35.0			
B3.4.3		LI	c) Gabions of section 1,0 m x 1,0 m for walls	m ³	100.0			
	8.2.4		Geotextile non-woven polyester grade A4 placed where ground water seepage occurs					
B3.4.4			a) below foundation mattresses	m ²	120.0			
B3.4.5			b) backing to gabion baskets	m ²	130.0			
B3.5			PITCHING					
B3.5.1	8.2.5	LI	Ordinary pitching, of thickness at least 100 mm on slope of bank where instructed	m ²	50.0			
Total Carried Forward								

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY

PART B : BULK AND RETICULATION MAINS:

SECTION 3 : GABIONS AND PITCHING

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
Brought Forward								
B3.6	SANS 1200G		GROUTING					
B3.6.1	8.7	LI	a) Stiff grout over exposed surfaces of gabions and reno mattresses. (15Mpa)	m³	10.0			

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY

PART B : BULK AND RETICULATION MAINS:

SECTION 4 : PIPE BEDDING

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
B4	SABS 1200LB		SECTION 4 : PIPE BEDDING					
B4.1	PSLB 8.2.1		Provision of Bedding from Trench Excavations					
			a) Selected granular material					
B4.1.1		LI	i) For bedding cradle below and around pipe up to 100mm above pipe crown.	m ³	1 800.0			
B4.1.2		LI	ii) For 200mm fill blanket from 100mm above pipe crown.	m ³	1 050.0			
B4.1.3	PSLB.8.2.7		Extra over item 8.2.1 for sieving and screening					
B4.1.4		LI	(a) For yield over 80%	m ³	700.0			
B4.1.5		LI	(b) For yield between 60% and 80%	m ³	1 250.0			
B4.1.6		LI	(c) For yield between 40% and 60%	m ³	1 500.0			
	PSLB.8.2.2.3		From commercial sources					
		LI	a) Selected granular material					
B4.1.7		LI	i) For bedding cradle below and around pipe up to 100mm above pipe crown.	m ³	1 420.0			
			b) Selected fill material					
B4.1.8		LI	i) For 200mm fill blanket from 100mm above pipe crown.	m ³	1 200.0			
B4.1.9	PSLB. 8.2.2.3	LI	c) 19mm single size stone (Provisional)	m ³	46.0			
B4.2			ENCASING PIPES					
	8.2.4		a) Grade 20/19 to:					
B4.2.1		LI	i) Pipes up to DN200	m ³	72.0			
			ii) Forming stops at joints or ends	No	10.0			
B4.3			OVERHAUL					
	8.2.5		Overhaul of material for bedding (Provisional)					
B4.3.1			a) Selected granular material	m ³ km	500.0			
Total Carried Forward								

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY

PART B : BULK AND RETICULATION MAINS:

SECTION 4 : PIPE BEDDING

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
Brought Forward								
B4.3.2	PSLB 8.2.6		b) Selected fill material	m³km	500.0			
B4.4			MISCELLANEOUS					
B4.4.1			Supply of geofabric					
			a) Geofabric non-woven polyester Grade A4 to stone bedding (Provisional)	m²	1 100.0			

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY

PART B : BULK AND RETICULATION MAINS:

SECTION 5 : MEDIUM PRESSURE PIPELINES

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
B5	SABS 1200 L		SECTION 5 : MEDIUM PRESSURE PIPELINES					
			PIPELINE					
B5.1	PSL.8.2.1	LI	Supply, handle, lay in flexible bedding, with joints, test, and disinfect					
B5.1.1			DN200 o-PVC Pipe for the following Classes					
		LI	a) Class 10	m	3 700.0			
		LI	b) Class 13	m	1 000.0			
		LI	c) Class 16	m	1 850.0			
		LI	d) Class 20	m	1 560.0			
		LI	e) Class 25	m	290.0			
B5.1.2			Hot Dip Galvanised Steel Pipes, flanged both ends, in 6m lengths to diameters and pressures of:					
B5.1.2.1			Heavy duty pipelines to SANS 716.					
			a) DN200 PN25	m	150.0			
B5.1.3	PSL.8.2.18		Extra-over item PSL.8.2.1 for laying pipes through sleeve pipes as shown on Dwg. No. 2142D/PH1/T/5801 REV D	m	90.0			
B5.1.3.1	LE.8.2.1		Supply, handle, lay and bed Class C. joint with O-G interlocking joints:					
			b) Precast Concrete Pipes					
		LI	i) DN375 CL100D	m	90.0			
B5.2			SPECIALS AND FITTINGS					
B5.2.1	PSL.8.2.2		Extra-over items 8.2.1 for supply and install:					
B5.2.1.1			For o-PVC Pipes (All SG Iron fittings to be epoxy coated)					
B5.2.1.1.1			o-Pvc Bends (PN16)					
			a) 200mm ø					
			i) 90 degree	No.	4.0			
Total Carried Forward								

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY

PART B : BULK AND RETICULATION MAINS:

SECTION 5 : MEDIUM PRESSURE PIPELINES

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
Brought Forward								
B5.2.1.2			ii) 45 degree	No.	9.0			
B5.2.1.2.1			iii) 22½ degree	No.	5.0			
B5.2.1.2.1.1			Hot Dip Galvanised Steel Fittings					
			Elbows - Flanged					
B5.2.1.3			DN200 PN25					
			a) >22.5<=45 deg bend	No	20.0			
			Flange adaptore DN200 PVC to DN200 steel pipes					
			a) DN200 PN25	No	25.0			
B5.3			b) DN200 PN16	No	8.0			
B5.3.1		PSL.8.2.2	PIPEWORK ASSEMBLIES					
B5.3.1.1			Extra over Item 8.2.1 for:					
			ISOLATING VALVES					
			On 0-PVC pipelines socketed wedge gate valve					
			a) 200 Ø					
			i) PN 16	No	6.0			
			PIPEWORK FOR AIR VALVE					
B5.4			Extra over Item PSL8.2.1 for air valves					
B5.4.1			Supply and install takeoffs for air valve assemblies as per Dwg 2142D/PH1/T/5809/REVD. Air valve assemblies paid elsewhere					
B5.4.1.1			a) DN200					
			i) T9	No	21.0			
B5.4.1			Supply and install air valve assemblies as per Dwg 2142D/PH1/T/5809/REVD					
			a) A4	No	15.0			
			b) A5	No	3.0			
			c) A10	No	2.0			
Total Carried Forward								

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY

PART B : BULK AND RETICULATION MAINS:

SECTION 5 : MEDIUM PRESSURE PIPELINES

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
Brought Forward								
B5.5	PSL.8.2.2		d) A11 PIPEWORK FOR SCOUR VALVE Extra over item PSL8.2.1 for scour valves	No	1.0			
B5.5.1			Supply and install takeoffs and scour assemblies as per Dwg No. 2142D/PH1/T/5806/REVD Typical Details Scour Valves for combinations:					
B5.5.1.1			On DN200 oPVC PN16 with					
B5.5.1.2			a) DN100 Scour	No	9.0			
B5.5.1.2			On DN200 oPVC PN25 with					
B5.5.1.2			a) DN100 Scour	No	3.0			
B5.6			PIPEWORK FOR TAKEOFF CHAMBER					
B5.6.1			Item 1 DN500 blank flange	No	1.0			
B5.6.2			Item 2 T piece concentric reducer all flanged DN500 X DN150	No	1.0			
B5.6.3			Item 3 Resiliant Gate Valve PN16 flanged both ends (FBE)	No	1.0			
B5.6.4			Item 4 DN150 Spool pipe (f.b.e) (length = 750mm)	No	1.0			
B5.6.5			Item 5 DN150 Flow meter (FBE)	No	1.0			
B5.6.6			Item 6 DN150 Spool pipe (FOE) POE with DN100 flanged offtake for air valve (length =975)	No	1.0			
B5.6.7			Air Valve Assembly A4	No	1.0			
B5.6.8			Sleeve type adaptor DN150 flange to DN150 plain	No	1.0			
B5.6.9			DN150/DN200 Spool piece with concentric reducer, puddle flange, flanged (FBE) (length = 620mm)	No	1.0			
B5.6.10			DN200 sleeve type adaptor	No	1.0			
B5.6.11			DN500 spool pipe,FBE with puddle flanges	No	1.0			
Total Carried Forward								

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY

PART B : BULK AND RETICULATION MAINS:

SECTION 5 : MEDIUM PRESSURE PIPELINES

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
Brought Forward								
B5.6.12	8.2.13		Anchor/Thrust Blocks As per Dwg No.No. 2142D/PH1/T/5810/REVA					
B5.6.13			e/o trench excavation for thrust blocks	m³	40.0			
B5.6.14			Concrete Class 25/19Mpa	m³	62.0			
B5.6.15			Formwork	m²	55.0			
B5.7			CHAMBERS AND MANHOLES					
B5.7.1			a) Isolating valve chamber to isolating valve up to DN250 complete as detailed on Dwg. No. 2142D/PH1/T/5806/REVD					
		LI	i) For depths up to 1.5m	No	6.0			
B5.7.2			b) Air valve chamber complete as detailed on Dwg No. 2142D/PH1/T/5809/REVD					
		LI	i) For depths up to 1.5m	No	20.0			
B5.8			Masonry Chambers					
B5.8.1			as used at Scours, etc including additional excavation, the floor slabs, walls , cover slab and access lid complete as per drawings for sizes					
B5.8.1.1			LI 1000 < W < 1200, 1400 < L < 1600, H < 1500	No	18.0			
B5.8.1.2			2600 < W < 2800, 4000 < L < 4200	No	4.0			
B5.9			e/o B5.8 for pipe anchors cast in wall for dia:					
B5.9.1			< = 200Ø	No	44.0			
			200Ø > = 500Ø	No	2.0			
B5.10			e/o B5.8 for supply and cast in vents					
B5.10.1			50Ø	No	6.0			
B5.10.2		100Ø	No	15.0				
		CORROSION PROTECTION						
Total Carried Forward								

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY

PART B : BULK AND RETICULATION MAINS:

SECTION 5 : MEDIUM PRESSURE PIPELINES

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
Brought Forward								
B5.11	8.2.15		Supply all materials, plant and labour and field wrap burried fittings with ""Denso"" tape (or similar approved) including for 100mm on either side of fitting concerned for:					
B5.11.1			Flanged Joints for Dia:					
B5.11.1.1			DN100	No	24.0			
B5.11.1.2			DN200	No	96.0			
B5.12			400mm wide strip of Coal Tar Epoxy coating to galvanised fittings cast into concrete for Dia:					
B5.12.1			DN100	No	62.0			
B5.12.2			DN200	No	7.0			
B5.12.3			DN500	No	2.0			
B5.13			MISCELLANEOUS					
B5.14	PSL.8.2.17		Marker posts as detailed on Dwg. No. 2142D/PH1/T/5802/REVD					
B5.14.1			To include for the supply and installation including foundation of posts and directional markings and painting after installation					
		LI	a) Pipeline marker posts	No	168.0			
		LI	b) Valve marker posts (Scour, Isolating and Air)	No	29.0			
	SANS 1200G		CONCRETE (STRUCTURAL)					
	8.2.6		Demolish existing wall to form a boxout hole for DN500 steel pipe reinforcement preserved for re-use					
			a) Large, square, of area over 0.5m ² and up and including to 1 m ² ,depth 0m to 0.5m	No	1.0			
	8.2		Formwork					
	8.22		Smooth to Vertical faces					
			a) To box-out repairs	m ²	2.0			
Total Carried Forward								

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY

PART B : BULK AND RETICULATION MAINS:

SECTION 5 : MEDIUM PRESSURE PIPELINES

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
Brought Forward								
B5.16	PSG8.10		Reinforcement infilling of box outs in walls around pipes					
			a) High tensile steel (Y-bars)	t	0.05			
			CONCRETE					
	8.4		Strength concrete Grade 30/19:					
			a) To box-out repairs	m³	1.0			
	PSL 8.2.19		Grouting of sleeved pipes					
			a) Pressure injected concrete grouting MPa 15	m³	5.0			
			b) Other as required	m³	5.0			
Total Carried Forward To Summary								

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY

PART B : BULK AND RETICULATION MAINS:

SECTION 6 : TRENCHLESS 3 X ROAD CROSSINGS

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
B6	C2.1 - 3.1		SECTION 6 : TRENCHLESS 3 X ROAD CROSSINGS					
B6.1			Detail Geotechnical Survey	Prov Sum	75 000.0	1.00	75 000	00
B6.2			Detail Topographical Survey	Prov Sum	60 000.0	1.00	60 000	00
B6.3			Horizontal Directional Drilling	Prov Sum	900 000.0	1.00	900 000	00
B6.4			Contractors Markup on items B6.1 to B6.3	%	1 035 000.0			
Total Carried Forward To Summary								

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY

PART B : BULK AND RETICULATION MAINS:

SECTION 7 : REHABILITATION

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
B7			SECTION 7 : REHABILITATION					
B7.1	PSD.8.3.12a		Ripping of compacted and disturbed areas to 150mm depth on designated areas	m ²	32 000.0			
B7.2	PSD.8.3.12b	LI	Hand trimming	m ²	12 600.0			
B7.3	PSD.8.3.12c	LI	Topsoiling	m ²	6 300.0			
B7.4	PSD.8.3.12d	LI	Alien vegetation clearing programme	m ²	12 600.0			
B7.5	PSD.8.3.12e		Fertilizer	t	1.2			
B7.6	PSD.8.3.12f		Hydroseeding	m ²	2 000.0			
B7.7	PSD.8.3.12g		Mulching	m ²	2 000.0			
B7.8	PSD.8.3.11a	LI	Seed collection and storage	Prov Sum	10 000.0	1.00	10 000	00
B7.9	PSD.8.3.11b	LI	Search rescue	No	70.0			
Total Carried Forward To Summary								

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY

PART C: COMPLIANCE OBLIGATIONS, DAYWORKS AND TRAINING AND CAPACITY

SECTION 1 : OCCUPATIONAL HEALTH AND SAFETY OBLIGATIONS

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
C1	PD2		SECTION 1 : OCCUPATIONAL HEALTH AND SAFETY OBLIGATIONS					
C1.1			Contractor's initial obligation in respect of the Occupational Health and Safety Act and Construction Regulations	Sum	1.0			
C1.1.1			Contractor's time related obligations in respect of the Occupational Health and Safety Act and Construction Regulations	Sum	1.0			
C1.1.2			Penalty for late submission of the Health and Safety File (a) Initial once off penalty	No		-5 000.00	Rate Only	
C1.1.3			(b) Time related penalty	Week		-10 000.00	Rate Only	
Total Carried Forward To Summary								

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY

PART C: COMPLIANCE OBLIGATIONS, DAYWORKS AND TRAINING AND CAPACITY

SECTION 2 : ENVIRONMENTAL MANAGEMENT PLAN OBLIGATIONS

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
C2	PE2		SECTION 2 : ENVIRONMENTAL MANAGEMENT PLAN OBLIGATIONS					
C2.1			COMPLIANCE WITH ENVIRONMENTAL MANAGEMENT PLAN (EMP)					
C2.1.1			Contractor's initial obligation in respect of compliance with the Environmental Management Plan	Sum	1.0			
C2.1.2			Contractor's time related obligations in respect of the Environmental Management Plan and Environmental Regulations	Sum	1.0			
C2.1.3			Provision of Environmental Liason Officer (ELO)	month	24.0			
C2.2			TRANSGRESSION FINES					
			Fine for transgression of the Environmental Management plan (EMP)					
C2.2.1			(a) Any persons, vehicles, plant or anything related to the Contractor's operations within the designated boundaries of a No-Go area	No		-1 000.00	Rate Only	
C2.2.2			(b) Any vehicle driving in excess of designated speed limits	No		-1 000.00	Rate Only	
C2.2.3			(c) Any vehicle being driven, and items of plant or materials being parked or stored outside the demarcated boundaries of the site	No		-1 000.00	Rate Only	
C2.2.4			(d) Persons walking outside the demarcated boundaries of the site	No		-500.00	Rate Only	
C2.2.5			(e) Persistent and un-repaired oil leaks from machinery	No		-2 000.00	Rate Only	
C2.2.6			(f) The use of inappropriate methods of refuelling	No		-1 000.00	Rate Only	
C2.2.7			(g) Litter on the site	No		-1 000.00	Rate Only	
C2.2.8			(h) Deliberate lighting of illegal fires on site	No		-10 000.00	Rate Only	
Total Carried Forward								

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY

PART C: COMPLIANCE OBLIGATIONS, DAYWORKS AND TRAINING AND CAPACITY

SECTION 2 : ENVIRONMENTAL MANAGEMENT PLAN OBLIGATIONS

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
Brought Forward								
C2.2.9			(i) The eating of meals on site outside the defined eating areas	No		-100.00	Rate Only	
C2.2.10			(j) Individuals not making use of the site ablution facilities	No		-500.00	Rate Only	
C2.2.11			(k) Dust or excessive noise on or emanating from the site	No		-500.00	Rate Only	
C2.2.12			(l) Any person, vehicle, item of plant, or anything related to the contractors operations causing a public nuisance	No		-500.00	Rate Only	
C2.3			PENALTIES FOR GENERAL NON COMPLIANCE					
			Penalties for non-compliance with the Environmental Management Plan (EMP)					
C2.3.1			(a) Nominal rehabilitation cost of erosion	Prov Sum	-20 000.0	1.00	Rate Only	
C2.3.2			(b) Additional penalty on D2.3.1	%	0.0	5.00		
C2.3.3			(c) Cleanup of oil spills	Prov Sum	-20 000.0	1.00	Rate Only	
C2.3.4			(d) Additional penalty on D2.3.3	%	0.0	5.00		
C2.3.5			(e) Restoration of damage to indigenous vegetation	Prov Sum	-20 000.0	1.00	Rate Only	
C2.3.6			(f) Additional penalty on D2.3.5	%	0.0	5.00		
C2.3.7			(g) Restoration of damage to sensitive environments	Prov Sum	-20 000.0	1.00	Rate Only	
C2.3.8			(h) Additional penalty on D2.3.7	%	0.0	5.00		
C2.3.9			(i) Damage to cultural/historical sites	No		-10 000.00	Rate Only	
C2.4			PENALTIES FOR UNAUTHORISED TREE REMOVAL OR DAMAGE					
			Penalties for General Non-compliance					
C2.4.1			(a) Girth 0-100mm	No		-1 000.00	Rate Only	
C2.4.2			(b) Girth 101-150mm	No		-2 000.00	Rate Only	
C2.4.3			(c) Girth 150-300mm	No		-5 000.00	Rate Only	
Total Carried Forward								

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY

PART C: COMPLIANCE OBLIGATIONS, DAYWORKS AND TRAINING AND CAPACITY

SECTION 2 : ENVIRONMENTAL MANAGEMENT PLAN OBLIGATIONS

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
Brought Forward								
C2.4.4			(d) Girth larger than 300mm	No		-10 000.00	Rate Only	
C2.5			PENALTIES FOR OTHER INCIDENTS					
C2.5.1			(a) Failure to stockpile materials correctly	No		-1 000.00	Rate Only	
C2.5.2			(b) Pollution of water bodies	No		-10 000.00	Rate Only	
C2.5.3			(c) Failure to control stormwater runoff	No		-5 000.00	Rate Only	
C2.5.4			(d) Failure to reinstate disturbed areas within 3 months of completion	No		-50 000.00	Rate Only	
C2.5.5			(e) Any other contravention of the enviromental specification	No		-20 000.00	Rate Only	
Total Carried Forward To Summary								

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY

PART C: COMPLIANCE OBLIGATIONS, DAYWORKS AND TRAINING AND CAPACITY

SECTION 3: ACCEPTANCE TESTING OBLIGATIONS

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
C3			SECTION 3: ACCEPTANCE TESTING OBLIGATIONS					
C3.1	PSA.8.5.1		Additional tests ordered by the Engineer					
C3.1.1			a) Establishment on site	Prov Sum	25 000.00	1.00	25 000	00
C3.1.2			b) Testing staff	Prov Sum	80 000.00	1.00	80 000	00
C3.1.3			c) Pipe Testing	Prov Sum	50 000.00	1.00	50 000	00
C3.1.4			d) Soil & Concrete Testing	Prov Sum	50 000.00	1.00	50 000	00
C3.1.5			e) Provision of Troxler on site	Prov Sum	45 000.00	1.00	45 000	00
C3.1.6			f) Overheads cost and mark-up	%	250 000.00			
Total Carried Forward To Summary								

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY

PART C: COMPLIANCE OBLIGATIONS, DAYWORKS AND TRAINING AND CAPACITY

SECTION 4: DAYWORK SCHEDULE

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
C4			SECTION 4: DAYWORK SCHEDULE					
C4.1			PLANT					
C4.1.1			Lowbed transport to and from site	t.km	4 000.0			
C4.1.2			Bulldozer and ripper (CAT D6 or equivalent)	hrs	30.0			
C4.1.3			Front end loader (CAT 950 or equivalent)	hrs	30.0			
C4.1.4			Backactor excavator (Hitachi EX200 or equivalent)	hrs	30.0			
C4.1.5			TLB	hrs	30.0			
C4.1.6			Mobile crane 6 ton)	hrs	30.0			
C4.1.7			Grader (type 120G or equivalent)	hrs	30.0			
C4.1.8			Roller (10 ton)	hrs	30.0			
C4.1.9			Tipper truck (10m3)	hrs	30.0			
C4.1.10			Tipper truck (6m3)	hrs	30.0			
C4.1.11			Crane truck (6 ton)	hrs	30.0			
C4.1.12			Water cart/truck (12 000 litres)	hrs	30.0			
C4.1.13			Water cart/truck (7 000 litres)	hrs	30.0			
C4.1.14			LDV (1 ton or equivalent)	hrs	30.0			
C4.1.15			Pedestrian roller	day	20.0			
C4.1.16			Trench compactor	day	20.0			
C4.1.17			Compressor with 2 breakers and 2 operators	day	10.0			
C4.1.18			Water pump	day	10.0			
C4.2			LABOUR					
C4.2.1			Field Surveyor	hrs	20.0			
C4.2.2			Foreman	hrs	10.0			
C4.2.3			Skilled Labourer	hrs	20.0			
C4.2.4			Semi-skilled Labourer	hrs	30.0			
C4.2.5			Unskilled Labour	hrs	50.0			
Total Carried Forward								

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY

PART C: COMPLIANCE OBLIGATIONS, DAYWORKS AND TRAINING AND CAPACITY

SECTION 4: DAYWORK SCHEDULE

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
Brought Forward								
C4.3.1			Dayworks not included above, calculated with GCC6.5.1.2	Prov Sum	500 000.00	1.00	500 000	00
C4.3.2			The percentage allowance to cover the Contractors profit and superintendence on Dayworks i.t.o. GCC cl 6.5.1.2.3	%	500 000.00			

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY

PART C: COMPLIANCE OBLIGATIONS, DAYWORKS AND TRAINING AND CAPACITY

SECTION 5: TRAINING AND CAPACITY BUILDING

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
C5	PA3		SECTION 5: TRAINING AND CAPACITY BUILDING					
C5.1			REQUIREMENTS OF THE EXPANDED PUBLIC WORKS PROGRAMME (EPWP)					
C5.1.1			Payments associated with Training of the local workers programme:					
			a) Provision of the following:					
			i) Prescribe tool	Prov Sum	160 000.00	1.00	160 000	00
			ii) EPWP PPE branded apparel	Prov Sum	160 000.00	1.00	160 000	00
			b) Provision, erection and removal of EPWP signboard	Prov Sum				
			c) Handling costs and profit in respect of subitems PB.2.7.1a) and (b)	%	340 000.00			
C5.1.2			Payments associated with Training of the local workers programme:					
			a) Provision of training by an accredited training provider including training material in the form of manuals, stationery etc	Prov Sum	100 000.00	1.00	100 000	00
			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	100 000.00	1.00	100 000	00
			c) Handling costs and profit in respect of subitems PB.2.7.2 (a) and (b) above	%	200 000.00			
C5.2			COMPLIANCE WITH EXPANDED PUBLIC WORKS PROGRAMME (EPWP)					
			(a) Contractor's obligation in respect of compliance with the Expanded Public Works Program (EPWP)	Sum	1.0			
			(b) Contractor's time related obligations in respect of compliance with the Expanded Public Works Program (EPWP)	Sum	1.0			
Total Carried Forward To Summary								

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY

PART C: COMPLIANCE OBLIGATIONS, DAYWORKS AND TRAINING AND CAPACITY

SECTION 6: DEVELOPMENT MENTORSHIP AND SKILLS PROGRAM

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
C6	PB10		SECTION 6: DEVELOPMENT MENTORSHIP AND SKILLS PROGRAM					
C6.2			Construction Works for Targeted Sub-contractors					
C6.2.1			a) Contractor's charge for the management of the Targeted Subcontractors appointed in terms of Part PC may not be more than 10% of the value allocated to targeted sub contractors	Sum	1.0			
C6.2.2			b) Supply of materials and small plant to assist Targeted Subcontractors appointed in terms of Part PC	Sum	1.0			
C6.3			TRANSGRESSION FINES					
C6.3.1			(a) Non-compliance with the Development Mentorship and Skills Program	No	1.0	-250 000.00	Rate Only	
C6.4			Training and Mentoring of learners employed by Targeted Sub-contractors					
C6.4.1			a) Generic Skills					
			i) Training Costs	PC Sum	90 000.00	1.00	90 000	00
			ii) Handling Cost and profit in respect of subitem C6.4.1 (a) (i)	%	90 000.00			
C6.4.2			b) Entrepreneurial skills					
			i) Training Costs	PC Sum	90 000.00	1.00	90 000	00
			ii) Handling Cost and profit in respect of subitem C6.4.2 (b) (i)	%	90 000.00			
C6.4.3			(c) Engineering skills					
			i) Training costs	PC Sum	90 000.00	1.00	90 000	00
			i) Handling Cost and profit in respect of subitem C6.4.3 c (i)	%	90 000.00			
C6.4.4			d) Transportation and accommodation costs for selected learners only, while receiving off-site training					
Total Carried Forward								

TENDER FOR THE BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA
LOCAL MUNICIPALITY

PART C: COMPLIANCE OBLIGATIONS, DAYWORKS AND TRAINING AND CAPACITY

SECTION 6: DEVELOPMENT MENTORSHIP AND SKILLS PROGRAM

ITEM NO	PAYMENT	LIC	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
							R	c
Brought Forward								
			i) Transportation and accommodation costs	Prov Sum	65 000.0	1.00	65 000	00
			ii) Handling cost and profit in respect of subitems C6.4.4 (d) (i)	%	65 000.00			

C2.2: BILLS OF QUANTITIES

C2.2.1 SUMMARY OF SECTIONS

PART A: PRELIMINARY AND GENERAL

1. : Preliminary and General R

TOTAL PART A: PRELIMINARY AND GENERAL TO SUMMARY OF SCHEDULES

R

PART B: BULK GRAVITY MAIN

1. : Site Clearance R

2. : Earthworks, Pipe Trenches R

3. : Gabions and Pitching R

4. : Pipe Bedding R

5. : Medium Pressure Pipelines R

6. : Trenchless Road Crossings R

7. : Rehabilitation R

TOTAL PART B: BULK GRAVITY MAIN TO SUMMARY OF SCHEDULES

R

PART C: COMPLIANCE OBLIGATIONS, DAYWORKS AND TRAINING

1. : Occupational Health and Safety Obligations R

2. : Environmental Management Plan Obligations R

3. : Acceptance Testing Obligations R

4. : Dayworks Schedule R

5. : Training and Capacity Building R

6. : Development Mentorship and Skills Programme R

TOTAL PART C: COMPLIANCE OBLIGATIONS, DAYWORKS AND

TRAINING TO SUMMARY OF SCHEDULES

R

SUMMARY OF SCHEDULE OF QUANTITIES**CALCULATION OF TENDER SUM**

TOTAL PART A : PRELIMINARY AND GENERAL R

TOTAL PART B : BULK GRAVITY MAINS R

TOTAL PART C : COMPLIANCE OBLIGATIONS, DAYWORKS AND TRAINING R

SUB TOTAL 1 R**CONTINGENCY AT 10%** (*Show 10% of the Sub-Total 1*) R**SUB TOTAL 2** R**CONTRACT PRICE ADJUSTMENT AT 6%** (*Show 6% of the Sub-Total 2*) R**SUB TOTAL 3** R**VAT AT 15%** (*Show 15% of the Sub-Total 3*) R**TOTAL OF SCHEDULE OF QUANTITIES CARRIED TO
FORM OF OFFER (FORM C1.1)** R

SIGNATURE OF TENDERER.....

ON BEHALF OF.....

PART C3: SCOPE OF WORKS

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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 Middledrift Sub Supply Area 3.

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 portions of the regional bulk supply pipe to SSA 3. Connecting to an existing reservoir and tie in with previous phase.

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 installation of approximately 8.4km of oPVC bulk pipeline of 200mm diameter;
- b. The new connection manifold and manhole at the clearwater reservoir;
- c. The installation of galvanised steel pipe on river crossings;
- d. The installation of several road crossings by pipe jacking or drilling;
- e. Supply and installation of associated valves and specials;
- f. Construction of concrete and masonry chambers.

1.4 Location of the Works

Drawing 2142D/PH 1/D/5011 indicates the location of the works.

The works is located:

- about 55km west of Eshowe via the P50, P15, and P706; or
- about 44km east of Kranskop via the P15 and P706.
- The co-ordinate for the CH0 is 28°49'29"S 31°08'55"E
- The co-ordinate for the CH 8400 is 28°49'10"S 31°04'38"E

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 HDD contractor will be responsible for the detail design of each trenchless crossing.

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 DISCRPTION	DWG. NUMBER
Overall Site Plan Layout	2142D/PH 1/T/5011/REVD
Regional Bulk Supply Pipeline Sheet 01 of 22	2142D/PH 1/T/5101/REVF
Regional Bulk Supply Pipeline Sheet 02 of 22	2142D/PH 1/T/5102/REVF
Regional Bulk Supply Pipeline Sheet 03 of 22	2142D/PH 1/T/5103/REVF
Regional Bulk Supply Pipeline Sheet 04 of 22	2142D/PH 1/T/5104/REVF
Regional Bulk Supply Pipeline Sheet 05 of 22	2142D/PH 1/T/5105/REVF
Regional Bulk Supply Pipeline Sheet 06 of 22	2142D/PH 1/T/5106/REVF
Regional Bulk Supply Pipeline Sheet 07 of 22	2142D/PH 1/T/5107/REVF
Regional Bulk Supply Pipeline Sheet 08 of 22	2142D/PH 1/T/5108/REVF
Regional Bulk Supply Pipeline Sheet 09 of 22	2142D/PH 1/T/5109/REVF
Typical Pipe Bedding Detail	2142D/PH 1/T/5801/REVD
Marker Post Detail	2142D/PH 1/T/5802/REVE
Typical Details River Crossings	2142D/PH 1/T/5803/REVD
Scour and Isolation Valve Detail	2142D/PH 1/T/5806/REVD
Typical Details Air Valves	2142D/PH 1/T/5809/REVD
Thrust Block Details	2142D/PH 1/T/5810/REVA
Contract Name Board	2142D/PH 1/T/5998/REVA
Typical Details Manhole Cover Details	2142D/PH 1/T/6001/REVA
Typical Details Cat Ladders	2142D/PH 1/T/6002/REVA
Typical Details Air vent details	2142D/PH 1/T/6004/REVA
Typical Masonry Chamber	2142D/PH 1/T/6007/REVA
Reservoir Take-Off	2142D/PH 1/T/6906/REVA

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 inline with the Particular Specification for Small Contractor Development

3.3 Scope of Mandatory Subcontract Work

- a. Portions of the pipework with associated earthworks, pipework & fittings supply and install.
- b. Gabion and stone pitching

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 AH : General Structures
- SANS 1200 C : Site Clearance
- SANS 1200 D : Earthworks (1988)
- SANS 1200 DB : Earthworks (Pipe Trenches)
- SANS 1200 DK : Gabions and pitching
- SANS 1200 DM : Roads Subgrade
- SANS 1200 G : Concrete (Structural)
- SANS 1200 L : Medium-Pressure Pipelines
- SANS 1200 LB : Bedding (Pipes)
- SANS 1200 LC : Cable Ducts
- SANS 1200 LE : Stormwater
- SASTT-TS-TT3 : Trenchless Construction Works Horizontal directional drilling

4.2 Variations to Standard Specification

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

- PSA General
- PSAB Employer's Agent's Office
- PSC Site Clearance
- PSD Earthworks
- PSDB Earthworks (Pipe Trenches)
- PSG Structural Concrete
- PSL Medium Pressure Pipelines
- PSLB Bedding (Pipes)
- PSLG Pipe Jacking

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: CORROSION PROTECTION
- PG GALVANISING
- PH PARTICULAR SPECIFICATION FOR VALVES
- PI PARTICULAR SPECIFICATION - FLANGES AND ACCESSORIES
- PJ PARTICULAR SPECIFICATION FOR WELDING

4.5 Plant and Materials provided by the Employer

Nil

4.6 Services and Facilities Provided by the Employer

Water: For testing from the source point for this project. It is to the Contractor to transport water from a source point to the point of testing. The free issue is limited for 1 test per pipeline/ structure.

4.7 Other Services and Facilities

Water: For domestic use at a camp site. Normal service connection to be applied for by the Contractor.

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 in 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. For any other drawings provided by the Contractor
 - 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 the trenchless road crossings, Design by Contractor

5.2.4 Clause 4.2.2

The Structural engineer is: Cas Bodley of Eyethu Engineers

5.2.5 Clause 4.2.3

Drawing and other information are to be submitted in accordance with the contractors 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. The pipeline portion adjacent to the Clearwater Reservoir up to the next isolating valve is to be complete, tested and sanitised before the connection to the new outlet manifold may be made.
 - ii. The new pipeline in its entirety is to be complete, connected to the clearwater reservoir, tested and sanitised before the connection on the existing main line at $\pm$ CH 8 400 may be made. The line will then be the live supply to SSA3.
- 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 1000m lengths and a line item for each portion indicated on the programme. Pipeline branches will be portions on their own. Single house connections shorter than 50m need not be listed as a branch.
 - 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, house connections, 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 The requirements for working in the road reserve of KwaZulu-Natal Department of Transport roads are indicated in the Annexures C5.7 SUMMARY OF EXISTING SERVICES INVESTIGATION"

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. Samples of mechanical equipment where the specifications call for such.
- b. Samples of the precast concrete elements to be used.

5.2.12 Clause 4.12.2

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

- a. Nil

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:

- a. Offices

Previous phases have provided a permanent office for the employer's agent at reservoir R3-1 in the form of parkhome type structures. These to be maintained for the duration of the contract and left at Reservoir R3-1 after construction has been completed.

b. Survey Equipment

The following survey equipment must be available on site as and when required for checking.

- i. A dumpy level, staff and tripod.
- ii. Measuring tapes of 20m and 8m respectively.
- iii. A large diameter measuring wheel.

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 in the Annexure C5.5 placed at the P15/P706 intersection.
- b. EPWP sign board as per the EPWP requirements in the Annexures, placed at the P15/P706 intersection

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 provincial 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. Wayleaves from KZN DOT for various crossings and working in and alongside the road reserve.
- d. General permission to occupy from the traditional local authority.
- e. 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.

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.

5.10 Insurance Provided by the Employer

As per the conditions of contract the Employer has provided certain insurances.

Details, methods and procedures regarding the insurance provided by the Employer can be found in the Annexures to the Scope of Works.

5.11 Trenchless Works

It is anticipated that the trenchless works will be done by the horizontal directional drilling (HDD) method.

3 crossings are planned.

- Ch ± 1 970 -35m
- Ch ± 3 650 -35m
- Ch ± 6 600 -35m

5.11.1 Arrangement for Trenchless Works

The Contractor will arrange for the site information pertaining to Geotechnical and Topographical information to be collected, assemble the information with the details below into a suitable data pack, obtain 3 quotes for the trenchless works, obtain approval from the Employer to proceed and manage the successful HDD Contractor.

5.11.2 Specifications for Trenchless Works

The specification SASTT-TS-TT3 as issued by the Southern African Society for Trenchless Technologies shall apply. Specification data associated with this specification follows below.

5.11.3 Clause 4.1.1

Pipes shall be:

- DN315 HDPE PE100 as the sleeves
- HDPE PE100 DN200 PN10 and PN16 butt welded as the fluid conduits

5.11.4 Clause 4.1.1.1 b) iii

Welders shall be IFPA members and all welds will be stamped.

5.11.5 Clause 4.1.1.1 b) vi

A weld procedure specification is required.

5.11.6 Clause 4.3.1.2

The wayleave approvals from the KZN DOT is available. Specific conditions are that the works will occur from outside the road reserve.

5.11.7 Clause 4.3.1.3

The Geotechnical information will be gathered as part of this contract.

The classification of rock is as per particular specification PD.

5.11.8 Clause 4.3.1.4

One lane of traffic shall always be available. The specifications of SANS 1921-2 regarding traffic control apply.

5.11.9 Clause 4.3.1.7

The drill plan shall be approved by the Employers Agent.

5.11.10 Clause 4.3.4.3.5

A breakaway link shall be used.

5.11.11 Clause 4.3.4.3.5

A pullback gauge shall be used.

5.11.12 Clause 4.3.5.3

Draw wires shall be inserted if the conduit pipes are not also installed by the HDD contractor.

5.11.13 Clause 4.3.5.4

Pipe end markers shall be installed at both ends.

5.11.14 Clause 4.3.5.6

Surplus excavated material shall be removed, transported and disposed of at a site selected by the main contractor.

5.11.15 Clause 5.2.1

The following tests shall be performed on the pipeline and the sleeve.

Pressure testing as per SANS 1200L

5.11.16 Clause 5.2.2

Pipe sleeves will be accepted after the fluid conduit has successfully been installed.

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°, entrance angle, 5,0°) 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 5.4 PROTECTION OF OVERHEAD AND UNDERGROUND SERVICES (SUB-CLAUSE 5.4)

Add the following:

In addition to the requirements of clause 5.4, the existing ND160, ND250 and ND900 main on site has been identified as critical to water supply in the region, and as such it has to remain operational and any down time due to damage has to be minimised. In the event of damage to this rising main and associated infrastructure along this length the damage shall be repaired by the Contractor at his own expense as set out below.

This clause shall apply to the full length of the existing ND90 and ND250 main from reservoir R1-1 to the limit of construction of the ND200 pipeline. Any damage to the pipeline within the length of the site defined in this contract shall be deemed to be due to construction activities, and shall be repaired by the contractor at his own expense as outlined above, while any damage outside of that length shall be deemed not to be due to construction activities and shall be repaired by the contractor at the expense of the Employer, unless such damage can reasonably be attributed to the activities of the contractor, which judgment shall be made by the Engineer.

Payment for repairs deemed not to be due to construction activities shall be paid in terms of the contract for valuations of variations

a. Classification

Any damage resulting in an interruption in the supply of services shall be deemed an emergency repair, and the timing of the works would therefore be of an urgent nature. Such classification shall be at the discretion of the Engineer and communicated as such to the Contractor.

b. Availability of Contractor for emergency repairs

During the contract period, the Contractor shall ensure that a designated member of his staff is contactable by cell phone in the event of the need for an emergency repair.

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

A minimum of 1 artisan and 1 skilled labourer shall be available to attend to an emergency repair at all times during normal hours and after hours.

Suitable tools, plant, transport, test equipment, spares and repair kits shall be available at all times to do the necessary emergency repairs.

Above labour and resources shall be available at all times, including Saturdays, Sundays and public holidays, during normal hours and after hours, and the names, addresses and contact information shall be made available to the Employer and Engineer for this purpose.

d. Procedure for commencement and execution of repairs

Upon discovery of damage, the Engineer or his representative shall instruct the Contractor to attend to the said emergency repair, which instruction shall be verbal, and thereafter confirmed in writing.

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

e. Communication in the event of emergency repairs

The Contractor shall immediately upon arrival inform the Engineer 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 shall provide a verbal notification to the Engineer to the fact that the works have been completed and confirm same in writing within 12 hours.

f. 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 and within the response times noted, the Employer shall also 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.

g. Standard of work of repairs

The repairs shall be to the same specification as the main works, and any repair work not meeting the specification shall be replaced by the Contractor, for which purpose payment shall be withheld by the Engineer to cover the cost of this work, which amount shall be calculated by the Engineer, and which shall be returned to the Contractor following acceptance by the Engineer of the repair. A method statement for the replacement of unsatisfactory repairs shall be submitted by the Contractor and approved by the Engineer prior to commencement of the work.

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 5.10 WORKING 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.

The Contractor has the option of agreeing to a "Shared Laboratory". The Shared Laboratory shall comprise the following:

- a. An external materials laboratory for soil density and concrete cube testing selected by the Engineer. The materials laboratory shall report to the Engineer who shall forward all test results to the Contractor. Communication with the materials laboratory shall be through the Engineer
- b. A site troxler. The troxler shall be hired by the Contractor from an accredited supplier and be accompanied by a current calibration certificate.

Both time related and testing costs of the external laboratory for soils and concrete testing shall be shared equally (50-50) by the Employer and the Contractor.

Payment for site troxler shall be shared equally by the Employer and the Contractor.

Payment to the external soils lab shall be made by the Contractor upon receipt of invoices certified by the Engineer. Proof of payment of these items and the troxler shall be forwarded to the Engineer. The Employer's share of these shall be added to the following monthly payment certificate.

Costs of any tests which fail to meet specification shall be deducted from the sum to be split and charged directly to the Contractor.

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 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.8.3.4 SCHEDULED ITEMS (SUB-CLAUSE 8.3.4)

Add the following:

The removal of the establishment shall cover the relocation of the Engineer's mobile office described in item 8.3.2.1 a) to another location in the area within a 10km radius, should this be required. In addition, the contractor is to include in the appropriate items of the Preliminary and General for the cost of trimming, raking, top soiling and re-grassing the area on completion.

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.8.8.4 Existing services

Add to clause

- e. Penalty for Late Completion of Emergency Repairs Unit : Sum

The penalty shall be a once off sum per event as shown in the Schedule of Quantities. This penalty shall be enforced for each separate time that an emergency repair is not completed within 12 hours

of the service becoming un-operational.

f. Penalty for Late Completion of Emergency Repairs..... Unit : hr

The penalty shall be the sum per hour as shown in the Schedule of Quantities. This penalty shall be enforced for each hour after the initial 12 hour period that the emergency repair is not completed.

Supply and store on site, the following items for emergency repair of the existing ND160 and ND200 gravity main:

g. Pipes (Type stated) Unit: m

h. Fittings (Type stated).....Unit: No

The unit of measurement shall be linear meter for pipes and number (No.) for fittings.

Payment will be made for these items as soon as they are on site.”

PSA.8.9 ADD NEW CLAUSE

“8.9 Cost of obtaining PTO and Digital Surveys

a. Obtaining Permission to Occupy (PTO)Unit: Sum

b. Detailed Digital SurveyUnit: 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 phaseUnit: 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)**

In the 3rd line delete "South African Institution of Civil Engineers" and substitute with "Consulting Engineers South Africa".

Add the following:

Notwithstanding sub clause 3.1 of the Standard Specification, the name board shall be according to the pro-forma attached in section C4.

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

Previous contracts of this project have provided for the offices, ablutions and boardroom required by the Employers Agent.

This contract will provide for any maintenance required, the cleaning of the facilities, the provision of water and power and the provision of security for the duration of the contract."

3.2.7 General

On completion of the works, ownership of the Engineer's Offices shall again revert to the Employer for use on further contract phases of this water supply scheme. The contractor would be advised if any moving on or off site would be required at an agreed rate.

Failure to provide the above facilities including electricity and sanitation in this time period will lead to penalties being applied as per payment clause PSAB.8.3.1.

These penalties will only be enforced after the Contractor has been put on notice, in writing, by the Engineer."

PSAB.3.3 SITE INSTRUCTION BOOK (ADDITIONAL SUB-CLAUSE)

Throughout the construction period the Contractor shall supply a carbon triplicate book as a Site instruction book.

This book shall be kept on Site and shall be accessible to both the Contractor and the Engineer's Representative at all times. It may be used as follows:

by the Contractor for:

providing the Engineer's Representative with any information regarding the construction of the works which may be requested,

And

giving notification in writing as required by any of the relevant clauses of the General Conditions of Contract,

by the Engineer's Representative for the purpose of writing day to day instructions and confirming any verbal information or instructions given to the Contractor.

One copy of each site instruction issued by either party shall remain in the book.

PSAB.4 PLANT (CLAUSE4)

PSAB.4.1 TELEPHONE (CLAUSE 4.1)

Delete the Sub-Clause and replace with the following:

The Contractor will not be required to provide a telephone for the Engineer or the Engineer's Representative (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 metal change point for levelling;
- e. One spirit levels (one meter long);
- f. One 2kg hammer with steel or wooden pegs when required;
- g. One tape of length 30m;
- h. One 5m steel pocket tapes.

PSAB.8 MEASUREMENT & PAYMENT (CLAUSE 8)**PSAB.8.2 SCHEDULED ITEMS (SUB-CLAUSE 8.2)****PSAB.8.2.1 Facilities for the Engineer**

- a. Furnished Offices Unit : Prov Sum

The provisional sum shall be utilised to cover capital and maintenance works at the Engineers Offices on instruction from the Engineer.

- b. Name board (1 No.) Unit : No.

The sum tendered under this item shall include full compensation for all costs incurred in complying with the requirements of clause 1200AB.3.1 including supply, delivery to site, erection on site, maintenance and removal upon completion of the Contract. 95% of the No will be certified once the board is in place, the remaining 5% once the board is removed.

- c. Toilets (Provisional) Unit : Sum

The sum tendered under this item shall include full compensation for all costs incurred in complying with the requirements of clause 1200 PSAB.3.2

- d. Survey Equipment Unit Sum

The sum tendered under this item shall include full compensation for all costs incurred in complying with the requirements of clause 1200 PSAB 5.6

PSAB.8.3.2.1 Penalties

- a. Penalty for failure to complete Engineer's office including electricity and sanitation in specified time period Unit: Day

The unit of measurement shall be the number of days of late completion of the Engineer's offices.

The time for completion of the Engineer's offices is given in clause PSAB.3.2. The amount of the penalty is specified in the Schedule of Quantities.

PSAB.8.2.1 Facilities for the Engineer

Time Related

a. Engineers officesUnit : Sum

The sum tendered under this item will be deemed to cover the running costs of the Engineers offices for the duration of the contract period. To include insurances, cleaning, security and sanitation services.

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

b. 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

c. 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."

Add after sub clause 3.1.1

"Notwithstanding Sub-Clause 3.1 of SANS 1200D, no classification will be made for either intermediate or boulder excavation Class B. For the purpose of this contract all material will either be classed as soft, hard rock or Boulder Class A.

The classification for excavation shall be as follows:

Machine Excavation:

For machine excavation, No differentiation shall be made between "soft" and "Intermediate excavation" and "Boulder Class B". The unit rate for excavation shall cover all material except rock.

Rock excavation will comprise all material that cannot be removed by any other means than by using compressors and jack hammers, or alternatively by blasting. Boulders larger than 0,5 cubic meter which require blasting or wedging and splitting for removal will also be classified as rock.

Hand excavation

Notwithstanding Clause 3.1 of SANS 1200D, the classification for hand excavatable material will be made in terms of the Generic Labour Intensive Specification contained in the Annexure for Particular Specifications.

Classes of excavation not stated in the Schedule of Quantities shall not be measured and paid for.

The tenderer must allow for all other costs arising from this in the rates of the classes that are stated in the Schedule of Quantities.

PSD 3.1.2 Classes of Excavation (Sub-Clause 3.1.2)

Replace Clause 3.1.2 (c) as follows

“(c) Hard rock Excavation. Hard rock excavation shall be excavation in materials that requires the use of pneumatic tools, wedging and splitting, hydraulic impact hammering, drum milling or blasting prior to removal.”

Delete Clause 3.1.2 (e)

Backfilling and Embankment

Replace last sentence of the first paragraph with the following

Material excavated must be stockpiled in designated storage areas as specified in the Site Establishment Plan.

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.

PSD5.1.3 Stormwater and Groundwater

Add to clause 5.1.3

The flow of water in any river must not be stopped during construction. Any activity requiring a temporary stoppage in the flow of water must be discussed in detail at the preliminary site meeting and a detailed method statement provided. Under normal construction conditions the water must be diverted around the construction site.

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 XXX Finishing

Add the following:

FINAL GRADING

The Contractor shall restore the surface of the ground for the full width of the working areas to a condition as near as may be equivalent to that which existed at the time of beginning construction operations on each such areas.

In all areas of the working space the surface area shall be free of bumps and hollows caused by the construction activities and, where required by the Engineer, bumps shall be cut away and hollows filled and lightly compacted to leave the surface of the site in a smooth, even and tidy condition.

The surface of access ways to residential properties shall be reinstated to the owner's satisfaction and any stones, gravel or other deleterious material left from spoil piles shall be removed and disposed of to the satisfaction of the ER. All stormwater channels and drains shall be cleaned.

Veld grass areas shall be cleared of surplus spoil, where required, but clearing operations shall be carried out by methods that will cause as little disturbance as possible to the grass root systems.

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.

GRASS-SEEDING

Seed collection shall be an ongoing exercise throughout the construction period (at least twice a year) in order to ensure that sufficient seed is collected for use in re-vegetation.

Only if the harvested seed quantities are not sufficient may additional seed be bought. Any procurement of seed for use in re-vegetation shall be from reputable sources only. The seed mix quantities and purity levels shall be as specified in the approved method statement.

Indigenous seed shall be harvested from areas that are free of alien vegetation, either within construction areas prior to site clearing or from suitable neighbouring areas with the consent of the relevant landowners.

Harvested seed shall be free of excessive quantities of organic and/or substrate material.

If it is required to collect seed from selected species by hand, this seed shall be treated and stored separately.

Following harvesting, seed shall be dried under cool airy conditions. Seed shall be insect-free and shall be stored in suitable containers under cool conditions that are free of rodents or insects. No wet, mouldy or otherwise damaged seed is acceptable.

The Contractor shall provide adequate facilities for the storage of collected seed in rodent- and insect-free, cool, dry conditions to the satisfaction of the ER.

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 DWA 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

Add new clause

TRANSPORT OF MATERIALS, EQUIPMENT AND STAFF TO SITE

This section covers the issues associated with the transport of construction material, equipment and staff to and from the site. The aim is to ensure that the transport activities associated with the project do not impact significantly on the environment and the surrounding residents.

The area of disturbance for the laying of pipes should be limited to 3m. Where possible woody vegetation must be trimmed back instead of removed and the pipelines must be diverted around large trees. The area of disturbance for construction of the reservoir is to be limited to the minimum extent necessary. Access to the construction sites will be via existing public roads. The contractor will monitor the condition of the road in the vicinity of the construction areas and should the road be damaged due to construction activities, the road will be repaired within two days of detection/complaint/notification.

Drivers will reduce speed and exercise caution due to pedestrians and other road users, especially in the vicinity of the construction site.

The majority of the construction will take place adjacent to existing roads and, as such are utilized on a regular basis, throughout the day and night, by local residents. The contractor must ensure that the roads adjacent to construction areas are kept clear at all times and not blocked by construction vehicles or equipment. Should a road closure be required during the contract this must be discussed with the Department of Transport and the local community.

Add new clause

EXCAVATION AND STORAGE

Add new clause

This section deals with the earthworks to be undertaken during the construction period and the equipment lay-down. The aim is to ensure that the area of impact due to construction is minimized and all material excavated during construction is stockpiled in an appropriate manner.

Equipment lay-down areas and material storage areas must be discussed and agreed to with the neighbouring landowners and specified in the Site Establishment Plan for each individual construction site.

Lay-down and material storage areas must be located away from the banks of rivers to avoid any contaminated stormwater runoff from entering the rivers. In addition, stormwater diversion berms or cut-off trenches must be constructed around the lay down areas.

All potentially hazardous materials i.e. fuels, oils and chemicals, will be stored in an acceptable manner. In addition, all hazardous material storage areas will be bunded, with a minimum of sand bags.

In the event of a spill of construction material, either hazardous or non-hazardous, the material must be contained in an area as small as possible. The spill material must then be removed and disposed of in a legally acceptable manner. In the event of hazardous material spillage and cleanup, a safe disposal certificate will be required. In the event of a spill the Engineer must be notified immediately.

REINSTATEMENT OF COMPACTED AND DISTURBED AREAS

The Contractor shall restore the surface of the ground for the full width of the working areas to a condition as near as may be equivalent to that which existed at the time of beginning construction operations on each such areas.

In all areas of the working space the surface area shall be free of bumps and hollows caused by the construction activities and, where required by the Engineer, bumps shall be cut away and hollows filled and lightly compacted to leave the surface of the site in a smooth, even and tidy condition.

The surface of access ways to residential properties shall be reinstated to the owner's satisfaction and any stones, gravel or other deleterious material left from spoil piles shall be removed and disposed of to the satisfaction of the ER. All stormwater channels and drains shall be cleaned.

Veld grass areas shall be cleared of surplus spoil, where required, but clearing operations shall be carried out by methods that will cause as little disturbance as possible to the grass root systems.

Add new clause

SOIL IMPROVEMENTS

FERTILIZER

Type of fertilizer to be specified by the Engineer before commencement of this item.

The use, storage and handling of fertilizer shall be strictly controlled by the Contractor.

Fertilizers shall be suitably stored in sealed containers in areas approved by the ER.

Care shall be taken when using fertilizers near "No-Go" areas, watercourses and wetland areas and other sensitive natural areas.

Soil shall be well watered and moist before any fertilizer is applied.

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 SCHEDULE ITEMS (SUB-CLAUSE 8.3)

PSD8.3.X Bulk excavation

- a. Excavation in all materials and use for embankment or backfill or dispose as ordered for Unit: m³

For this Contract bulk excavation includes the total excavation to a specified level including the preparation of the exposed excavation for concrete works, pitching and gabions.

The rate shall therefore also cover the cost of preparation of the exposed excavation floor including cleaning of this area or treatment of these areas, providing, installing, maintaining and removing lateral support that is adequate for preserving the stability of the existing fences, walls, buildings, structures and services.

PSD8.3.6 Overhaul (Sub-Clause 8.3.6)

In addition 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

PSD.8.3.8.1 Location

Add to clause 8.3.8.1c

The unit rate for proving existing services shall include for:

Items of Clause 8.3.2

Extra over cost for permanent reinstatement

Extra over cost for compaction in road reserves

For proving services anywhere within the contract area and in advance of the main excavation; and

Special care in excavation by hand in vicinity of services

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 150mm depth..... Unit: m²

Payment on this item will only be made upon the written instruction from the Engineer for an area to be ripped and recompacted. 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.

- g. Mulching Unit: m²

The measurement shall be the square meter of mulching instructed.

The rate shall be deemed to be full compensation for all costs associated with production and application of mulch in accordance with the requirements of 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.3.1 CLASSES OF EXCAVATION (SUB-CLAUSE 3.1)**

Add to paragraph 3.1 after "...SABS 1200DA"

"and PSD.2.1 & 2.2"

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. 600m per front over three fronts, which shall be separated from each other by a gap of at least 600m along green fields sections and some road reserve sections as identified in the drawings; or
- ii. 300m per front over two fronts, which shall be separated from each other by a gap of at least 300m along road reserves going through densely populated areas as identified in the drawings.

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 than 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 undertaken 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 Contractor's 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 test 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: m ³
c. h=375mm.....	Unit: m ³
d. h=450mm.....	Unit: m ³

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.3.4 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 Concrete to bases and floor slabs is to be placed in shade. Shade shall be maintained until curing has been applied. Shade cloth for shading shall have a 90% effective factor.

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 1/500th 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 10/20 concrete will be paid for at a nominal thickness of 300mm. Excavation for overbreak in rock for floor of reservoir will be paid for as excavation at a nominal thickness of 300mm.

Backfill to rock overbreak to vertical faces of wall bases with 10/20 concrete will be paid for at a nominal thickness of 150mm. Excavation for overbreak in rock for floor of reservoir will be paid for as excavation at a nominal thickness of 150mm.

PSG 8.2.7 Corbels

Add new Sub-Clause:

- a. Column Heads.....Unit: No.

Rate shall include all formwork to form column heads as shown on drawings.

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 pipesUnit: 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 1 SCOPE:**

Clause 1 Substitute '2.5MPa' in the second line with '4.5MPa'.

Add to Clause 2.1.2

Particular Specification PG Corrosion Protection

Particular Specification PJ Valves

Particular Specification PI Flanges and Accessories"

PSL 3 MATERIALS**GENERAL**

Add to Sub-Clause: All pipe materials shall comply in all respect with the SANS Specifications or ISO 4422 or ISO 4427

Add the following: -

Manufactured Elements

Elements manufactured or supplied 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. Where the mass of an element exceeds 55kg, consideration should be given to the size of the element relative to its total mass related to the number of workers who would be needed to lift such mass.

MATERIAL STORAGE (NEW SUB-CLAUSE)

Add new Sub-Clause:

All piping, pipe fittings, and equipment stored outside or awaiting installation are to be protected from the weather by suitable coverage and from dirt and mud by storing same on suitably prepared raised surfaces.

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.

PSL 3.4 STEEL PIPES, FITTINGS, AND SPECIALS

In Clause 3.4.2 replace "...shall be screwed," with "joined as indicated on the drawings,"

Clarification to Clause 3.4.3

The class of pipe to be used is Class B or better of SANS 719.

Pipes to API 5L Grade X42 will also be acceptable.

PSL 3.4.4 Fittings and Specials (Sub-Clause 3.4.4)

Add to Sub-Clause:

Steel specials shall be manufactured off site including galvanising, coatings and linings by a manufacturer approved by the Engineer and tested in accordance with BS 534 - Clause 4.

Where specified on the drawings or Schedule of Quantities, ANSI B16 curvature for bends, tees and reducers shall be used.

All even curvature bends and fittings up to and including ND200 shall be in accordance with ASTM

A234, B16.9.

Bends shall be segmented type except where otherwise shown or stated on the drawings.

All segmental bends shall be fabricated with bevelled plain ends suitable for butt welding or with square, plain faced ends where slip-on flanges are to be welded to the special.

PSL 3.7 Other types of pipes (3.7)

Add to clause 3.7.1

Up to Class 16 pipe, where uPVC, PVCm or oPVC bends are specified, they shall have a minimum pressure rating of 1600 kPa irrespective of the rating of the pipe to which they are attached.

For class 20 and class 25 uPVC, PVCm or oPVC pipes, bend will be from steel.

Add clause 3.7.3 oPVC

oPVC pipes and fittings shall be fitted with spigot and socket rubber joints and shall comply with the relevant requirements of SANS16422

Add clause 3.7.4 mPVC

mPVC pipes and fittings shall be fitted with spigot and socket rubber joints and shall comply with the relevant requirements of to SANS966

Add clause 3.7.5 HDPE

HDPE pipes shall be manufactured in accordance with SANS4427 .HDPE pipes up to class 16 shall be fitted with compression couplings rated at 1600kPa Fusion butt welding is to be used for classes higher than 16.

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:

Bolted Connections are to be in accordance with Particular Specification PI.

Any bolts not complying with this requirement shall be removed and replaced at the expense of the Contractor.

PSL 3.9 CORROSION PROTECTION (CLAUSE 3.9)

Add the following: -

Corrosion protection to be in accordance with Particular Specification PG

PSL 3.10 VALVES (CLAUSE 3.10)

Replace clause 3.10 with the following: -

All valves or meters fitted to the pipework isto 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)

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 9° and one extra pipe length per 3° thereafter.

JOINTING METHODS

PSL5.2.2 Flanged Joints (Sub-Clause 5.2.2)

Add to Sub-Clause:

Before being brought together, the ends of the pipes, fittings, couplings and flanges are to be inspected and cleaned to ensure that all parts forming the joint are undamaged and clean.

When jointing flanges, the faces shall be cleaned thoroughly and approved jointing material, cut properly to size, is to be inserted immediately before bringing the two flanges together. Before closing the joints, the flanges must be parallel to each other, with all bolts inserted in the bolt holes. After the fittings have thus been aligned and well supported, the joint shall be bolted up to a uniform tightness using torque wrenches to achieve the required compression force on the gasket.

Sleeve couplings

At all positions where steel pipes or specials are cast into a concrete structure in an underground

position the first joint outside the structure and a joint 1m from the structure shall be made by using a sleeved coupling unless otherwise specified.

At flexible couplings the pipe ends shall be at least 10mm apart to accommodate any pipe expansion.

In all rigid assemblies inside chambers at least one pipe/valve connection shall be made by means of a flange adapter sleeved coupling / dismantling joint to facilitate the removal of the parts of the assembly from the line. The coupling shall be an equivalent class to the valve or higher.

SETTING OF VALVES, SPECIALS AND FITTINGS

Add New Sub-Clause:

The Contractor shall ensure that all valves and equipment are installed in the correct flow direction. Refer to the Engineer where there is doubt or where the flow direction is not indicated on the drawings.

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 manufactures, 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 7.3 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.

Add to Clause 7.3.1.2 as follows:

For steel pipes the test pressure for field testing shall be not less than 1.25 times the Maximum Working Pressure and not more than 1.5 times the Maximum Working Pressure, where Maximum Working Pressure is the pressure corresponding to a stress in the pipe wall of 50% of the minimum yield strength of the steel.

PSL 7.3.4 Water or testing

Add to new Clause:

The availability of water for testing will be the responsibility of the Contractor and the associated costs are deemed to be included in the tender rates.

The Contractor shall include in his method statement how the water used for the hydraulic testing of one section can be reused for filling and testing of a following section.

Sufficient potable water for the approved testing programme will be provided once only at no charge. The cost of water required for re-testing and to replace lost water shall be borne by the Contractor. This water will be available at the source point of the project, the contractor shall transport the water at his own costs to the point of testing.

PSL7.3.5 Initial Filling of Pipeline

Add New Clause 7.3.5:

The method statement for filling of the pipe for testing shall be submitted to the Engineer for approval. As a base point, the charging rate shall not exceeding 25 percent of the full capacity of the pipeline operating at a maximum velocity of 1.2m/s .

Under no circumstances will the Contractor be allowed to carry out filling of the pipeline without the supervision of the Engineer, neither shall he permit any other persons to carry out such filling without the written permission of the Engineer.

PSL7.3.6 Draining of Pipeline (Additional Sub-Clause 7.3.6)

Add New Sub-Clause:

When drainage of the pipeline is required for any reason, the pipeline shall be drained from scour valves in a controlled manner that does not cause erosion of any stream bed, does not create surface damage to farm lands or private property or negatively impact on the environment in any way. Any such drainage of the pipeline shall be carried out in accordance with a method statement to be approved by the Engineer. All air valves shall be open and operational during any drainage event.

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.

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 m³

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.3.1 SELECTED GRANULAR MATERIAL (CLAUSE 3.1)**

In the second line delete "19 mm" and substitute "6,7 mm".

Add the following:

SELECTED GRANULAR MATERIAL FOR STEEL PIPEWORK All selected granular material used for the cradle beneath and surrounding the coated steel pipes shall be fine sand or fine non-cohesive soil, carefully selected, with maximum particle size of 6.7 mm and which shall not cake nor form lumps when drying, and comply with the following requirements:

GRADING ANALYSIS RANGE	
SIEVE SIZE (mm)	PERCENTAGE PASSING
4.750	95 to 100
2.360	90 to 100
1.180	90 to 100
0.600	35 to 50
0.425	35 to 45
0.300	3 to 5
0.150	0 to 3
0.075	0 to 3

The material shall be free of organic matter and shall have a compatibility factor of not more than 0.4.

The material should classify as a silty fine sand having a stiffness ratio of not less than 5.0 MPa. Furthermore, the origin of the materials should be river transported since it is required that the larger grains (4.0 to 6.7 mm in size) be rounded and not sharp and angular.

Selected granular materials shall be compacted to 100% Mod. A.A.S.H.T.O. either by full saturation or mechanical means or a combination of both, approved by the Engineer.

Samples of selected granular material shall be submitted by the Contractor to the Engineer for approval well in advance of construction. Only after the Contractor has received written approval from the Engineer, may he/she proceed with placing sand as selected granular material.

PSLB.3.2 SELECTED FILL MATERIAL (CLAUSE 3.2)

Delete this clause and substitute with the following:

Selected fill material for pipe bedding purposes shall be material that has a PI not exceeding 12 Free from vegetation and from lumps and stones of diameter exceeding 26.5 mm.

The material obtained from the trench excavations will generally be suitable for use as selected fill material which is placed above the Selected Granular Material bedding to the pipe.

PSLB.3.4 SELECTION**PSLB.3.4.1 Suitable Bedding Material Available from Trench Excavations (Sub-Clause 3.4.1)**

Replace Clause 3.4.1 with

Where suitable material for selected granular and selected fill material is available from the trench excavation within the freehaul distance then notwithstanding the requirements of Sub Clause 3.7 of SANS 1200DB (Earthworks – Pipe trenches) and Sub Clause 3.4.1 of SANS 1200LB regarding the use of selective methods of excavation, the contractor shall use selective methods of excavating and shall provide and use methods that will enable him to avoid burying or contaminating material that is suitable and is required for bedding. The contractor will be required to screen or sieve material so as to conform to the bedding and selected fill blanket requirements.

PSLB.5 CONSTRUCTION (CLAUSE 5)

PSLB.5.1 GENERAL (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.

PSLB 5.1.5 Add new sub-clause (5.1.5)

The contractor will also be required to do pipe excavations in areas where soft to medium Amphibolite weathered rock are expected early in the contract so the material suitability for bedding can be evaluated in terms of quality and quantity. During this limited evaluation period it is probable that pipe bedding material will be obtained from commercial sources.

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.5.3 PLACING AND COMPACTING OF FLEXIBLE PIPES (SUB-CLAUSE 5.3)

Bedding Cradle

In addition to the requirements of clause 5.3(a), add the following:

Due to the slenderness of the steel pipes, the placing and compaction of the blanket material need to be carefully controlled in order to avoid deflection of the pipe.

Particular attention shall be paid to compaction of material in the pipe haunch area. Compaction shall be achieved by hand punning horizontally and obliquely with a suitably sized and shaped hand tool. The Contractor shall take the necessary precautions not to inflict damage to the pipe line coating when compacting the cradle and the blanket material.

The Contractor shall carry out his own quality control testing of the proposed bedding material to ensure that it meets this specification.

At least one grading analysis should be carried out for every 300 metres of bedding placed. The results of these tests shall be forwarded to the Engineer within 24 hours of completion of the test. Should the material not comply with the specification, the Contractor shall remove and replace material not complying with the specification, with approved material at his own cost.

Should the Contractor change the source of the bedding material, samples of the proposed material shall be supplied to the Engineer, inclusive of the analysis of the characteristics of the material. Only after the Contractor has received written approval from the Engineer, may he proceed with placing of the new selected granular bedding material.

Completion of the bedding cradle and placing of the selected fill blanket, and the main fill, shall

commence as soon as possible after pipe laying has been completed. The Contractor shall meet all costs of operation ordered by the Engineer to remedy defects in the trench caused by lengthy exposure.

200mm selected fill blanket

In addition to the requirements of clause 5.3(b), add the following:

Pipeline to be constructed beneath roads.

In this case the selected fill material shall be taken to the underside of the road layerworks and compacted to minimum 98% Mod AASHTO density. Thereafter the structural road layers will be constructed.

PSLB.6 TOLERANCES (CLAUSE 6)

PSLB.6.3 PIPE DEFLECTION

Add new clause

The maximum allowable pipe deflection at any stage during or after construction is 2% of the pipe diameter horizontally or vertically. The Contractor will be required to provide the necessary apparatus and to monitor deflection during construction.

Slenderness shall not exceed 0.5% of its Nominal Diameter.

PSLB.8 MEASUREMENT AND 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.8.2 SCHEDULED 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”

PSLB.8.2.1 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.

PSLB.8.2.2.3 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 geofabric 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.

ANNEXURE C3.B: PARTICULAR SPECIFICATIONS

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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 60° 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 cone 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 undertaken 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 administering 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 finishProvisional 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 markupUnit: 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 PLC.

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 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 diaries 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 reos.

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 m ²
Ablutions (male)	6 m ²
Ablutions (female)	6 m ²
Chairs for learners (individual chairs, with backs)	25 off
Desk area for 25 learners (500 mm width)	12,5 m ²
Chairs for trainers and management (individual chairs, with backs)	5 off
Table area for trainers and management	3 m ²
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	4 off
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 m ²

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) abovepercentage(%)

- 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			
	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

[illegible]

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
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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 BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA LOCAL MUNICIPALITY 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 RegulationsUnit: 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 RegulationsUnit: 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 penaltyUnit: No.

d. Time related penaltyUnit: 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 C.

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. Unless otherwise stated in the project specification, the penalties imposed per incident or violation will be as follows:

Incident/ Violation	Penalty
Failure to stockpile material correctly	R 1 000
Pollution of water bodies	R 3 000
Failure to control stormwater runoff	R 1 500
Failure to provide adequate sanitation	R 3 000
Unauthorized removal / clearing of vegetation	R 10 000
Failure to provide adequate waste disposal facilities and services	R 5 000
Failure to reinstate disturbed areas within specified time period	R 3 000
Failure to rehabilitate disturbed areas within 3 months of completion	R 5 000
Any other contravention of the environmental specification	R 1 000

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).

PE.2.3 Fines for transgressions of the EMP.

a. (Type stated) Unit: No.

The unit of measurement shall be the number No. of transgressions. The fine shall be a sum per transgression of a given requirement as stated in in the Bills of Quantities. These fines can only be enforced after the Contractor has been put on notice, in writing by the Engineer.

PE.2.4 Penalties for General Non-compliance

a. Recovery of actual costs (Type stated) Unit: Sum

b. Penalty for Non-compliance Unit: %

The unit of measurement for (a) shall be the Sum. The sum deducted under this item shall be the amount of the environmental rehabilitation cost as stated in the Bill of Quantities, and shall be deducted only once a certified invoice has been received for the rehabilitation cost.

PE.2.5 Penalties for Unauthorised Tree Removal Or Damage

a. (Girth stated) Unit: No

The sum deducted under this item shall be the amount stated in the Bill of Quantities.

PE.2.6 Penalties for other incidence

a. (Incident stated) Unit: No

The sum deducted under this item shall be the amount stated in the Bill of Quantities.

PF PARTICULAR SPECIFICATION: CORROSION PROTECTION**PF.1 SCOPE**

This particular specification covers cathodic protection, the coatings and linings to the steel pipes as well as repairs, reinstatement and testing. For Holiday testing refer to Particular Specification PP.

PF.2 CONSTRUCTION**PF.2.1 CORROSION PROTECTION**

Cathodic Protection (CP) shall be installed by a CP specialist consultant employed and supervised by the Engineer.

PF.2.2 CONTRACT DOCUMENTS

Contract documents and drawings for the Cathodic Protection (CP) shall be prepared by a CP specialist consultant employed and supervised by the Engineer. A nominated sub-contractor shall be employed by the main Contractor to carry out the work, which shall be billed separately.

The main Contractor shall uncover the pipe as required and reinstate pipe coatings and linings where required.

PF.2.3 STEEL PIPES OF NOMINAL BORE UP TO 200MM

Pipes, fittings, specials etc, including pipes welded to large diameter blank flanges, shall all be internally and externally hot-dip galvanized. All galvanizing shall be done in accordance with SANS 121: 2000/ISO 1461 2000. The minimum amount of zinc deposited shall be 760 g/m². The Contractor shall submit certificates certifying that all galvanized pipes have been manufactured in a certified facility and meet the specifications noted above. Retention will not be released until such certificates are delivered to the Engineer.

All buried flanges and bolts shall be protected with the Denso Clingwrap or equivalent approved by the Engineer

PF.2.4 LININGS:**PF.2.4.1 Steel pipes**

Steel pipes of nominal bore over 200mm shall be lined internally with Solvent Free Epoxy such as Stoncor Pipecoat SF, Sigmaline 523, or equivalent approved by the Engineer. Such materials shall be certified for use with potable water, and applied in accordance with SANS 1217 and the manufacturer's specifications.

PF.2.4.2 Flanges and specials

Flanges and specials shall be lined internally with a solvent free epoxy, certified for use with potable water, such as StonCor Pipecoat SF, Sigmaline 523, or Denso ST 100 or equal approved by the Engineer, applied in accordance with SANS 1217 and the manufacturer's instructions.

PF.2.5 COATINGS:**PF.2.5.1 Steel pipes**

Steel pipes of nominal bore over 200mm shall be coated externally with Fusion Bonded Medium Density Polyethylene (FBMDPE) to Australian Standard Specification AS 4321-1995 (Sintakote or similar approved)

PF.2.6 Flanges and specials**PF.2.7 Items below ground / partially buried items**

Items below ground / partially buried items shall be coated externally with FBMDPE (Sintercoat or similar approved) or Denso Ultra flex 1250/300 PVC, or similar approved. Densotherm HD Tape wrapping as specified in Clause PF.2.1.6.2.1.1 below shall be applied to crotch plates in connecting

areas to the main body of the fitting and on barrel/branch connections. The entire circumference of the barrel shall be wrapped with Densotherm HD Tape wrapping over the length of the crotch plate join. This shall also apply to scour tees.

Puddle flanges shall be coated with Solvent Free Epoxy as per PF.2.1.6.2.1.1, with Denso Ultra flex 1250/300 PVC as per PF.2.2.3 applied to the pipe on either side.

Flanged connections to buried/partially buried items shall be protected with the Denso Clingwrap system described in PF.2.2.3.2 below or equivalent approved by the Engineer.

PF.2.8 Recommended application procedure for Densotherm HD system to crotch plate tees and other specials

PF.2.8.1 Surface preparation

The tee and surrounding shop applied coating shall be clean and free of any mud, oil, grease and any other contaminants. The entire surface shall be dry. The exposed steel surface shall be prepared to min St2 standard.

PF.2.8.2 Shop applied coating preparation (Bituguard / Sintercoat)

A sharp blade shall be used to cut straighten and chamfer the edges of the shop applied coatings.

PF.2.8.3 Primer application

The primer Shall be applied in three (3) stages:

- The stub
- The crotch plate/composite pad
- The pipe section

A coat of Denso Prime D shall be applied at a rate of 6 m²/1l and allow to dry (10min @ 25°C). The primer shall extend onto the shop applied coating by a minimum of 220mm.

PF.2.8.4 Application of Densotherm hd

The Densotherm shall be applied in three (3) stages commencing with the stub.

PF.2.9 Stub Section

The following procedure shall be employed:

Pre measure 150mm wide sections of tape to be applied longitudinally to the stub.

The sections shall overlap by a min of 50mm onto itself and 100mm onto the crotch plate / composite pad. (Do not bond the 100mm overlap to the crotch plate / composite pad

The pre-measured sections of Densotherm HD are placed over the primed steel and positioned to ensure that they are straight and true.

Peel back the interleave and gently heat the face of the section by means of a gas torch until the surface has a glossy appearance. (Do not overheat or allow to run or drip).

Press the heated section firmly into place with gloved hands, ensuring intimate contact with the primed surface. Once this is done, roll the Densotherm up the anchored section.

Continue the application of the Densotherm, ensuring the intimate contact of the tape as well as ensuring no air entrapment.

Remove the external release film and chamfer both edges of the tape.

Apply the following section of Densotherm in the same fashion, ensuring a min 55mm overlap onto the applied section of tape.

PF.2.10 Crotch plate / composite pad

The following procedure shall be employed:

First lift the 100mm overlap from the stub

The crotch plate / composite pad are wrapped in the same fashion as the stub, using 300mm wide tape.

This is applied to both sides of the crotch plate.

The edge of the crotch plate is then wrapped by means of a 100mm wide tape.

The 100mm overlap from the stub is then 'locked' onto the crotch plate/composite pad.

PF.2.11 Pipe section

The following procedure shall be employed:

Using 100 & 150mm wide sections of tape, the pipe section is wrapped as above ensuring that the tape is worked into the crotch plate / pipe interface and ensuring that there is no air entrapment.

The tape shall extend by a minimum of 150mm onto the chamfered shop applied coating.

PF.2.12 Items inside chambers

Items inside chambers shall be coated with Solvent Free Epoxy such as Stoncor Pipecoat SF, Sigmaline 523, or Denso ST 100 applied in accordance with the manufacturer's specifications, or equivalent approved by the Engineer, with a polyurethane top coat of Stone-Corr Carboguard 134, Sigma Cover 550 or equivalent approved by the Engineer.

Before coating, all surfaces shall be thoroughly cleaned and rust, grease dirt and other contaminants or deleterious substances shall be removed. The surfaces shall be shot blast cleaned to ISO-Sa 2 1/2, blasting profile (Rz)50-100 mm'. Surface profile must not exceed 0,1mm. Alternatively the manufacture's specification as approved by the Engineer shall be followed.

Coatings on flanges and specials shall be inspected and approved by the Engineer prior to inclusion in the works.

PF.2.13 Repairs and Reinstatement of Linings and Coatings

PF.2.13.1 Preparation of Steel Surfaces for Repairs or Reinstatement of Internal Lining and/or External Coating

The following method is applicable for the preparation of all exposed steel surfaces prior to the carrying out of any repair procedure to internal linings and/or to external coatings. This specification is applicable to all pipe steel surfaces which have been stripped of their corrosion protection layer, internally or externally, as a result of the manufacturing of specials, construction activities or pipe laying, welding and/or damages caused by handling or latent defects in application.

PF.2.13.2 Degreasing

All bare metal surfaces shall be degreased in order to remove grease and oil from the pipe surface as a first step in the preparation process ie before grit blasting and/or power brushing starts. Degreasing shall be carried out using a non volatile solvent (e.g. "Aquasolve", "Chesterton Nr. 261 Safety Solvent Cleaner" or similar approved substance). The surface shall then be cleaned with potable water and left to dry completely before the next step is taken.

PF.2.13.3 Grit Blasting – Internal Lining Repair:

Grit blasting of bare metal surfaces shall take place after degreasing of the area. The finished grit blasted surface shall be 75 micron with an angular profile.

Transition areas from epoxy internal lining, to bare metal which has been grit blasted, shall be smooth without rough edges or flaking appearances.

All grit blasting within the pipe line that is under construction, shall be performed by way of a "vacuum blast" process in order to limit the generation of dust.

Grit blasting shall, under all circumstances, be carried out using equipment suitable for the size of the work to be undertaken.

The Contractor shall provide the Engineer with a method statement for approval for each type/location of grit blasting, before work commences.

PF.2.13.4 Power Brush – External Coating Repair:

Power brushing of bare metal surface shall take place after degreasing of the area as specified. The area that has been power brushed shall be free from rust, laitance, dust, oil or other deleterious matter before the application of primer. Any areas in the region where power brushing took place shall be free from signs of disbonding of lining and/or coating, once power brushed. The surface finish, once power brushing has been completed, shall conform to minimum St2 standard.

PF.2.14 REPAIR AND REINSTATEMENT OF EPOXY LININGS

PF.2.14.1 General

The Contractor shall ensure that making good of linings is carried out progressively as the pipe is being laid and shall not be permitted to lag behind for more than three pipe lengths at each working front.

Only solvent free epoxy repair kits shall be utilized to repair the internal linings of the pipe line. This specification refers to "two part epoxy" as an epoxy repair kit which consists of a base and an activator approved by the Engineer and could be products similar to "Denso ST100", "Sigma SF 523", "Nordbak", etc. Mixing shall be carried out in accordance with PF.2.2.2.4.

All making good of internal solvent free epoxy linings at welded and flanged joints that is required to ensure continuous internal corrosion protection to steel surfaces shall be carried out strictly in accordance with the manufacturer's specifications.

Once an internal lining has been repaired, nobody will be allowed to enter the pipe, except for inspection and cleaning purposes.

PF.2.14.2 Repair and reinstatement of epoxy linings (small areas)

A small area repair will be represented by a defect up to 100mm² in area.

At each pinhole detected by the Wet Sponge test, the surrounding area shall be abraded to 25mm beyond the defective area. It is to be noted that any cluster of pinholes within a radius of 25mm shall be regarded as one defect. The abrasion shall be carried out with clean emery paper of 80 to 100 mesh so as to provide a suitably rough surface profile without causing the removal of excessive amounts of lining material.

All damaged and blistered epoxy lining shall be removed back to sound epoxy by mechanical grinding.

Exposed steel surfaces shall be prepared as set out in Clause PF.2.2.1.2.

The roughened area of lining and the defect shall then be repaired by the application of a solvent free epoxy repair kit to a minimum dry film thickness of 300 micrometers. The repair area shall be masked in order to limit the area of repair and to allow for a "halo" of 1 to 2 mm of the abraded material to be left uncovered around the repair.

Application of the repair kit shall be by means of roller application.

The patch material shall be of a different colour to the pipe lining material.

After the repair has been adequately cured, the repair and the surrounding 250mm of epoxy lining shall be tested for electrical insulation defects by means of the "wet sponge" detector set at 90 Volts.

Any pinhole defects found are to be repaired in terms of the specification.

Once an internal lining has been repaired, nobody will be allowed to enter the pipe, except for

cleaning purposes.

PF.2.14.3 Repair of epoxy linings (large areas)

Repair to large areas of damaged epoxy linings or areas of epoxy which has to be reinstated at joints where epoxy was removed in order to facilitate jointing by welding, shall follow the procedure below:

The exposed steel surface shall be de-greased as specified in clause 2.2.1.1 above.

The exposed steel surface shall be grit blasted as specified in clause 2.2.1.2 above.

All damaged and blistered epoxy lining shall be removed back to sound epoxy by mechanical grinding.

The surrounding area of sound epoxy shall be abraded to 25mm beyond the defective area.

The abraded area of lining and the defect shall then be repaired by the application of a solvent free epoxy repair kit (such as Denso ST100 or similar approved) to a minimum dry film thickness of 300 micrometers. A "halo" of 1 to 2 mm of the abraded material shall be left uncovered around the repair.

Application of the repair kit shall be by means of roller application.

After the repair has been adequately cured, the repair and the surrounding 250mm of epoxy lining shall be tested for electrical insulation defects by means of the "wet sponge" detector set at 90 Volts.

All pinhole defects found are to be repaired.

PF.2.14.4 Preparation Mixing and Application of Epoxy Compounds

When mixing two part epoxies, the base and activator shall be mixed in accordance with the manufacturer's specifications. Mixing in the original container will only be permitted by means of methods that ensure full integration of different parts of the compound into a homogeneous compound with the characteristics as intended by the manufacturer. The different parts of the compound shall not be diluted. Mixing shall only be allowed with full batches and reduction of volumes from mixing packs by means of weight or volume measurement, which will result in smaller portions to be mixed, will not be allowed. In the application of the epoxy the following shall be strictly in compliance with the manufacturer's instructions:

Method of application (Type of Brush or roller.)

Over coating time.

Temperature range for application.

Method of mixing base and activator.

Number of coats to achieve the specified thickness.

Safety aspects e.g. Eye and hand protection, ventilation, fire precautions, etc.

Note that roller and brush applicators shall be replaced once the product application expiry time has been reached on any specific applicator tool.

Uncured epoxy must be regarded as being toxic and shall be handled in accordance with the manufacturer's instructions. Adequate lighting and ventilation shall be provided whilst working within the pipeline.

Two part epoxy may only be applied on steel surfaces prepared as specified in

PF.2.15 REPAIRS AND REINSTATEMENT OF EXTERNAL COATINGS

Repairs and reinstatement of external coatings shall be carried out in accordance with the procedure below. This procedure is based on the Denso Ultra flex 1250/300 PVC system. Alternative systems including the Stopaq CZH system may be used subject to the approval of the Engineer.

PF.2.15.1 Surface preparation

Light commercial blast or wire brush to St2 standard to remove all millscale loose rust.

All welded areas must be free of all slag, weld spatter and burnt coating.

Remove all grit and/or dust before priming with Denso Primer D at the average spread rate of 6m²/litre.

Welded butt joints can only be primed & wrapped above 5 °C and below 65°C.

Cleaned pipe should be primed on the same day as the pipe is to be wrapped and should be re-primed should any contamination occur prior to wrapping. Any flash rusting, surface oxidation, or other foreign agents should be removed by repeating the necessary cleaning steps.

The primer should be applied in a uniformly thin film at a minimum of 25um DFT free of runs and sags covering the entire surface of the pipe. The flow of primer must be regulated so that the pipe surface is entirely covered. Allow the solvents to flash off for a minimum of 30 minutes and maximum of 8 hours before application of tape or mastic. Uncoated flooded, or areas primed over improperly cleaned pipe, should be cleaned to the satisfaction of the engineer and re-coated.

PF.2.15.2 Profiling tape

Apply Denso Mastic Sealing Tape 50mm wide and 1.5mm thick to cover the weld bead. For ease of application it is suggested that 1 or 2 metre strips be pre-cut from the roll.

Remove the release film from one end of the tape and press the compound firmly onto the weld bead. The release film is removed progressively as the tape is placed in position.

NOTE: Do not stretch the tape

Once fully bonded, the tape is applied into the primer whistle smoothing out air pockets. The upper layer of release paper is removed prior to overwrapping with the tape.

PF.2.15.3 Tape wrapping

Apply the Denso Ultra flex 1250/300Tape in a spiral fashion, ensuring a 55% overlap. The tape must be applied with sufficient tension to make it conform to the shop applied coating to the weld and to itself on the overlaps. The tape must be applied free of any creases or air pockets. The tape must cover at least 100mm onto the shop applied coating.

Starting at one side of the weld, begin with a full circumferential wrap of Ultra flex 1250/300 ensuring a 100% overlap. Thereafter proceed by wrapping at a 55% overlap across the width of the butt-welded joint and again finish the wrap with a full circumferential wrap of tape when you reach at least 100mm onto the shop coat. Finish the circumferential wrap in a weatherboard fashion ensuring a 100% overlap.

Whilst applying the Ultra flex 1250/300 tape, ensure that any air bubbles, wrinkles or creases are smoothed out.

PF.2.15.4 Testing

Spark test using a Gatronic Holiday Detector with a brass bristle probe of maximum 300mm width, to be conducted in the presence of the engineer.

Backfill only once the engineer has signed off the QCP documentation.

PF.2.15.5 Protection of buried flanges

Protection of buried flanges shall be carried out in accordance with the Denso Clingwrap System described below. This procedure is based on the Denso range of products. Alternative systems will be considered by the Engineer.

PF.2.15.6 Surface preparation

Surfaces to be protected shall be thoroughly cleaned and dry.

PF.2.15.7 Priming

Brush Denso Priming Solution well over the entire flange, leaving a thin film and a liberal amount around the bolt threads, narrow cavities, etc as per the manufacturer's instructions.

PF.2.16 Application

Apply Denso Superlight Profiling Mastic or Denso Triangular Strips to cover all bolt heads and nuts, built up to form an elliptical sphere section for the entire circumference against each side of the flange.

One layer of Denso Tape is applied circumferentially over the applied Profiling Mastic, and 20mm minimum width onto the pipe barrels either side of the Mastic, allowing a minimum 75mm end overlap in weatherboard fashion.

The Denso Tape is smoothed over carefully to eliminate any air pockets and wrinkles and to seal the overlaps.

100mm wide Denso Tape is applied to the circumference of the pipe barrel either side of the pipe flange and to overlap weatherboard fashion the edges of the previously applied tape by not less than 30mm to reinforce and seal the wrapping procedure. Eliminate air pockets, wrinkles, creases and overlaps as before.

Apply a final application of Denso Clingwrap spirally, commencing at one pipe barrel, over the fitting, and onto the pipe barrel on the other side, allowing a 55% spiral overlap. This is repeated to ensure a four layer outer wrap.

PF.2.17 External and Internal Coating and Lining Repair as Result of Thermic Welding of Cables Onto Pipe

Removal of existing tape wrap to effect thermic welding shall be by means of cutting a 50mm by 50mm square out of the existing tape wrap.

Thermic welding shall be done in terms of the manufacturer's specifications, by cathodic experts, as employed by the Employer.

The cables shall be flattened on the pipe in a longitudinal direction and the thermal weld area shall be completely covered with a Denso mastic or similar approved. The cable shall be covered over a longitudinal distance of 500mm past the thermic welded point, with Denso mastic or similar approved,

The approved Tape Wrap system shall be applied over the existing tape wrap system from a distance of 300mm before the thermic weld to a distance of 500mm after the thermic weld, over the mastic coated cables.

The existing tape shall be well degreased and cleaned before application of the layer of tape that covers the cables and the thermic weld. Internally the lining shall be repaired as per this specification above.

PG GALVANISING

- PG.1 All hot dip galvanizing shall be executed in accordance with the SANS No 763 (as amended) specification for Hot Dip (Galvanised) Zinc Coatings, with particular reference to the following requirements.
- PG.2 All hot dipped galvanizing shall be of the heavy duty grade.
- PG.3 Mild steel plate and sections shall be of good commercial quality, or higher grades, best suited for galvanizing. The material shall be free from slag or coarse laminations, fine fissures and rolled-in impurities.
- PG.4 Castings shall be sound, dense and clean and free from distortion, porosity, carbon and slag enclosures, blow-holes and other injurious conditions.
- PG.5 Folded, riveted or similarly jointed metal constructions are not acceptable.
- PG.6 Welding flux shall be chipped away and all welds wire brushed before galvanizing.
- PG.7 The surfaces to be galvanized shall be free from paint, oil, grease and similar impurities.
- PG.8 All exposed surfaces including welds shall be thoroughly sand blasted prior to galvanizing.
- PG.9 The Engineer shall have the right to inspect all steel components before galvanizing, and to reject or ask for remedial treatment of any material which is considered to be unsuitable. This applies particularly to welds.
- PG.10 The zinc bath shall contain not less than 98,5 % pure zinc.
- PG.11 The galvanized coating shall be smooth, adherent, continuous and free from black spots or flux stains.
- PG.12 Globular extra heavy deposits of zinc which interfere with the intended use of the material shall not be acceptable. Excessively protuberant lumps and nodules shall be removed by hot wiping or by the skilful application of mechanical means. However, there shall remain a sufficient minimum thickness of unbroken zinc coating.
- PG.13 Flaws smaller than 50mm Ø may be repaired by application of two-part zinc rich epoxy performing preparation and application as per the manufacturers requirements. The use of zinc rich or zinc alum paints is not permitted.
- PG.14 Flaws larger than 50mmØ and working surfaces shall be repaired only by stripping and re-dipping.
- PG.15 The deposits required from galvanized coatings shall be as follows:

MATERIAL THICKNESS	COATING GRAMS PER m ²	THICKNESS IN MICRON
5 mm and over	735	105
5 mm to 2 mm	560	80
2 mm to 1,25 mm	385	55
Bolts and nuts	315 - 385	45 – 55

PH PARTICULAR SPECIFICATION FOR VALVES**PH.1 SCOPE AND DEFINITIONS****PH.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.

PH.1.2 NOTES PERTAINING TO THIS PARTICULAR PROJECT

All isolation valves shall be gate valves geared for slow closing.

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.

PH.1.3 DEFINITIONS

The definitions as contained in SANS 191 and 664: 2011 are applicable to this specification.

PH.2 CONSTRUCTION**PH.2.1 GENERAL****PH.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.

PH.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-driving 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.

PH.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.

PH.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)

PH.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.

PH.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.

PH.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 $\pm$ 50 microns; and
- Lining : 250 microns $\pm$ 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	Use an experienced	Each Valve

		finish, free from excessive runs, sags, orange peel, occlusion or other visible defects	observer	
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.

PH.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).

PH.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	50°C

All Woltman type mechanical meters supplied in terms of this contract shall perform to an accuracy of better than $\pm 2\%$ error over the meter's operating range; i.e. between Q_t and Q_p (Q_n). The performance characteristics of the meters offered must be equal to or better than the values listed below:

Size DN	Q_{start} m3/h	Q_{min} m3/h	Q_t m3/h	Q_n (Q_p) m3/h	Q_{max} (Q_s) 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)

PH.2.11 GATE VALVES

Gate valves up to class 25 shall be resilient seal gate valves.

PH.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.

PH.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 DFT of 250 microns inside and out.

The gland packing shall be of the "Maxmech Style M57", Chesterton 1724" or similar approved.

PH.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.

PH.2.15 AIR RELEASE AND VACUUM BREAK VALVES

PH.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.

PH.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

PH.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.

PH.2.16 NON RETURN (CHECK) VALVES

PH.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

PH.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.

PH.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

PH.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)

PH.2.17 LEVEL CONTROL VALVES BY BERMAD OR SIMILAR APPROVED

PH.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.

PH.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.

PH.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.

PH.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.

PH.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.

PH.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

PH.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.

PH.2.18 EQUILIBRIUM FLOAT LEVEL CONTROL VALVES

PH.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.

PH.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)

PI PARTICULAR SPECIFICATION - FLANGES AND ACCESSORIES**PI.1 SCOPE**

This particular specification covers the fabrication, protection and assembly of flanged joints.

PI.2 CONSTRUCTION**PI.2.1 Bolted Connections**

All pipes of 150mm in diameter or larger, connected to equipment or fittings, or where specifically indicated, shall be flanged to SANS 1123:2007 (Table 3) or BS EN 1092 where SANS 1123:2007 (Table 3) does not apply.

Bolts, threaded studs, flat washers and nuts shall be hot dipped galvanised to SANS 121:2000/ISO 1461:1999 and shall comply with relevant requirements of SABS 135 – 1985 and SABS 136 – 1985 where applicable.

The length of each bolt and /or threaded studs shall be such that after the bolt has been tightened onto the flat washer, the end of the bolt shall not project above the nut by more than two threads. Threaded studs on restrained couplings shall be fitted with “backing nuts.”

All nuts and stud bolts are to be dipped in graphite oil or shall be liberally coated with “Copper slip” or similar approved prior to assembly. Upon completion, bolt heads and nuts shall be coated with “Denso Mastic”. Correctly sized and installed stud bolts shall have between 2 and 3 whole threads projecting. Short or long stud bolts shall be replaced. All joints are to be pulled up evenly at all times.

Each flanged joint is to be fitted with an approved and suitably rated gasket and sealed watertight such that there will be no visible sign of leakage under the specified factory and field test pressures and under the in-service working conditions (pressures).

Gaskets are to be installed centrally without damage. No grease or other compound shall be used to hold the gasket in place prior to tightening the bolts. Ring Insert gaskets shall be installed after fitting the bottom half of the bolts and nuts loosely in order to insure that the gasket assembly is centered properly. Full Face gaskets are to be centered by inserting bolts and nuts loosely around the circumference of the flange, at an even spacing.

All bolt torque sequences are to be agreed with the Engineer.

All piping and flanged surfaces shall be cleaned before connections are made.

All flanges shall have a raised face.

The (raised) faces of flanges that are to be in contact with gaskets shall be masked and shall not be painted or coated. The mating flange shall then receive one coat of rust inhibitor (Plascon Rustix 84 or similar approved). Care shall be exercised to ensure that after the application of all coatings there are no runs or drips on the mating surfaces of the flanges and that the flange profiling is clearly visible over the entire face. Excessive coating build up in flange bolt holes that could snag bolts will not be permitted.

Temporary end covers shall be provided by the Contractor for protection of flanges, and prepared plain ends of pipes and fittings to prevent damage to internal lining during transportation and during handling on site.

Buried flanges are to be protected in accordance with Particular Specification PN – Corrosion Protection.

PI.2.2 Flange insulating gaskets.

Novus Flange Insulation Kit Type E Full Face or similar approved shall be used where flange insulating gaskets are specified. Corrosion protection of the area between mild steel and stainless steel flanges shall be in accordance with Standard Specification DWS 9900 Section C36.

PJ PARTICULAR SPECIFICATION FOR WELDING**PJ.1 SCOPE**

This particular specification shall be read in conjunction with the latest version of the American Petroleum Institute Standard (API) 1104, covering the welding of pipelines and related facilities.

PJ.2 CONSTRUCTION**PJ.2.1 Codes, Procedures and Certification of Welders**

Field welding of steel pipelines shall be carried out in accordance with the relevant requirements of the latest version of API 1104.

In particular, The Contractor, prior to commencement of welding, shall produce a qualified Welding Procedure in accordance with the latest version of API 1104 for the intended sizes, processes, positions and consumables to be used on this project. The Welding Procedure shall be approved by the Engineer prior to commencement of welding.

Welding shall be carried out by welders who are competent in terms of the procedure approval test given in API 1104. Prior to commencement of welding, the current qualification of each welder shall be produced in accordance with the welding procedure. Should constant repairs be required on welds carried out by one particular welder, the Engineer may require that the welder be re-tested or removed from the project.

PJ.3 MATERIALS

Welding electrodes shall comply with SABS 455. They shall bear the SABS mark unless prior approval has been obtained from the Engineer to use non-mark-bearing electrodes.

See API 1104 for further details.

PJ.4 GENERAL REQUIREMENTS

For all critical welds the Contractor shall prepare welding procedures and test samples and submit same to the Inspection Authority for evaluation and approval.

Surfaces to be welded shall be free of filing, rust, grease, paint and other foreign materials which may adversely affect the quality of the weld.

Components shall be properly lined up and not distorted or bent after welding.

All welds shall be full penetration welds with no undercut.

PJ.5 MEASUREMENTS AND PAYMENT (CLAUSE 8)**PJ.5.1 BASIC PRINCIPLES (SUB-CLAUSE 8.1.1)**

- a. No separate payment shall be made for welding.
- b. The cost of testing shall be borne by the Employer except for the following costs which shall be borne by the Contractor:
 - i. Testing of operators
 - ii. Testing of welding procedures
 - iii. Any retests necessitated by defects
 - iv. Any tests which, in the opinion of the Engineer, have been necessitated by failure of the Contractor to comply with the requirements of the relevant specification(s).

PJ.5.2 SCHEDULE ITEMS (SUB-CLAUSE A.8.3)

Refer to Clause PSA.8.5.1 on Acceptance Testing.

PART C4: SITE INFORMATION

1. Site Location and Accessibility

The site is about 55km west of Eshowe and is accessible via the P50, P15, and P706;

Refer to Overall Site Plan Layout Drawing number 2142D/PH 1/D/5011

Access to the site is per normal vehicle on tar and dust or gravel roads. Access could become problematic during the rainy season.

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. Survey Pegs

No survey pegs have been placed.

4. 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

King Cetshwayo District Municipality



Occupational health and safety specification for 2142D Middledrift SSA 3 – Potable Water Reticulation

Proudly prepared by

EMPOWERisk Management Services (Pty) Ltd



May 2019

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Occupational health and safety specification for 2142D Middledrift SSA 3 – Potable Water Reticulation

1. Definitions

In this document the following expressions shall bear the meanings assigned to them below:

- 1.1 **Client** means any person for whom construction work is being performed and/or undertaken [i.e. King Cetshwayo District Municipality for purposes of this specification];
- 1.2 **Construction Regulations** means the Occupational Health and Safety Act's, No 85 of 1993, new Construction Regulations (GNR.84 of 07 February 2014) that came into effect on 01 March 2014;
- 1.3 **Occupational health and safety plan** means a sufficiently documented plan to the standards of the Client, which addresses hazards identified and includes safe working procedures to mitigate, reduce or control the hazards identified;
- 1.4 **Occupational health and safety specification** means a documented specification of all health and safety requirements pertaining to the associated works on a construction site, so as to ensure the health and safety of persons working, visiting, passing, staying and/or working close to the construction site and/or other applicable areas such as site camp;
- 1.5 **OHSACT** means the Occupational Health and Safety Act, No 85 of 1993, as amended; and
- 1.6 **Principal Contractor** means an employer, as defined by Section 1 of the OHSACT who performs construction work and is appointed by the Client to be in overall control and management of the construction site and works.

2. Introduction

In terms of Construction Regulation 5(1)(b) of the OHSACT, the Client is required to compile an occupational health and safety specification for any intended project and provide such specification to prospective tenderers/bidders.

This specification has as objective to ensure that the principal contractor entering into a contract with the Client achieves and maintain an acceptable level of occupational health and safety performance and compliance. This document forms an integral part of the contract between the Client and the principal contractor and the principal- and other contractors should make it part of any contract/s that they may have with other contractors and/or suppliers as far as this project is concerned.

Compliance with this document does not absolve the principal contractor from complying with any other minimum legal requirements and the principal contractor remains responsible for the health and safety of his employees, those of his mandatories as well as any persons coming on site or on adjacent properties as far as it relates to the construction activities.

3. Scope

To develop a project specific occupational health and safety specification that addresses the reasonable and foreseeable risks, exposures and aspects of occupational health and safety as affected by the abovementioned contract work.

The specification will provide the requirements that the principal contractor and other contractors will have to comply with in order to reduce the risks associated with the abovementioned contract work and that may lead to incidents causing injury and/or ill health, to a level as low as reasonably practicable and possible.

Any contractor interested in submitting a bid in response to the Client's formal tender for any construction project, has to prepare and include a draft occupational health and safety plan based on this specification and the OHSACT in its tender submission. The Client will evaluate this plan as part of its formal tender adjudication processes to ensure compliance with Construction Regulation 5 that stipulates that the Client may only appoint a contractor who has the necessary competencies and resources to carry of the work appointed for safely.

4. General occupational health and safety provisions

4.1 Hazard identification and risk assessment (Construction Regulation 9)

4.1.1 Risk assessments

Annexure 5 of this specification contains a list of risk assessment headings that have been identified by the Client as possibly applicable to the abovementioned contract work. It is, by no means, exhaustive and is only offered as assistance to the contractors intending to tender for the applicable works. It therefore remains the overall responsibility of the principal contractor to consider all applicable risks and pro-actively undertake risk assessments and implement appropriate risk mitigation measures.

4.1.2 Development of risk assessments

Every principal contractor performing construction work shall, before the commencement of any construction work or work associated with the aforesaid construction work and during such work, ensure that risk assessments are undertaken by a competent person, appointed in writing, and the risk assessments shall form part of the occupational health and safety plan and be implemented and maintained as contemplated in Construction Regulation 9(1).

The risk assessments shall include, at least:

- The identification of the current as well as emerging risks and hazards to which persons may be exposed to;
- The analysis and evaluation of the risks and hazards identified;

- A documented plan of safe working procedures (SWP) and any method statements to mitigate, reduce or control the risks and hazards that have been identified;
- A plan to monitor the application of the SWPs; and
- A plan to review the risk assessments as the work progresses and changes are introduced or incidents occurred which requires the re-evaluation of the processes/risk mitigation.

Based on the risk assessments, the principal contractor must develop a set of site-specific occupational health and safety rules that will be applied to regulate the occupational health and safety aspects of the construction.

The risk assessments, together with the site-specific occupational health and safety rules, must be submitted to the Client before mobilisation on site commences.

Despite the risk assessments listed in Annexure 5, the principal contractor is required to conduct a baseline risk assessment and the aforesaid risk assessments must be incorporated into the baseline risk assessment. The baseline risk assessment must further include the SWPs and the applicable method statements based on the risk assessments.

Hazard identification and risk assessments must be undertaken whilst SWPs must be developed for all out-of-scope work.

4.1.3 Review of risk assessments

The principal contractor is to review the hazards identified, the risk assessments and the SWPs at each production planning and progress report meeting as the contract work develops and progresses and each time changes are made to the designs, plans and construction methods and/or processes.

It is also proposed that should an incident occur the SWPs and all other applicable processes be re-evaluated to ensure that the mitigation measures are still applicable and appropriate and if not a revision of the risk assessments be undertaken.

The principal contractor must provide the Client, other contractors and all other concerned or affected parties with copies of any changes, alterations or amendments as soon as possible but within 14 calendar days of such changes.

4.2 Legal Requirements

All Contractors entering into a contract with the Client shall, as a minimum, comply with the -

- OHSACT and a current, up-to-date copy of the OHSACT and its Regulations must be available on site at all times;
- Compensation for Occupational Injuries and Diseases Act, No 130 of 1993 (COIDA) as amended. The principal contractor will be required to submit a letter of registration and “good-standing” from the Compensation Commissioner or compensation insurer before being awarded the contract. A current, up-to-date copy of the COIDA must be available on site at all times; and
- Where work is being carried out on mine premises, the contractor will comply with the Mine Health and Safety Act and Regulations, No 29 of 1996) as amended, the Minerals Act and Regulations, No 50 of 1991 as amended and any other occupational health and safety requirements that the mine may specify. Current, up-to-date copies of these Acts must, if applicable, also be available on site at all times.

4.3 Structure and responsibilities

4.3.1 Overall supervision and responsibility for occupational health and safety

- a. The principal contractor [appointed in terms of Construction Regulation 5(1)(k)] is responsible to implement and maintain the occupational health and safety plan approved by the Client.
- b. The Chief Executive Officer (in terms of Section 16(1) of the OHSACT) of the principal contractor is to ensure that the Employer (as defined in the OHSACT) complies with the OHSACT. Annexure 1 “Legal Compliance Checklist” may be used for this purpose and assistance.
- c. The principal contractor’s Chief Executive Officer may appoint any person reporting to him/her as Designated Person in terms of Section 16(2) of the OHSACT. Such Designated Person is responsible to assist the Chief Executive Officer to ensure that the Employer complies with the requirements of the OHSACT.
- d. The construction manager, assistant construction manager, construction supervisor and assistant construction supervisor(s) appointed in terms of Construction Regulation 8 are responsible for supervising the construction work and in specific to ensure that all work undertaken comply with the requirements of the OHSACT, its Regulations and the Client’s specifications.

4.3.2 Operational responsibilities for occupational health and safety

The principal contractor shall appoint designated competent employees and/or other competent persons as outlined in the following list to assist with the operational responsibilities for occupational health and safety. This list is only the minimum requirement and is therefore in no way exhaustive.

Appointment description	Appointment required in terms of
Assistant construction manager	Construction Regulation 8(2)
Assistant construction supervisor	Construction Regulation 8(8)
Blasting supervisor	Explosives Regulation 12
Construction health and safety officer	Construction Regulation 8(5)
Construction manager	Construction Regulation 8(1)
Construction supervisor	Construction Regulation 8(7)
Construction vehicle, mobile plant and machinery supervisor	Construction Regulation 23
Drivers of construction vehicles and operators of plant	Construction Regulation 23
Electrical installation and appliances inspector	Construction Regulation 24
Emergency, security and fire coordinator	Construction Regulation 29
Excavation supervisor	Construction Regulation 13
Fall risk protection supervisor	Construction Regulation 10
First-aiders	General Safety Regulation 3
Fire fighting equipment inspector	Construction Regulation 29
Hazardous chemical substances supervisor	Hazardous Chemicals Substances Regulations 10
Incident investigator	General Administrative Regulation 9
Ladder inspector	General Safety Regulation 13(a)
Lifting machines and equipment inspector	Construction Regulation 22
Occupational health and safety committee	OHSACT Section 19
Occupational health and safety representatives	OHSACT Section 17
Person responsible for machinery	General Machinery Regulation 2
Pressure equipment supervisor	Pressure Equipment Regulations
Risk assessor	Construction Regulation 9(1)
Scaffolding supervisor	Construction Regulation 16
Stacking and storage supervisor	Construction Regulation 28
Structures supervisor	Construction Regulation 11
Temporary works supervisor	Construction Regulation 12
Traffic management supervisor	OHSACT Section 9(1)
Traffic safety officer	OHSACT Section 9(1)
Working on, over or next to water supervisor	Construction Regulation 26
Welding supervisor	General Safety Regulation 9

These appointments must be in writing and the responsibilities clearly stated together with the period for which each appointment is made. This information must be communicated to and agreed with the appointees.

Copies of appointments must be submitted to the Client together with concise CV's of the appointees as part of the principal contractor's health and safety plan and if appointed copies of the appointments included in the occupational health and safety file. All appointments must be approved by the Client and any changes of appointees or appointments must be communicated to the Client and agreed upon before being implemented.

The principal contractor must, furthermore provide the Client with an organogram of all contractors that he/she has appointed or intends to appoint and keep this list updated on a weekly basis.

4.3.3 Construction health and safety officer

This project requires the appointment of a full-time construction health and safety officer, appointed in terms of Construction Regulation 8(5). This appointee should be duly registered and in good standing with a statutory body approved by the Chief Inspector as is required by Construction Regulation 8(6).

The South African Council for Project and Construction Management Professions (SACPCMP) is currently the statutory body responsible for the professional registration of construction health and safety officers and a copy of the appointee's SACPCMP's registration certificate should be submitted as part of the principal contractor's health and safety plan and also be readily available in the health and safety file to be kept and maintained on site.

4.3.4 Designation of occupational health and safety representatives (Section 17 of the OHSACT)

Where the principal contractor employs more than 20 persons [including the employees of other contractors (sub-contractors) and its supervisors] he has to appoint one occupational health and safety representative for every 50 employees or part thereof. General Administrative Regulation 6 requires that the election, appointment and subsequent designation of the occupational health and safety representatives be executed in consultation with employee representatives or employees. (Section 17 of the OHSACT as well as General Administrative Regulation 6 and 7 refer).

Occupational health and safety representatives have to be designated in writing and the designation must include the area of responsibility of the person and term of the designation.

4.3.5 Duties and functions of the occupational health and safety representatives (Section 18 of the OHSACT)

- a. The principal contractor must ensure that the designated occupational health and safety representatives conduct a weekly inspection of their respective areas of responsibility, using a checklist, and report thereon to the principal contractor.
- b. Occupational health and safety representatives must be included in accident and/or incident investigations.
- c. Occupational health and safety representatives must attend all occupational health and safety committee meetings.

4.3.6 Appointment of occupational health and safety committee (Section 19 of the OHSACT)

The principal contractor must establish an occupational health and safety committee consisting of all the designated occupational health and safety representatives together with a number of management representatives that are not allowed to exceed the number of occupational health and safety representatives on the committee and a representative of the Client who shall act as the chairperson without voting rights. The members of the occupational health and safety committee must be appointed in writing and copies of the appointments included in the occupational health and safety file.

The occupational health and safety committee must meet as a minimum on a monthly basis and consider, at least, the following agenda items:

1. Opening and welcome.
2. Members present, apologies and absent.
3. Minutes of previous meeting.
4. Matters arising from the previous meeting.
5. Occupational health and safety representatives' reports.
6. Incident and/or accident reports and investigations.
7. Incident, accident and/or injury statistics.
8. Other matters.
9. Endorsement of registers and other statutory documents by a duly authorised representative of the principal contractor.
10. Close and next meeting.

4.4 Mandatories

It is a requirement that the principal contractor, when he appoints contractors or sub-contractors in terms of Construction Regulations 7(1)(c) includes an OHSACT Section 37(2) agreement (i.e. Agreement with Mandatary) in his agreement with such contractor.

4.5 Administrative controls and the occupational health and safety file

4.5.1 The occupational health and safety file [Construction Regulation 7(1)(b)]

As required by Construction Regulation 7(1)(b), the principal contractor and other contractors will each keep an occupational health and safety file on site containing the following documents as a minimum:

1. Copy of the construction work permit (for applicable projects) (Construction Regulation 3)
2. Notification of construction work (Construction Regulation 4.).
3. Updated copies of the OHSACT and its Regulations as well as the COIDA Act (General Administrative Regulation 4.).

4. Proof of registration and good standing with the Compensation Commissioner or a COID Insurer [Construction Regulation 5(1)(j)].
5. Occupational health and safety plan agreed with the Client including the underpinning risk assessment(s) and method statements [Construction regulation 7(1)].
6. Copies of occupational health and safety committee meetings and other relevant minutes.
7. Designs and/or drawings [Construction Regulation 7(1)(b)].
8. A list of contractors (sub-contractors) including copies of the agreements between the parties, proof of good standing with the Compensation Commissioner or COID Insurer, and the type of work to be undertaken by each contractor (Construction Regulation 7).
9. Appointment and designation forms as per paragraphs 4.3.1 and 4.3.2 above.
10. Copy of the construction health and safety officer's SACPCMP registration certificate.
11. The following registers:
 - Accident and/or incident register (Annexure 1 of the General Administrative Regulations);
 - Occupational health and safety representatives' inspection register;
 - Construction vehicles and mobile plant inspections by controller;
 - Daily inspections of vehicles, plant and other equipment by the operator, driver and/or user;
 - Designer's inspections and structures record;
 - Inspection of electrical installations (including inspection of portable electrical tools, electrical equipment and other electrical appliances);
 - Fall risk protection inspections;
 - First-aid box content;
 - Record of first-aid treatment;
 - Fire equipment inspections and maintenance;
 - Record of hazardous chemical substances kept and used on site;
 - Ladder inspections;
 - Machine safety inspections (including machine guards, lock-outs etcetera);
 - Inspection registers and logbooks for lifting machines and – tackle (including daily inspections by drivers/operators);
 - inspections of pressure equipment;
 - Inspections of scaffolding;
 - Inspections of stacking and storage;
 - Inspections of structures; and
 - Inspections of welding equipment.
12. All other applicable records.

The Client will conduct and evaluation of the principal contractor's occupational health and safety file from time to time.

4.6 Occupational health and safety goals and objectives and arrangements for monitoring and review of occupational health and safety performance

The principal contractor is required to maintain a casualty incident frequency rate (CIFR) of not more than four (See Annexure 2 to this document: "Measuring Injury Experience") and report on this to the Client on a monthly basis.

4.7 Notification of construction work (Construction Regulation 4)

The principal contractor does not need to notify the Department of Labour of its intention to carry out construction work as the Client, due to the value of the construction work, needs to apply for a construction work permit in terms of Construction Regulation 3. The principal contractor may not commence with any construction work until a site specific permit number was issued by the Department of Labour and the principal contractor must display this site specific permit number conspicuously at the entrance to the main site camp.

4.8 Medical certificates of fitness (Construction Regulation 7)

As required by Construction Regulation 7(1)(g), the principal contractor must ensure that all employees have a valid medical certificate of fitness specific to the construction work to be performed. These certificates must be issued by an occupational health practitioner in the form of Annexure 3 (i.e. Annexure 3 in the Construction Regulations).

4.9 Training, awareness and competence

The contents and syllabi of all training required by the OHSACT and Regulations must be included in the principal contractor's occupational health and safety plan.

4.9.1 General induction training

All members of the contractor's site management as well as all the persons appointed as responsible for occupational health and safety in terms of the Construction and other Regulations will be required to attend a general induction session.

All employees of the principal and other contractors must be in possession of proof of general induction training.

All subsequent and newly appointed employees must also be subjected to the induction training as soon as possible after the appointment but prior to starting working on site.

4.9.2 Site-specific induction training

The principal contractor will be required to develop a contract work project specific induction training course based on the risk assessments for the contract work and train all employees and other contractors and their employees in this.

All employees of the principal and other contractors must be in possession of proof that they have attended a site-specific occupational health and safety induction training at all times.

4.9.3 Other training

1. All operators, drivers and users of construction vehicles, mobile plant and other equipment must be in possession of valid proof of training and where applicable licenses or proof of competency.
2. All employees in jobs requiring training in terms of the OHSACT and Regulations must be in possession of valid proof of training.
3. Occupational health and safety training requirements [as required by the Construction Regulations and as indicated by the occupational health and safety specification and the risk assessment(s)] i.e. -
 - a. General induction (Section 8 of the OHSACT);
 - b. Site and job specific induction, including visitors (Sections 8 and 9 of the OHSACT);
 - c. Site and project manager;
 - d. Construction manager;
 - e. Construction supervisor;
 - f. Occupational health and safety representatives [Section 18 (3) of the OHSACT];
 - g. Training of the appointees indicated in paragraphs 4.3.1 and 4.3.2;
 - h. Operators and drivers of construction vehicles and mobile plant (Construction Regulation 23);
 - i. Basic fire prevention and protection (Environmental Regulations 9 and Construction Regulation 29);
 - j. Basic first-aid (General Safety Regulations 3);
 - k. Storekeeping methods and safe stacking (Construction Regulation 28); and
 - l. Emergency, security and fire coordinator.

4.9.4 Awareness and promotion

The principal contractor is required to have a promotion and awareness programme in place to create an occupational health and safety culture within employees as well as sub-contractors. The following are some of the methods that may be used:

- Toolbox talks
- Posters

- Videos
- Competitions
- Suggestion schemes
- Participative activities such as employee “occupational health and safety circles”.

4.9.5 Notices and signs

The following notices and signs are, where applicable, compulsory on the construction site as well as the contractors' yards:

Area and/or activity where notice or sign is required	Notice or sign required in terms of
Display of notices and signs	General Safety Regulation 2B and SABS Code 1186
Entry	General Safety Regulation 2C(2)
First-aid	General Safety Regulation 3(6)
Toilets and change rooms	Facilities Regulation 2 (5) 4(2)(f)
Storage of flammable materials	General Safety Regulation 4(8)(a)(i) and (ii) [10(e) only applicable to contractor's yards]
Grinding wheels	Driven Machinery Regulation 8(1)(7)
Machinery	General Machinery Regulation 9 (Schedule D)
Explosive actuated fastening devices	Construction Regulation 21(2)(f)
Prohibition on smoking and eating or drinking at the workplaces where high risk substances [FR5 (1)] are stored or handled	Facilities Regulation 6(b)
Non-potable water	Facilities Regulation 7(B)
Construction Works Permit	Construction Regulation 3(4)

4.9.6 Competence

The principal contractor shall ensure that his and other contractors' employees appointed are competent and that all training required to undertake the work safely and without risk to health of their or other persons, has been successfully completed before work commences.

The principal contractor shall ensure that follow-up and refresher training is conducted on a regular basis as well as the contract work progresses and the work situation or requirements changes.

Records of all training must be kept on the occupational health and safety file for auditing purposes.

4.10 Consultation, communication and liaison

The following arrangements will apply-

- 4.10.1 Occupational health and safety liaison between the Client, the principal contractor, the other contractors, the designer and other concerned parties will be through the occupational health and safety committee. In the absence of a health and safety committee, the Client and principal contractor will agree on an alternative communication forum to be implemented.
- 4.10.2 In addition to the above, communication may be directly to the Client or his appointed Agent, verbally (followed up in writing within 14 calendar days) or in writing, as and when the need arises.
- 4.10.3 Consultation with the workforce on occupational health and safety matters will be through their supervisors, occupational health and safety representatives, the occupational health and safety committee and their elected trade union representatives, if any.
- 4.10.4 The principal contractor will be responsible for the dissemination of all relevant occupational health and safety information to the other contractors, for example design changes agreed with the Client and the designer, instructions by the Client and/or his Agent, exchange of information between contractors, the reporting of hazardous and/or dangerous conditions and/or situations etcetera.
- 4.10.5 The principal contractor will be required to do site safety walks with the Client and/or his Agent on a basis to be determined and agreed between the parties.
- 4.10.6 The principle and other contractors will be required to conduct toolbox talks with their employees on at least a weekly basis and records of these including the topics discussed must be kept on the occupational health and safety file. Employees must acknowledge the receipt of toolbox talks which record must, likewise be kept on the occupational health and safety file.
- 4.10.7 The principal contractor's most senior manager on site will be required to attend all the Client's occupational health and safety meetings.
- 4.10.8 The Client or his Agent and the principal contractor will agree on the dates, times and venues of the occupational health and safety meetings.

4.11 Checking, reporting and corrective actions

4.11.1 Monthly compliance assessment by Client [Construction Regulation 5(1)(0)]

The Client will be conducting a periodic assessment to comply with Construction Regulation 5(1)(o) and to confirm that the principal contractor has implemented and is maintaining the agreed and approved occupational health and safety plan.

4.11.2 Other assessments and inspections by the Client

The Client reserves the right to conduct other ad-hoc assessments and inspections as deemed necessary. This could include among others site safety walks.

4.11.3 Conducting an assessment

A representative of the principal contractor must accompany the Client on all assessments and inspections and may conduct his/her own inspection at the same time. Each party will, however, take responsibility for the results of his/her own assessment and/or inspection.

4.11.4 Contractor's assessments and inspections

The principal contractor is to conduct his own internal assessments and inspections to verify compliance with his own occupational health and safety plan and management system as well as the requirements of this specification and the compliance of other contractors under his/her control.

4.11.5 Inspections by occupational health and safety representatives and other appointees

Occupational health and safety representatives must conduct weekly inspections of their areas of responsibility and report thereon to their foreman or supervisor whilst other appointees must conduct inspections and report thereon as specified in their appointments for example vehicle, plant and machinery drivers, operators and users must conduct daily inspections before start-up.

4.11.6 Recording and review of inspection results

All the results of the abovementioned inspections must be in writing, reviewed at occupational health and safety committee meetings, endorsed by the chairperson of the meeting and placed on the occupational health and safety file.

4.11.7 Reporting of inspection results

The principal contractor is required to provide the Client with a monthly report in the format as per the attached Annexure 3: "Safety, Health and Environment Risk Management Report".

4.12 Incident reporting and investigation

4.12.1 Reporting of accidents and incidents (Section 24 and General Administrative Regulation 8 of the OHSACT)

The principal contractor must report all incidents where an employee is injured on duty to the extent that he/she:

- dies
- becomes unconscious
- loses a limb or part of a limb
- is injured or becomes ill to such a degree that he/she is likely either to die or to suffer a permanent physical defect or likely to be unable for a period of at least 14 days either to work or continue with the activity for which he/she was usually employed

or where -

- a major incident occurred
- the health or safety of any person was endangered
- where a dangerous substance was spilled
- the uncontrolled release of any substance under pressure took place
- machinery or any part of machinery fractured or failed resulting in flying, falling or uncontrolled moving objects
- machinery ran out of control

to the Client within two calendar days and to the Provincial Director of the Department of Labour within seven calendar days from date of incident (Section 24 of the OHSACT and General Administrative Regulation 8), **except** that, where a person has died, has become unconscious for any reason or has lost a limb or part of a limb or may die or suffer a permanent physical defect, the incident must be reported to both the Client and the Provincial Director of the Department of Labour forthwith by telephone, telefax or e-mail. All other reports should still be completed and provided as required.

The principal contractor is required to provide the Client with copies of all statutory reports required in terms of the OHSACT within seven calendar days of the incident occurring.

The principal contractor is required to provide the Client with copies of all internal and external accident/incident investigation reports, including the reports contemplated in 4.11.2 (3) and (4) below, within seven calendar days of the incident occurring.

4.12.2 Accident and incident investigation (General Administrative Regulation 9)

1. The principal contractor is responsible for the investigation of all accidents and/or incidents where employees and non-employees were injured to the extent that he, she and/or they had to be referred for medical treatment by a doctor, hospital or clinic.
2. The results of the investigation to be entered into the accident and/or incident register.
3. The principal contractor is responsible for the investigation of all minor and non-injury incidents as described in Section 24 (1) (b) and (c) of the OHSACT and keeping a record of the results of such investigations including the steps taken to prevent similar accidents/incidents in future.
4. The principal contractor is responsible for the investigation of all road traffic accidents, related to the construction activities, and keeping a record of the results of such investigations including the steps taken to prevent similar accidents in future.
5. The Client reserves the right to hold its own investigation into an incident or call for an independent external investigation.

5. Operational control

5.1 Emergency preparedness, contingency planning and response

- 5.1.1 The principal contractor must appoint a competent person to act as emergency controller and/or coordinator.
- 5.1.2 The principal contractor must conduct an emergency identification exercise and establish what emergencies (such as health, safety, environmental, third party or community related actions etcetera) could possibly develop. He/she must then develop detailed contingency plans and emergency procedures, taking into account any emergency plan that the Client may have in place.
- 5.1.3 The principal contractor and the other contractors must hold regular practice drills of contingency plans and emergency procedures to test them and familiarise employees with them.

5.2 First-aid (General Safety Regulation 3)

- 5.2.1 The principal contractor must provide first-aid equipment (including a stretcher) and have qualified first-aider(s) on site as required by General Safety Regulation 3 of the OHSACT.

- 5.2.2 The contingency plan of the principal contractor must include arrangements for the speedily and timeously transportation of injured and/or ill person(s) to a medical facility or getting emergency medical support to person(s) who may require it.
- 5.2.3 The principal contractor must have firm arrangements with his contractors in place regarding the responsibility of these contractor's first-aid arrangements as well as treatment of injured and/or ill employees.

5.3 Security

- 5.3.1 The principal contractor must establish site access rules and implement and maintain these throughout the construction period. Access control must, among others, include the rule that non-employees will not be allowed on site unaccompanied.
- 5.3.2 The principal contractor must develop a set of project applicable security rules and procedures and maintain these throughout the construction period.

5.4 Accommodation of traffic

- 5.4.1 The principal contractor shall appoint a competent traffic safety officer to take responsibility for the accommodation of all traffic.
- 5.4.2 The principal contractor shall undertake a detailed risk assessment to ensure that all traffic related risks are identified and appropriate risk mitigation measures be established, implemented and maintained. This risk assessment should be kept on the health and safety file and also duly communicated to all employees and especially operators and drivers of construction vehicles and plant.
- 5.4.3 The principal contractor shall develop a comprehensive traffic accommodation plan to provide for traffic entering the site as well as traffic on site, i.e. internal roads and construction areas.
- 5.4.4 Where construction work is undertaken in, next to or close to a public road, the use of appropriate as well as a sufficient number of road signs to be of paramount importance to protect employees against traffic and to warn all road users of the presence of construction work as well as construction employees/risks/vehicles.
- 5.4.5 The principal contractor shall ensure that appropriate as well as a sufficient number of road signs are posted to protect employees against traffic and to warn all road users of the presence of construction work as well as construction employees/vehicles. These signs shall be repeated and utilised, where appropriate, as actual construction work is approached.

- 5.4.6 The following signage shall be provided as a minimum where construction work is undertaken in, next to or close to a public road:
- "Construction work ahead" sign at least 45 meters before the start of the construction work;
 - "Lane narrows" sign 30 meters before the start of the construction work;
 - "Keep right/left" sign 15 meters before the start of the construction work and again where the tapering begins; and
 - Delineators and cones every 5 meters for the entire stretch of construction work.
- 5.4.7 Where construction work includes excavations in or next to a public road, warning lights or visible boundary indicators shall be provided after dark or when visibility is poor.
- 5.4.8 The maintenance of all signage and especially those that is suitable after dark shall be duly managed.
- 5.4.9 Where appropriate duly trained flag persons shall be deployed a good distance ahead of areas where traffic is deviated or lanes closed off. These flag persons to be managed assertively to ensure that they add optimal value and should they not do so they should be retrained and if necessary replaced.
- 5.4.10 The community liaison officer (CLO) shall also be sensitised on the optimal management of traffic and the risks involved and then be instructed to increase community awareness through talking to all stakeholders including the distribution of suitable information brochures.

5.5 Work in fall risk positions [Fall protection (Construction Regulation 10)]

- 5.5.1 A pre-emptive risk assessment is required for any work to be carried out from a fall risk position.
- 5.5.2 As far as is practicable, any person working in a fall risk position will work from a stable platform, ladder or other device that is at least as safe as if he or she is working at ground level and whilst working in this position be wearing suitable fall arrest equipment to prevent the person falling from the platform, ladder or other device utilised. This fall arrest equipment will be, as far as is possible, secured to a point away from the edge over which the person might fall and the lanyard must be of such a length and strength that the person will not be able to move over the edge.

Alternatively any platform, slab, deck or surface forming an edge over which a person may fall shall be fitted with suitable guard rails at two different heights as prescribed in SANS 10085 code of practice for the design, erection, use and inspection of access scaffolding.

- 5.5.3 Where the requirement in paragraph 5.5.2 is not practicable, the person will be provided with a full body harness that will be worn and attached above the wearer's head at all times and the lanyard must be fitted with a shock absorbing device or the person must be attached to a fall arrest system that is approved by the Client.
- 5.5.4 Where the requirements in paragraph 5.5.3 are not practicable, a suitable catch net, which must be able to sustain the weight of at least the average person working in the elevated position, must be erected.
- 5.5.5 Employees working in fall risk positions must be trained to do this safely and without risk to their or other person's health and safety.
- 5.5.6 Where work on roofs is carried out, the risk assessment must take into account the possibility of persons falling through fragile material, i.e. skylights and openings in the roof.
- 5.5.7 Updated records confirming the physical and psychological fitness of employees working in fall risk positions should be kept on the health and safety file at all times.
- 5.5.8 Specifically focusing on the operation risks i.e. mountains.

5.6 Structures (Construction Regulation 11)

The principal contractor must ensure that:

- 5.6.1 Only skilled employees are allowed to erect structures and that the skills of these employees are being verified at regular intervals.
- 5.6.2 Steps are taken to ensure that no structure becomes unstable or collapses due to construction work being performed on it or in the vicinity of it.
- 5.6.3 No structure is overloaded to the extent where it becomes unsafe.
- 5.6.4 He or she has received from the designer the following information:
 - Information on known or anticipated hazards relating to the construction work and the relevant information required for the safe execution of the construction work.
 - A geo-scientific report (where applicable).
 - The loading the structure is designed to bear.
 - The methods and sequence of the construction process.
 - Any other applicable information.
- 5.6.5 All drawings pertaining to the design are on site, utilised and available for inspection.

5.7 Access scaffolding (Construction Regulation 16)

Access scaffolding must be erected, used and maintained safely in accordance with Construction Regulation 16 and SA Bureau of Standards Code of Practice, SANS 10085 entitled, "The Design, Erection, Use and Inspection of Access Scaffolding".

Detailed consideration must be given to all scaffolding to ensure that it is properly planned to meet the working requirements, designed to carry the necessary loadings and maintained in a sound condition. It must also be ensured that there is sufficient material available to erect the scaffolding properly and safely.

Scaffolding must be erected, altered, maintained or dismantled by person(s) who has/have adequate training and experience in this type of work or under the continuous and direct supervision of such a person.

5.8 Lifting equipment (Construction Regulation 22)

Lifting equipment must be designed and constructed in accordance with the manufactures/designers specifications as well as generally accepted technical standards and operated, used, inspected and maintained in accordance with the manufactures requirements as well as that of the Driven Machinery Regulation 18 of the OHSACT:

The Driven Machinery Regulation requires that:

- a. Lifting equipment to be clearly and conspicuously marked with the maximum mass load (MML) that it is designed to carry safely. When the MML varies with the conditions of use, the table of maximum loads should be used by the driver/operator;
- b. Each winch on a lifting machine must at all time have, at least, three full turns of rope on the drum when the winch has been run to its lowest limit;
- c. Lifting equipment be fitted with a brake or other applicable device capable of holding the MML. This brake or device must automatically prevent the downward movement of the load when the lifting power is interrupted;
- d. Lifting equipment fitted with a load limiting device that automatically arrest the lift when the load reaches its highest safe position or when the mass of the load is greater than the MML;
- e. Every chain or rope on a lifting machine that forms an integral part of the machine must have a factor of safety as prescribed by the manufacturer of the machine and where no standard is available the factor of safety must be:
 - chains – 4 (four)
 - steel wire ropes - 5 (five)
 - fibre ropes- 10 (ten)
- f. Every hook or load attaching device must be designed as such or fitted with a device that will prevent the load from slipping off or disconnecting;
- g. Every lifting machine must be inspected and load tested by a competent person every time it has been dismantled and re-erected and every 12 months after that. The load test must be in accordance with the

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- manufacturers prescription or to 110% of the MML in addition all ropes, chains, hooks or other attaching devices, sheaves, brakes and safety devices forming an integral part of a lifting machine must be inspected every 6 months by a competent person;
- h. All maintenance, repairs, alterations and inspection results must be recorded in a log book and each lifting machine must have its own log book; and
 - i. No person may be lifted by a lifting machine not designed for lifting persons unless in a cradle approved by an inspector of the Department of Labour.

5.9 Lifting tackle

The following requirements will apply to lifting tackle:

- a. Manufactured of sound material, well constructed and free from latent defects;
- b. Clearly and conspicuously marked with an identity number;
- c. Maximum mass load factor of safety:
 - Natural fibre ropes - 10(ten)
 - Man-made fibre ropes and woven webbing - 06(six)
 - Steel wire ropes – single rope - 06(six)
 - Steel wire ropes – combination slings - 08(eight)
 - Mild Steel chains - 05(five)
 - High tensile/alloy steel chains - 04(four)
- d. Steel wire ropes must be discarded (not used any further for lifting purposes) when wear and corrosion is evident and must be examined by a competent person every three months for this purpose and the results recorded in a designated log book.

5.10 Construction vehicle and mobile plant operators

The following requirements will apply to construction vehicle and mobile plant operators:

- a. Only certified and/or competent employees may be allowed to operate any construction vehicle and mobile plant.
- b. Every lifting machine operator must be trained specifically for the type of lifting machine that he or she is operating.
- c. Only employees duly authorised to do so may operate any construction vehicle and mobile plant.
- d. Only employees physically and psychologically fit, i.e. in possession of a medical certificate of fitness, may be allowed to operate any construction vehicle and mobile plant.

5.11 Electrical installations (Construction Regulation 24)

Any electrical work undertaken as part of the project, including the installation of temporary electricity for construction use shall be in accordance with Construction Regulation 24 and the Electrical Installation Regulations.

The principal contractor must ensure that:

- a. Existing services are to be located and clearly marked before construction commences and during the progress thereof;
- b. Where the abovementioned is not possible, employees with jackhammers etc. will be protected against electric shock by the use of suitable protective equipment e.g. rubber mats, insulated handles etcetera;
- c. Electrical installations and -machinery are sufficiently robust to withstand normal working conditions on site;
- d. Temporary electrical installations must be inspected at least once per week by a competent person and a record of the inspections kept on the occupational health and safety file;
- e. Electrical machinery used on a construction site must be inspected daily before start-up by the competent driver/operator or any other competent person and a record of the inspections kept on the occupational health and safety file; and
- f. A competent person appointed in writing must control all temporary electrical installations.

5.12 Electrical and mechanical lockout

An electrical and mechanical lockout procedure must be developed by the principal contractor and submitted to the Client for approval before construction commences. All contractors on site must be informed of and adhere to this lockout procedure.

5.13 Use and storage of flammables (Construction Regulation 25)

The principal contractor must ensure that:

- a. No person is required or permitted to work in a place where there is the danger of fire or an explosion due to flammable vapours being present unless adequate precautions is taken;
- b. Flammables stored on a construction site are stored in a well-ventilated, reasonably fire-resistant container, cage or room that is kept locked with consistent access control measures in place and sufficient fire fighting equipment installed and fire prevention methods practiced for example proper housekeeping;
- c. Only one day's quantity of flammable is to be kept in the workplace;
- d. Containers (including empty containers) to be kept closed to prevent fumes/vapours from escaping and accumulating in low lying areas; and
- e. Welding and other flammable gases to be stored segregated as to the type of gas and empty and full cylinders.

5.14 Hazardous chemical substances

The principal contractor must ensure that:

- a. Employees receive the necessary information and training to be able to use, handle and store hazardous chemical substances safely;
- b. The risk assessments required in terms of Construction Regulation 9 include employee exposure to hazardous chemical substances and that the necessary measures be taken to protect persons from being detrimentally affected by hazardous chemical substances present or used in the workplace;
- c. Suppliers provide the necessary information in the form of material safety data sheets regarding hazardous chemical substances required to ensure the safe use, handling and storage of these substances;
- d. An up-to-date list is kept on site of hazardous chemical substances stored and used together with the material safety data sheet of the said hazardous chemical substances;
- e. Hazardous chemical substances containers be clearly marked as to the contents and main hazardous category e.g. "Flammable" or "Corrosive" and the reference number of the hazardous chemical substances on the list indicated above;
- f. No person eats or drinks in an area where hazardous chemical substances are stored or utilised; and
- g. Hazardous chemical substances waste is disposed of safely in terms of hazardous waste disposal requirements.

5.15 Fire prevention and protection

The principal contractor must ensure that:

- a. The risk of fire is avoided;
- b. Sufficient and suitable storage of flammables is provided;
- c. All employees are instructed in the use of the fire fighting equipment and know how to attempt to extinguish a fire;
- d. A sufficient number of employees are appointed and trained to act as an emergency team to deal with fires and other emergencies;
- e. Employees are informed regarding emergency evacuation procedures and escape routes;
- f. Emergency escape routes are kept clear at all times and clearly marked;
- g. Evacuation assembly points are demarcated and made known to employees;
- h. Evacuation is regularly practiced to ensure that all persons are evacuated timeously and;
- i. Roll call is held after evacuation to account for all employees and to ensure that no-one including visitors and disabled persons have been left behind; and
- j. A clearly audible, to all persons on site, siren or alarm is fitted and regularly tested.

5.16 Housekeeping (Construction Regulation 27)

The principal contractor must ensure that:

- a. Housekeeping is continuously implemented and maintained;
- b. Materials and equipment are properly stored;
- c. Scrap, waste and debris are removed off site regularly;
- d. Materials placed for use are placed safely and not allowed to accumulate or cause obstruction to the free-flow of pedestrians and vehicular traffic;
- e. Where practicable, construction sites are fenced off to prevent entry of unauthorised persons;
- f. An unimpeded work space is maintained for every employee;
- g. Every workplace is kept clean, orderly and free of tools and the likes that are not required for the work being done;
- h. As far as is practicable, every floor, walkway, stair, passage and gangway is kept in good state of repair, skid-free and free of obstruction, waste and materials; and
- i. The walls and roof of every indoor workplace be sound and leak-free.

5.17 Stacking and storage (Construction Regulation 28)

The principal contractor must ensure that:

- a. A competent person is appointed in writing to supervise all stacking and storage on a construction site;
- b. Adequate storage areas are provided and demarcated;
- c. The storage areas are kept neat and under control;
- d. The base of any stack is level and capable of sustaining the weight exerted on it by the stack;
- e. The items in the lower layers can support the weight exerted by the top layers;
- f. Cartons and other containers that may become unstable due to wet conditions are kept dry;
- g. Pallets and containers are in good condition and no material is allowed to spill out;
- h. The height of any stack does not exceed 3 times the base unless stepped back at least half the depth of a single container at least every fifth tier or the approval of an inspector of the Department of Labour has been obtained to build the stacks higher with the aid of a machine. (The operator of the machine must be protected against items falling from overhead or off the stack and no items may overhang);
- i. The articles that make up a single tier are consistently of the same size, shape and mass;
- j. Structures for supporting stacks are structurally sound and able to support the mass of the stack;
- k. No articles are removed from the bottom of the stack first but from the top tier first;
- l. Anybody climbing onto a stack can and does do it safely and that the stack is sufficiently stable to support him or her;
- m. Stacks that are in danger of collapsing are broken down and restacked;

- n. Stability of stacks are not threatened by vehicles or other moving plant and machinery;
- o. Stacks are built in a header and stretcher fashion and that corners are securely bonded; and
- p. Persons climbing onto stacks do not approach unguarded moving machinery or electrical installations.

5.18 Eating, changing, washing and toilet facilities (Construction Regulation 30)

5.18.1 Toilets

- a. The provision of toilets for each sex is required in terms of the National Building Regulations and Construction Regulation 30.
- b. Chemical toilets are allowed instead of the water borne sewerage type. Toilets have to be provided at a ratio of at least 1 toilet per 30 employees.

5.18.2 Showers

At least cold-water showers of some sort for each sex have to be provided at a ratio of at least 1 shower per 15 employees.

5.18.3 Change rooms

Some form of screened off changing facility must be provided separately for each sex.

5.18.4 Eating facility

Some form of eating facility sheltered from the sun, wind and rain must be provided.

5.18.5 Living accommodation

Where the site is in a remote location and transport to home is not readily available, reasonable and suitable living accommodation must be provided after obtaining of the necessary permission from authorities and adhering to requirements such as Bylaws of the local municipality.

5.19 Personal and other protective equipment (Sections 8, 15 and 23 of the OHSACT)

The principal contractor is required to proactively identify the hazards in the workplace and deal with them on an ongoing basis. He/she must either remove them or, where impracticable take steps to protect employees and make it possible for them to work safely and without risk to health under the hazardous conditions.

Personal protective equipment should, however, be the last resort and there should always first be an attempt to apply re-engineering and other solutions to mitigating hazardous situations before the issuing of personal protective equipment is considered.

Where it is not possible to create an absolutely safe and healthy workplace the principal 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 principal contractor maintain the said equipment, that he/she instructs and trains the employees in the use of the equipment and ensures that the prescribed equipment is used by the employee/s in a consistent and correct manner.

Employees do not have the right to refuse to use and/or 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 valid 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 the employee.

The principal contractor may **not charge any fee** for protective equipment prescribed by him or 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 blatantly abused or neglected the equipment leading to early failure; and
- Where the employee has lost the equipment.

Please note: Bullet points two and three above should form part of a formal disciplinary process, i.e. following a disciplinary hearing.

5.20 Portable electrical tools and equipment (Electrical Machinery Regulation 9)

Portable electrical tools and equipment includes every unit that takes electrical power from a 15 ampere plug point and is moved around for use in the workplace i.e. drills, saws, grindstones, portable lights, etcetera. In addition electrical appliances such as fridges, hotplates, heaters, etcetera must be inspected regularly but at least on a weekly basis and maintained to the same standards as portable electrical tools and appliances.

The use, inspection and maintenance of portable electrical tools and equipment must be governed by the following:

- Regular inspections by a competent person appointed in writing;
- Inspection results must be recorded in a register;

- Only competent authorised persons are allowed to use portable electrical tools and equipment; and
- The correct protective equipment is worn/used whilst operating portable electrical tools and equipment.

This equipment -

- Must be maintained in good condition at all times to prevent an electrical shock to the user;
- The main source should incorporate an earth leakage protection device or receive power through a double wound transformer or be double insulated and clearly marked as such; and
- All equipment must be fitted with a switch to allow for safe and easy starting and stopping.

5.21 Public health and safety (Section 9 of the OHSACT)

The principal contractor is responsible for ensuring that non-employees affected by the construction work are made aware of the dangers likely to arise from said construction work as well as the precautionary measures to be observed to avoid or minimise those dangers. This includes among others:

- a. Non- employees entering the site for whatever reason;
- b. The surrounding community; and
- c. Passers by the site.

Appropriate signage must be posted to this effect and all employees on site must be instructed to ensure that non-employees are protected at all times.

All non-employees entering the site must receive site applicable induction into the hazards and risks and the control measures for these.

5.22 Excavations (including piling) (Construction Regulation 13)

All excavation work has to comply with the following:

- 5.22.1 Excavation work must be carried out under the supervision of a duly competent person who has been appointed in writing.
- 5.22.2 Before excavation work begins the stability of the ground must be evaluated.
- 5.22.3 Whilst excavation work is being performed, the principal contractor must take suitable and sufficient steps to prevent any person from being buried or trapped by a fall or dislodgement of material.
- 5.22.4 No person may be required or permitted to work in an excavation that has not been adequately shored or braced.

- 2.22.5 Where the excavation is in stable material or where the sides of the excavation are sloped back to at least the maximum angle of repose measured relative to the horizontal plane, shoring or bracing may be left out **but only after** written permission has been obtained from the appointed competent person.
- 5.22.6 Shoring and bracing must be designed and constructed to safely support the sides of the excavation and prevent it from collapsing.
- 5.22.7 Where uncertainty exists regarding the stability of the soil the opinion of a competent professional engineer or professional technologist must be obtained, before excavation proceeds, whose opinion will be decisive. The opinion must be in writing and signed by the engineer or technologist as well as the appointed excavation supervisor.
- 5.22.8 No load or material may be placed near the edge of an excavation if it is likely to cause a collapse of the excavation, unless suitable shoring has been installed to be able to carry the additional load. Best practice requires a one meter clearance so as to reduce the pressure on the side walls as well as risk of material falling onto persons inside the excavation.
- 5.22.9 Every excavation must be provided with means of access that must be within 6 metres of any employee within the excavation at any time. Should ladders be utilised for this purpose they should be duly secured.
- 5.22.10 The location and nature of any existing services such as water, electricity, gas, telecommunication etcetera must be established before any excavation is commenced with and any service that may be affected by the excavation must be protected and made safe for employees working in or near in the excavation.
- 5.22.11 Every excavation, including the shoring and bracing or any other method to prevent a possible collapse, must be inspected by the appointed competent person as follows:
- Daily before work commences
 - After every blasting operation
 - After an unexpected collapse of the excavation or part thereof
 - After substantial damage to any support
 - After rain
- 5.22.12 The results of any inspections must be recorded in a register kept on site in the health and safety file.
- 5.22.13 Every excavation accessible to the public or that is adjacent to a public road or thoroughfare or that threatens the safety of persons, must be adequately barricaded or fenced off, on all sides, to at least one meter high and as close to the excavation perimeter as practicable. All such excavations must also be provided with warning

lights or visible boundary indicators after dark or when visibility is poor.

5.23 Blasting

In the event of blasting work being required, the principal contractor must ensure that:

- a. Blasting activities are carried out under the supervision of a competent person who has been appointed in writing.
- b. A method statement is developed in accordance with all applicable explosives legislation, by an appointed person who is certified as a competent person in the use of explosives.
- c. The necessary permits are in place for the transportation of explosives to be used.
- d. Access to the blasting area is strictly restricted.
- e. No smoking or hot work is allowed close to explosives or the blasting areas.
- f. Reasonable steps are taken to prevent damage to structures in the vicinity of the blasting area.
- g. Any other industry required safety measures are considered and implemented specifically taking the construction site's specific requirements into account including the removal of any surplus explosives off the site.

5.24 Working over or close to water

Where construction or other support work is undertaken over or in close proximity to water or similar liquids such as wastewater and sludge, the principal contractor shall –

- a. Appoint a competent person in writing to supervise, control and inspect any work on or over or in close proximity of the water as well as the construction, installation, and dismantling of caissons and/or cofferdams and/or other support or safety structures;
- b. Ensure that written proof of the competence of above appointee is available on site;
- c. Ensure that risk assessments are carried out by the competent person before any work is undertaken, mitigation measures documented as well as implemented and thereafter evaluated on a daily basis;
- d. Undertake the necessary induction and refresher training;
- e. Ensure that measures for the timeous warning of flooding are in place;
- f. Ensure that provision is made to prevent employees from falling into the water and the rescuing of employees in danger of drowning;
- g. Ensure that where an employee is exposed to the risk of drowning by falling into the water, a lifejacket is provided to and worn by the employee; and
- h. Provide applicable personal protective equipment such as safety harnesses etcetera and enforce the utilisation thereof.

5.25 Temporary work

- a. Temporary work must be carried out under the supervision of the competent person designated in writing.
- b. Temporary work structures must be so designed, erected, supported, braced and maintained that they will be able to support any vertical or lateral loads that may be applied.
- c. No load may be imposed onto a structure that the structure is not designed to carry.
- d. Temporary work must be erected in accordance with the structural design drawings for such temporary work and if there is any uncertainty, the designer must be consulted before proceeding with the erection/use of the temporary work.
- e. All drawings pertaining to the temporary work must be kept and be available on site.
- f. All equipment used in the erection of temporary work must be checked by a competent person before use.
- g. The foundation or base upon which the temporary work is erected must be able to bear the weight and keep the structure stable.
- h. Employees erecting temporary work must be trained in the safe work procedures for the erection, moving and dismantling of the temporary work.
- i. Safe access and emergency escape must be provided for employees.
- j. A competent person must inspect the temporary work structures that have been erected before, during and after pouring of concrete or the placing of any other load and thereafter daily until the temporary work is stripped. The dismantling must also be undertaken under the direct supervision of the appointed competent person. The results of all inspections must be recorded in a register kept on the site health and safety file.
- k. The temporary work must be left in place until the designated competent person has authorised its stripping in writing.
- l. Any damaged temporary work must be repaired and/or rectified without delay.
- m. Deck panels must be secured against displacement.
- n. The slipping of employees and other persons on release agents on deck panels must be prevented at all times.
- o. Employees' health must be protected against the use of solvents, oils or other similar substances.

5.26 Welding, flame cutting or similar operations

Should any welding work be undertaken as part of emergency repairs to plant and equipment on site or as part of the construction activities, the principal contractor must ensure that:

- 5.26.1 A competent person will be appointed to supervise welding, flame cutting or similar operations on site.
- 5.26.2 The following rules will govern all welding and flame cutting or similar operations:

- a. The welder will be trained regarding the safe use/operation of the equipment.
- b. The welder and his assistant will be provided with effective and appropriate personal protective equipment and/or clothing.
- c. Cables and electrode holders will be effectively insulated.
- d. The workplace will be effectively screened off to prevent bystanders from being affected by the welding rays or they will be provided with personal protective equipment.
- e. Special precautions will be taken where welding is undertaken in confined spaces e.g. proper and sufficient ventilation will be provided.
- f. In wet or damp conditions the welding equipment and the welder will be properly insulated and someone will be on standby to assist in the event of any emergency.
- g. A qualified person will certify in writing that it is safe to enter and work in a specific confined space before welding or flame cutting is undertaken.
- h. No welding, flame cutting, grinding, soldering or similar work shall be undertaken in respect of any drum, vessels or similar object or container where such object or container-
 - is completely closed, unless the rise in internal pressure cannot render it dangerous; or
 - contains any substance which, under the action of heat may explode or react to form dangerous or poisonous substances.
- i. Where pressure vessels/welding cylinders containing oxygen or acetylene are transported or used, the proper precautionary measures will be taken against bumping, falling, rolling etcetera.
- j. Gas welding hoses may only be joined with approved connectors and clamps.
- k. No oil or grease may be applied to oxygen valves and fittings.
- l. It is a sound practice to store pressure vessels and/or welding cylinders vertically and to secure them by means of a chain.
- m. Acetylene cylinders may never be inclined in excess of 45°.
- n. Proper and adequate fire prevention measures will be instituted and maintained for as long as the welding continues.
- o. Where explosive and/or flammable vapours are present welding will only be done under “hot work” permits.

5.27 Transportation of employees

- 5.27.1 Any vehicle used to transport employees must have seats firmly secured and adequate for the number of employees to be carried. No employee may be permitted to stand on the back or sit on the edge of the vehicle.
- 5.27.2 The vehicle utilised for the transportation of employees must be equipped with a serviced and fully operational fire extinguisher.

5.27.3 Regulation 247 of the National Road Traffic Act, Number 93 of 1996 (NRTA) stipulates that the principal contractor shall not allow employees to be transported in a vehicle unless the portion of the vehicle in which the employees are being conveyed is enclosed to a height of –

- a. at least 350 mm above the surface on which employees are seated; or
- b. at least 900 mm above the surface on which employees are standing,

in a manner and with a material of sufficient strength to prevent employees from falling from such vehicle when it is in motion.

5.27.4 Regulation 247 of the NRTA also stipulates that the principal contractor shall also not allow any employees to be conveyed in the goods compartment of a vehicle together with any tools or goods, except their personal effects, unless that portion in which the employees are being conveyed is separated by means of a partition, from the portion in which such goods are being conveyed.

5.28 Working under or close to overhead power lines

The principal contractor shall ensure that the following requirements are duly considered and adhere to:

5.28.1 Passing underneath overhead lines to access the site

Some of the access roads to the site cross under existing power lines.

The principal contractor has to –

- a. keep the number of passageways to a minimum;
- b. define the route of the passageway;
- c. ensure the surface of the passageway is as levelled as possible;
- d. put warning notices at either side of the passageway;
- e. enforce strict speed control measures; and
- f. make sure that the barriers and goalposts are maintained.

5.28.2 Working underneath overhead lines

- a. The principal contractor must confirm with the local authority or if applicable Eskom what the standard is for working close to and under these overhead lines.
- b. A risk assessment should be undertaken taking into account any situations that could lead to danger from the overhead wires, for example, consider whether someone may need to stand on top of a machine or scaffold platform and lift a long item above their head, or if the combined height of a load on a low truck breaches the safe clearance distance. If this type of situation could exist, applicable precautionary measures have to be taken.

- c. Where there is a risk of contact from, for example, the upward movement of cranes or tipper trucks or employees carrying tools and equipment, the principal contractor should carefully assess the risks and precautionary measures.
- d. Vehicles, plant, machinery, equipment, or materials that could reach beyond the safe clearance distance should not be taken near the line.
- e. Under no circumstances may any part of plant or equipment such as ladders, poles and hand tools be able to be utilised within the danger zone or make contact with the lines.
- f. The principal contractor should allow for uncertainty in measuring the distances and for the possibility of unexpected movement of the equipment due, for example, to wind conditions.
- g. Long objects should be carried horizontally and close to the ground and vehicles positioned so that no part can reach into the danger zone, even when fully extended.
- h. Construction vehicles and plant working underneath overhead lines such as cranes, excavators and tele-handlers should be modified by the suppliers with the addition of suitable physical restraints so that they cannot reach beyond the safe clearance distances, measures should be put in place to ensure these restraints are effective and cannot be altered or tampered with.
- i. Operators of high machinery should be instructed not carry out any work on top of the machinery near overhead power lines.
- j. Make sure that employees, including any sub-contractors, understand the risks and are provided with instructions about the risk prevention measures.
- k. Arrange for the work to be directly supervised by a competent person at all times who is familiar with the risks and can make sure that the required safety precautions are observed.

5.28.3 Emergency procedures

If someone or something comes into contact with an overhead line, it is important that everyone involved knows what action to take to reduce the risk of anyone sustaining an electric shock or burn injuries. Key points include –

- a. Never touch the overhead line's wires.
- b. Always assume that the wires are live, even if they are not arcing or sparking, or if they otherwise appear to be dead. Even if lines are dead, they may be switched back on either automatically after a few seconds or remotely after a few minutes or even hours if the line's owner is not aware that their line has been damaged.
- c. In the event of accidental contact call the emergency services. Give them the location of the incident, tell them what has happened and that electricity wires are involved.
- d. Should any employee or other person come in contact with, or close to, a damaged wire, he must away as quickly as possible and stay away until the line's owner advises that the situation has been made safe.

- e. In the event of a vehicle touching a wire, the driver and occupants should either stay in the vehicle or, should the need to get out, jump out of it as far as you can. Never touch the vehicle while standing on the ground. Do not return to the vehicle until it has been confirmed that it is safe to do so.
- f. All employees and other persons should be aware that if a live wire is touching the ground the area around it may be live. A safe distance from the wire or anything else it may be touching should therefore be maintained.
- g. Only duly competent and authorised persons may work on electrical wires and installations.

5.29 Exposure to poisonous animals or insects

The principal contractor shall ensure that the following are duly adhered to:

- a. the emergency procedure be expanded to provide for the effective treatment of employees or other persons visiting exposed to bites or stings from poisonous animals and insects, i.e. the contact details of the nearest medical unit that could treat employees exposed to bites or stings be obtained and arrangements be made with this service provider on the procedures to be followed to ensure swift response when required;
- b. confirmation be obtained from this medical unit that they have anti venom reserved to treat employees or other persons visiting that may be exposed to snake bites or scorpion stings;
- c. competent first aiders be available to facilitate the treatment of employees or other persons visiting exposed to stings or bites; and
- d. the potential exposure posed by poisonous animals or insects and awareness thereof is discussed with all employees as part of the toolbox talks and general awareness training and other persons visiting as part of the pre-site visit induction process.

5.30 Working in inclement weather

The principal contractor shall implement an early warning system to identify inclement weather and to prevent such weather from posing negative implications on the safety of employees and other persons visiting.

The early warning system shall as a minimum provide for the following:

5.30.1 Construction work done during electrical storms

- a. The principal contractor shall ensure that all employees are removed from heights and all employees are as safe as possible, in inclement weather conditions.
- b. No work is allowed on the construction site during electric storms where employees cannot be protected from it. Protection involves employees being restricted to:
 - eating area fitted with a lightning mast
 - workshops
 - inside buildings

- c. No work is allowed in electrical storms on top of open structural steel, even when earthed.
- d. No work is allowed on heights when the lightning is within a 10 kilometre radius.
- e. After inclement weather on-site risk assessments will be reviewed to include wet conditions.

5.30.2 Lifting equipment operations during inclement weather

- a. Lifting operations will stop during lightning within a 10 kilometre radius and wind above 28 km/h, and the lifting equipment operator will not be allowed to leave the lifting equipment with the booms extended.
- b. Lifting operations will stop during rain, rigging and hand lifts.
- c. Booms on all lifting equipment will be retracted.
- d. All rigging operations will stop and employees will be removed from site.

5.30.3 Construction work done during rain

- a. During rainy conditions all work on steel structures will stop.
- b. No electrical tools will be used during rainy weather in open areas.
- c. Work can be done in water proof areas where there is a zero risk for electrocution.
- d. Areas that may be cleared for work during rain includes:
 - workshops
 - offices
 - work on ground level with the provision that the area is maintained in a safe dry condition

5.30.4 Scaffolding activities during inclement weather conditions

During inclement weather only limited scaffolding actions will be permitted i.e. erecting and dismantling activities.

Guidelines for safe choices:

Weather type	Building and dismantling of scaffolding
Lightning	Stop all activities
Light rain	Stop all activities
Heavy rain	Stop all activities
Wind <28 km/h	Full use
Wind >40 km/h	Stop all activities
Light mist	Full use
Heavy mist	Full use
Hail	Stop all activities

Sometimes it might be necessary to allow scaffolding activities to continue during abnormal equipment and process conditions as this could impair personnel safety or pose an environmental risk. In such

cases, scaffolding activities may continue with the provision that the relevant team ensures that a comprehensive risk assessment is done, whilst considering both work and weather conditions.

All scaffold users will:

- a. Ensure that scaffolding is inspected immediately after inclement weather conditions.
- b. Ensure that the risks associated with working at heights during inclement weather are identified and reasonably mitigated.
- c. Be cautious of slip/trip hazards when performing activities during inclement weather.
- d. Take note of the weather when completing the daily safe task instructions on site, where applicable.

5.30.5 Driving in inclement weather

The principal contractor shall ensure that the danger of driving in wet conditions is adequately covered in a risk assessment.

The risk assessment will include, but not limited to:

- a. route planning
- b. speed reduction
- c. planning for emergency situations
- d. driving precautions for slippery surfaces
- e. visibility hazards

6. Health and safety policy

The principal contractor has to provide the Client, as an annexure to the health and safety plan, with a detailed health and safety policy outlining the principal contractor's stance on and principles adopted for health and safety.

7. Cost for health and safety measures during the construction process

To enable the Client to comply with Construction Regulation 5(1)(g), all potential principal contractors submitting tenders/bids have to demonstrate to the Client that sufficient provision has been made for the cost to implement and maintain the health and safety plan proposed by the principal contractor to meet the requirements of this health and safety specification as well as that of the OHSACT and its Regulations.

A detailed schedule of costs has to be included in the health and safety plan submitted as part of the potential principal contractor's tender document. Failure by the principal contractor to adhere to this requirement will force the Client to reject the tender/bid in terms of Construction Regulation 5(1)(h).

8. Project specific risk assessment requirements

See Annexure 5.

9. Overview of annexures

Annexure 1: Legal compliance assessment.
Annexure 2: Measuring injury experience.
Annexure 3: SHE risk management report.
Annexure 4: Guide to risk assessments.
Annexure 5: List of risk assessments.

10. Enquiries

For any enquiries regarding this occupational health and safety specification, please contact –

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King Cetshwayo District Municipality



Annexure 1

Legal compliance assessment

Proudly prepared by

EMPOWERisk Management Services (Pty) Ltd



May 2019

Occupational health, -safety and environment: Risk assessment checklist

(Based on the Construction Regulations of the Occupational Health and Safety Act)

* Denotes items applicable to both construction sites, contractor plant and storage yards

ELEMENT	REMARKS
1. Administrative and legal requirements	
2. Education, training and promotion	
3. Public safety, security measures and emergency preparedness	
4. Personal protective equipment	
5. Housekeeping	
6. Working at heights (including roof work)	
7. Scaffolding and temporary work	
8. Ladders	
9. Electrical safeguarding	
10. Emergency, fire prevention and protection	
11. Excavations and demolition	
12. Tools	
13. Cranes	
14. Builder's hoist hoists	
15. Transport and materials handling equipment	
16. Site plant and machinery	
17. Plant and storage yard or site workshop specifics	
18. Workplace environment, health and hygiene	

1. Administrative and Legal Requirements

OHSACT Section or Regulation	Subject	Requirements	Yes/No
Construction Regulation 3	Application for construction permit	Should the project qualifies to trigger this requirement - • Application for permit lodged; • Copy of construction permit in the OHS file; and • Is the site specific permit number conspicuously displayed at the main entrance.	

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OHSACT Section or Regulation	Subject	Requirements	Yes/No
Construction Regulation 4	Notice of carrying out Construction work	For construction projects where no permit is required - - Was the Department of Labour notified; and - Is a copy of notice available on site.	
General Admin. Regulation 4	Copy of OHSACT	Updated copy of the OHSACT and Regulations on site. Readily available for perusal by all employees.	
COID Act Section 80 and Construction Regulation 5(1)(j)	Registration with Compensation Commissioner or other approved compensation insurer	Written proof of registration/Letter of good standing available on site.	
Construction Regulation 4 and 5(1)	OHSACT specification, plans and program	OHSACT spec received from King Cetshwayo District Municipality. OHSACT plan developed. OHSACT program implemented. Plans and program updated regularly.	
Section 8(2)(d) Construction Regulation 9	Hazard identification and risk assessment	Competent risk assessor appointed in writing Proof of risk assessor's competence available on site Risk assessment and –plan drawn up and updated. Baseline risk assessment undertaken prior to commencement of construction work. Copy of baseline risk assessment available on site. Continued risk assessments undertaken and recorded. Copies of ongoing risk assessments available on site. Employees and sub-contractors informed and trained by a competent person in the risk assessment before work commences and on an ongoing basis thereafter. Health and safety committee or employee representatives consulted on the monitoring and review of the risk assessments.	
Section 16(2)	Assigned duties (Managers)	Responsibility of complying with the OHSACT assigned to other person/s by CEO.	
Construction Regulation 8(1)	Designation of person ultimately responsible for occupational health and safety on site	Competent person appointed in writing as construction manager.	

OHSACT Section or Regulation	Subject	Requirements	Yes/No
Construction Regulation 8(2)	Designation of assistant construction manager	Competent person appointed in writing as assistant construction manager.	
Construction Regulation 8(7)	Designation of person responsible for ensuring occupational health and safety compliance	Competent person appointed in writing as construction supervisor.	
Construction Regulation 8(8)	Designation of assistant for responsible person	Competent person(s) appointed in writing as assistant construction supervisors.	
Construction Regulations 8(5)	Health and safety officer	Competent and duly registered person appointed. Proof of health and safety officer's competency on site. Health and safety officer duly registered with SACPCMP as Professional Construction Safety Officer (Pr CHSO) Reports prepared and submitted to the client/contractor(s)?	
Section 17 & 18 and General Administrative Regulations 6 and 7	Election and designation of occupational health and safety representatives	More than 20 employees - one representative and one additional representative for each 50 employees or part thereof. Designation in writing, period and area of responsibility specified. Meaningful reports. Reports actioned by management.	
Section 19 and 20 and General Administrative Regulations 5	Occupational health and safety committee/s	Committee/s established. Members appointed in writing. Meetings held monthly. Minutes kept. Actioned by management.	
Section 37(1) and (2)	Agreement with mandataries, contractors and sub-contractors	Written agreement with contractors and sub-contractors. Updated list of contractors and sub-contractors displayed. Proof of Registration with Compensation Commissioner or Compensation Insurer as well as Letter of Good Standing. Construction Supervisor designated. Written arrangements regarding representatives and committee. Written arrangements regarding first-aid.	
Construction Regulation 7(1)(c) and 7(2)(a)	Management of sub-contractors	Has the principal contractor – - provided all sub-contractors with relevant sections of the client's OHS specification - formally evaluated and approved all sub-contractors' OHS plans. - ensured that the sub-contractors appointed made sufficient provision for the costs to be incurred to	

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OHSACT Section or Regulation	Subject	Requirements	Yes/No
		implement and maintain their OHS plan.	
Construction Regulation 7(1)(g)	Medical certificates of fitness	Are medical certificates of fitness (issued by an occupational health practitioners) specific to the construction work performed available for all employees on site	
Section 24 and General Administrative Regulation 8 COID Act Section 38, 39 and 41	Reporting incidents (Department of Labour)	Incident reporting procedure displayed. All incidents in terms of section 24 reported to the Provincial Director, Department of Labour, within 3 days (Annexure 1 and/or WCL 1 or 2). Cases of occupational disease reported. Copies of reports available on site. Record of first-aid injuries kept.	
General Administrative Regulation 9	Investigation and recording incidents	All injuries which resulted in the person receiving medical treatment other than first aid, recorded and investigated by investigator designated in writing. Copies of reports (Annexure 1) available on site. Tabled at committee meeting. Actioned taken by site management.	
Construction Regulation 10	Fall protection	Competent person appointed to draw up and supervise the fall protection plan. Proof of appointees' competence available on site. Risk assessment carried out for work at heights. Fall protection plan drawn up and updated. Plan available on site.	
Construction Regulation 10(5)	Roof work	Competent person appointed to plan and supervise roof work. Proof of appointees' competence available on site. Risk assessment carried out. Roof work plan drawn up and updated. Roof work inspect before each shift and inspection register kept. Employees medically examined for physical and psychological fitness and written proof on site.	
Construction Regulation 12	Temporary works	Competent person appointed in writing as temporary works designer to inspect and approved any erected temporary works before use. Proof of appointees' competence available on site. Competent person appointed in writing as temporary works supervisor. Proof of appointees' competence available on site. Risk assessment carried out for work on temporary works structures.	

OHSACT Section or Regulation	Subject	Requirements	Yes/No
		Temporary works drawings approved by temporary works designer and available on site. Other relevant documentation that includes construction sequence and method statements available on site. Competent person(s) appointed in writing to: • erect, move or dismantle temporary works structures; and • examine and check all temporary works structures before being used; Written proof of competence of above appointees. Temporary work structures are inspected: • before, during and after the placement of concrete; • after inclement weather; • after a load was imposed; • daily whilst in place; and • before stripping or dismantling and inspection register kept. Inspection registers kept. Fall protection plan drawn up and updated. Plan available on site.	
Construction Regulation 16	Scaffolding	Competent persons appointed in writing to: • erect scaffolding (scaffold erector/s); • act as scaffold team leaders; and • inspect scaffolding weekly and after inclement weather (scaffold inspector/s). Written proof of competence of above appointees. Appointees available on site. Copy of SANS 10085 available on site. Risk assessment carried out. Inspected weekly and/or after bad weather. Inspection register/s kept.	
Construction Regulation 17	Suspended platforms	Competent persons appointed in writing to: • control the erection of suspended platforms; • act as suspended platform team leaders; and • inspect suspended scaffolding weekly and after inclement weather. Risk assessment conducted. Certificate of authorisation issued by a registered professional engineer available on site and copy forwarded to the Department of Labour. The following inspections of the whole	

OHSACT Section or Regulation	Subject	Requirements	Yes/No
		installation carried out by a competent person • after erection and before use; • daily prior to use; and • inspection register kept. The following tests to be conducted by a competent person: • load test of whole installation and working parts every 12 months; and • hoisting ropes, hooks and load attaching devices quarterly; and • tests log book kept. Employees working on suspended platforms should be medically examined for physical and psychological fitness. Written proof available.	
Construction Regulation 13	Excavations	Competent person/s appointed in writing to supervise and inspect excavation work. Written proof of competence of above appointee/s available on site. Risk assessment carried out. Excavations inspected: • before every shift; • after any blasting; • after an unexpected fall of ground; • after any substantial damage to the shoring; and • after rain. Inspections register kept. Method statement developed where explosives will be and/or are used.	
Construction Regulation 14	Demolition work	Competent person/s appointed in writing to supervise and control demolition work. Written proof of competence of above appointee/s available on site. Risk assessment carried out. Engineering survey and method statement available on site. Inspections to prevent premature collapse carried out by competent person before each shift. Inspection register kept.	
Construction Regulation 19	Materials hoist	Competent person appointed in writing to inspect the material hoist. Written proof of competence of above appointee available on site. Materials hoist to be inspected weekly by a competent person. Inspection register kept.	
Construction Regulation 26	Water environments (including caissons and cofferdams)	Competent person appointed in writing to supervise, control and inspect work on or over water and the construction, installation, and dismantling of caissons	

OHSACT Section or Regulation	Subject	Requirements	Yes/No
		and/or cofferdams. Written proof of competence of above appointee available on site. Risk assessment carried by a competent person on a daily basis. Inspection register kept.	
Construction Regulation 21	Explosive actuated fastening devices	Competent person appointed to control the issue of the Explosive actuated fastening devices and cartridges as well as the service, maintenance and cleaning. Register kept of above. Empty cartridge cases, nails and fixing bolts returns recorded. Cleaned daily after use.	
Construction Regulation 20	Bulk mixing plant	Competent person appointed to control the operation of the bulk mixing plant as well as the service, maintenance and cleaning of this plant. Register kept of above. Risk assessment carried out. Bulk mixing plant to be inspected weekly by a competent person and inspections register kept.	
Construction Regulation 15 and Mine Health and Safety Act	Tunnelling	Complying with Mines Health and Safety Act (29 of 1996). Risk Assessment carried out.	
Construction Regulation 22 Driven Machinery Regulations 18 and 19	Cranes and lifting machines equipment	Competent person appointed in writing to inspect cranes, lifting machines and equipment. Written proof of competence of above appointee available on site. Cranes and lifting tackle identified and numbered. Register kept for lifting tackle. Logbook kept for each individual crane. Inspection: • All cranes: Daily by operator. • Tower cranes: After erection and thereafter 6 monthly. • Other cranes: Annually by competent person. • Lifting tackle (slings, ropes, chain slings etcetera): Three monthly.	
Construction Regulation 24 Electrical Machinery Regulations 9 and 10 Electrical Installation Regulations	Inspection and maintenance of electrical installation and equipment (including portable electrical tools)	Competent person appointed in writing to inspect/test the installation and equipment. Written proof of competence of above appointee available on site. Inspections: • Electrical installation and equipment inspected after installation, alterations and quarterly thereafter. Inspection registers kept. • Portable electric tools and -lights and	

OHSACT Section or Regulation	Subject	Requirements	Yes/No
		extension leads identified/numbered. Monthly visual inspection by user, issuer or storeman. Register kept.	
Diving Regulations	Diving operations	Competent person appointed in writing to supervise diving operations and ensure maintenance, statutory inspection and testing by an approved inspection authority of equipment used. Written proof of competence of above appointee available on site. Proof of registration of all divers present on site available. Risk assessment carried out. Diving manual produced and available on site. Record of voice communications kept. Diving operations record kept. Each diver keeps a personal logbook and entries countersigned by the diving supervisor. Decompression tables available on site. Records of any decompression illness kept. Certificate of manufacture of any compression chamber or diving bell in use available on site.	
Construction Regulation 28 General Safety Regulation 8(1)(a)	Designation of stacking and storage supervisor	Competent persons with specific knowledge and experience designated to supervise all stacking and storage. Written proof of competence of above appointee available on site.	
Construction Regulation 29 Environmental Regulation 9	Designation of a person to coordinate emergency planning and fire protection	Person/s with specific knowledge and experience designated to coordinate emergency contingency planning and execution and fire prevention measures. Emergency evacuation plan: • Developed and available on site; • Drilled and practiced; and • Records of drills and practices available on site. Fire risk assessment carried out. All fire extinguishing equipment: • Identified and on register; • Inspected weekly and inspection registers kept; • Replaced after use; and • Serviced annually.	
General Safety Regulation 3	First-aid	Every workplace provided with sufficient number of first-aid boxes (required where 5 persons or more are employed). First-aid boxes freely available. Content of boxes as per the minimum requirements of the OHSACT. One qualified first-aider appointed for every 50 employees (required where	

OHSACT Section or Regulation	Subject	Requirements	Yes/No
		more than 10 persons are employed). List of First-aiders and competency certificates available on site. Name and contact details of person in charge of first-aid box clearly displayed. Location of first-aid boxes clearly demarcated. Signs instructing employees to report all injuries and/or illness including first-aid injuries.	
General Safety Regulation 2	Personal protective equipment (PPE)	PPE risk assessment carried out. Items of PPE prescribed and use enforced. Records of issue kept. Undertaking by employee to use and/or wear PPE.	
General Safety Regulation 9	Inspection and use of welding and/or flame cutting equipment	Competent person/s with specific knowledge and experience designated to inspect electric arc, gas welding and flame cutting equipment. Written proof of competence of above appointee available on site. Equipment identified/numbered and entered into a register. Equipment inspected monthly. Inspection register kept.	
Hazardous Chemical Substances (HCS) Regulations Construction Regulation 25	Control of storage and usage of HCS and other flammables	Competent person/s with specific knowledge and experience designated to control the storage and usage of HCS (including flammables). Written proof of competence of above appointee available on site. Risk assessment carried out. Register of HCS kept and/or used on site.	
Pressure Equipment Regulations	Pressure vessel (PV)	Competent Person/s with specific knowledge and experience designated to supervise the use, storage, maintenance, statutory inspections and testing of PVs. Written proof of competence of above appointee available on site. Risk assessment carried out. Certificates of manufacture available on site. Register of PVs on site. Inspections and testing by approved inspection authority (AIA): • after installation, re-erection or repairs; • every 36 months; and • register or log kept of inspections, tests, modifications and repair on site.	
Construction Regulation 23	Construction	Operators or drivers appointed to:	

OHSACT Section or Regulation	Subject	Requirements	Yes/No
	vehicles and earth moving equipment	- Carry out a daily inspection prior to use; and - Drive the vehicle or plant that he/she is competent to drive or operate. Written proof of competence of above appointee available on site. Record of daily inspections kept on site. Medical assessments.	
General Safety Regulation 13A	Inspection of Ladders	Competent person appointed in writing to inspect ladders. Ladders inspected at arrival on site and monthly thereafter. Inspections register kept on site.	
General Safety Regulation 13B	Ramps	Competent person appointed in writing to supervise the erection and inspection of ramps. Inspection register kept on site.	

2. Education, training and promotion

Subject	Requirement	Yes/No
*Occupational Health and Safety Policy as per OHSACT Section 7(1)	Policy signed by CEO and published and communicated to employees. Policy displayed on employee notice boards. Management and employees committed.	
*Company and site health and safety rules as per OHSACT Section 13(a)	Rules published. Rules displayed on employee notice boards. Rules issued and explained to employees with written proof hereof. Follow-up to ensure employees understand and adhere to the rules.	
*Induction and task safety training as per OHSACT Section 13(a)	All new employees receive health and safety induction training. Training includes task safety instructions. Employees acknowledge receipt of training. Follow-up to ensure employees understand and adhere to instructions.	
*General health and safety training as per OHSACT Section 13(a)	All employees receive basic health and safety training. Written proof kept. Operators of plant and equipment receive specialised training. Follow-up to ensure employees understand and adhere to instructions.	
*Occupational health and safety promotion	Incident experience board indicating among others - - Number of hours worked without an injury; and - Number of days worked without an injury. Safety grading - Board kept up to date. Relevant safety posters displayed and changed regularly. Employee notice board for health and safety notices. Site health and safety competitions. Company health and safety competition. Participation in regional health and safety competitions. Suggestion scheme.	

3. Public safety, security measures and emergency preparedness

Subject	Requirement	Yes/No
*Notices and signs	Notices and signs at entrances along perimeters indicating “ No unauthorised entry ” and “ Entry at own risk ”. Notices and signs at entrance instructing visitors and non-employees what to do, where to go and where to report on entering the site or yard with directional signs for example “ Visitors to report to office ”. Notices and signs posted to warn of overhead work and other hazardous activities for example General Warning Signs .	
Site safeguarding	Nets, canopies, stills, fans etcetera to protect members of the public passing and/or entering the site.	
*Security measures	Access control measures and register in operation. Security patrols after hours and weekends. Sufficient lighting after dark. Guard has access to telephone or other means of emergency communication.	
*Emergency preparedness	Emergency contact numbers displayed near telephone. Emergency evacuation instructions posted up on all notice boards (including employees' notice boards). Emergency contingency plan available on site or in yard. Doors open outwards and unobstructed. Emergency alarm audible all over (including in toilets).	
*Emergency drill and evacuation	Adequate number of employees trained to use fire equipment. Emergency evacuation plan available, displayed and practiced. (See Section 1 for designation and register).	

4. Personal protective equipment (PPE)

Subject	Requirement	Yes/No
*PPE needs analysis	Need for PPE identified and prescribed in writing.	
*Head protection	It is compulsory for all persons on site to wear safety helmets including sub-contractors and visitors (where prescribed).	
*Foot protection	All persons on site have to wear safety footwear including gumboots for concrete or wet work and non-slip shoes for roof work.	
*Eye and face protection	Eye and face protection (such as goggles, face shields, welding helmets) to be used when operating the following: • Jack or kango hammers; • Angle or bench grinders; • Electric drills (overhead work into concrete, cement and bricks); • Explosive actuated fastening devices; • Concrete vibrators or pokers; • Hammers and chisels; • Cutting or welding torches; • Arc welding equipment; • Skill or bench saws; and • Spray-painting equipment etcetera.	
*Hearing protection	Hearing Protectors (such as muffs, plugs) used when operating the following: • Jack or kango hammers; • Explosive actuated fastening devices; and	

Subject	Requirement	Yes/No
	Wood or aluminium working machines such as saws, planers, routers.	
*Hand protection	Protective gloves to be worn by employees handling or using: - Cement, bricks, steel or chemicals; - Welding equipment; - Hammers and chisels; and - Jack or kango hammers etcetera.	
*Respiratory protection	Suitable and efficient respirators to be worn correctly by employees handling or using: - Dry cement; - Dusty areas; - Hazardous chemicals; - Angle grinders; and - Spray-painting etcetera.	
*Fall Prevention Equipment	Suitable fall arrest equipment correctly used by persons working on or in unguarded, elevated positions such as: - Scaffolding; - Riggers; - Lift shafts; - Edge work; and - Ring beam edges etcetera. Other applicable methods of fall prevention should also be applied such as catch nets.	
*Protective clothing	All jobs requiring protective clothing (such as overalls, rain wear, welding aprons etcetera) to be identified and clothing worn.	
*PPE issue and control	Identified equipment to be issued free of charge. All PPE should be maintained in good condition (i.e. regular checks). Workers instructed in the proper use and maintenance of PPE. Commitment obtained from wearer accepting conditions and to wear the PPE. Record of PPE issued kept on file.	

5. Housekeeping

Subject	Requirement	Yes/No
*Scrap removal system	All items of scrap, unusable off cuts, rubble and redundant material removed from working areas on a regular basis. Scrap and/or waste removal from heights by chute, hoist or crane (i.e. nothing thrown or swept over sides). Scrap disposed of in designated containers or areas. Removal from site or yard on a regular basis.	
Stacking and storage (See Section 1 for designation and register)	Stacking: - Stable; - On firm level surface or base; - Not leaning and/or collapsing; - Irregular shapes bonded; - Not exceeding 3 times the base; - Stacks accessible; and - Removal from top only. Storage: - Adequate storage areas provided;	

Subject	Requirement	Yes/No
	- Functional for example demarcated storage areas, racks, bins etcetera; - Special areas identified and demarcated for example flammable gas, cement etcetera: - Neat, safe, stable and square: - Store and storage areas clear of superfluous material; - Storage behind sheds etcetera should be neat and under control; and - Storage areas free from weeds, litter etcetera.	
*Waste control or reclamation	Re-usable off cuts and other re-useable material removed daily and kept to a minimum in the work areas. All re-useable materials neatly stacked or stored in designated areas (i.e. nails removed or bent over in re-useable timber). Issue of hardware, nails, screws and cartridges etcetera should be controlled and return of unused items monitored.	
Sub-contractors	Sub-contractors required to comply with the site or yard's housekeeping requirements.	

6. Working at heights (including roof work)

Subject	Requirement	Yes/No
Openings	Unprotected openings adequately guarded, fenced and barricaded with catch nets installed where necessary. Covers over openings in roof of robust construction and secured against displacement.	
General requirements	Roof work discontinued when bad or hazardous weather prevails. Fall protection measures (including warning notices) when working close to edges or on fragile roofing material.	

7. Scaffolding and temporary work

Subject	Requirement	Yes/No
Access and system scaffolding (See Section 1 for designation and register)	Foundation firm and stable. Sufficient bracing. Tied to structure and secured from side or cross movement. Platform boards in good condition and secured. Sufficient platform boards to be used. Handrails and toe boards provided. Access ladders or stairs provided. Area/s under scaffolding tidy. Safe and unsafe for use signs to be used. Complying with OHSACT and SANS 10085.	
Free Standing Scaffolding	Foundation firm and stable. Sufficient bracing. Platform boards in good condition and secured. Sufficient platform boards to be used. Handrails and toe boards provided. Access ladders or stairs provided. Area/s under scaffolding tidy. Safe or unsafe for use signs to be used. Height and base ratio correct. Outriggers used and tied to structure where necessary.	

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Subject	Requirement	Yes/No
	Complying with OHSACT and SANS 10085.	
*Mobile scaffolding	Foundation firm and stable. Sufficient bracing. Platform boards in good condition and secured. Sufficient platform boards to be used. Handrails and toe boards provided. Access ladders or stairs provided. Area/s under scaffolding tidy. Safe and unsafe for use signs to be used. Wheels and swivels in good condition Brakes working and applied. Height to base ratio correct. Outriggers used where necessary. Complying with OHSACT and SANS 10085.	
Suspended scaffolding	Outriggers securely supported and anchored. Correct number of steel wire ropes used. Platform as close as possible to the structure. Handrails on all sides. All winches, ropes, cables and brakes inspected regularly. Inspection registers kept on site. Scaffolding complies with OHSACT. Winches maintained by competent person.	
Temporary works	All components in good condition. Foundation firm and stable. Adequate bracing and stability ensured. Good workmanship, uprights straight and plum. Good cantilever construction. Safe access provided. Areas under support work tidy. Same standards as for system scaffolding.	
Special scaffolding	Special scaffolding for example cantilever, jib and truss-out scaffolds erected to an acceptable standard and inspected by specialists. Inspection registers to be kept on site.	
Edges and openings	Edges barricaded to acceptable standards. Manhole openings covered and/or barricaded. Openings in floor and other openings covered, barricaded or fenced. Stairs provided with handrails. Lift shafts barricaded or fenced off.	

8. Ladders

Subject	Requirement	Yes/No
*Physical condition, use and storage (See Section 1 for designation and register)	Stepladders – hinges, stays, braces and stiles in order. Extension ladders – ropes, rungs, stiles, safety latch and hook in order. Extension or straight ladders secured or tied at the bottom or top. No joined ladders used. All ladders stored on hooks or racks and not on ground. Ladders protrude 900 mm above landings, platforms or roof. Fixed ladders higher than 5 m have cages or fall arrest system.	

9. Electrical safeguarding

Subject	Requirement	Yes/No
*Electrical distribution boards and earth leakage	Colour coded, numbered and symbolic sign displayed. Area in front kept clear and unobstructed. Fitted with inside cover plate, openings blanked off and no exposed "live" conductors or terminals. Door kept close. Switches and/or circuit breakers identified. Earth leakage protection unit fitted and operating. Tested with instrument - test results within 15 – 30 milli-amps. Aperture openings provided for the plugging in and removal of extension leads without the need to open the door.	
*Electrical installations and wiring	Temporary wiring or extension leads in good condition with no bare or exposed wires. Earthing continuity and polarity correct: "Brown is live, Blue is neutral, Green and Yellow earth the lot" Cables protected from mechanical damage and moisture. Correct loading observed for example no heating appliance used from lighting circuit etcetera. Light fittings and lamps protected from mechanical damage/moisture.	
*Physical condition of electrical appliances and tools	Electrical Equipment and Tools (includes all items plugging in to a 15 Amp supply socket): • Insulation and casing in good condition. • Earth wire connected or intact where not of double insulated design. • Double insulation mark where no earth wire. • Cord in good condition/no bare wires/secured to machine & plug. • Plug in good condition, connected correctly and correct polarity.	

10. Emergency, fire prevention and protection

Subject	Requirement	Yes/No
*Fire extinguishing equipment (See Section 1 for designation and register)	Fire Risks Identified and on record. Fire Extinguishing Equipment available for: • Offices; • General stores; • Flammable store; • Fuel storage tanks; • Gas welding or cutting operations; and • Where flammable substances are being used or applied.	
*Maintenance	Fire equipment serviced minimum annually, but preferably 6 monthly.	
*Location & Signs	Fire Extinguishing Equipment: • Clearly visible; • Unobstructed; and • Sign posted including "No Smoking" and "No Naked Lights" where required i.e. (flammable store, gas store, fuel tanks etc.).	

Subject	Requirement	Yes/No
* Storage issue and control of flammables (incl. gas cylinders)	Storage area provided for flammables with suitable doors, ventilation, bund etcetera. Flammable store neat and tidy with no Class A combustibles. Decanting of flammable substances carried out in ignition free and adequately ventilated area. Container bonding principles applied. Only sufficient quantities issued for one day's use. Special gas cylinder store or storage area. Gas cylinders stored, used and transported upright and secured in trolley, cradle or structure that is well ventilated. Types of gas cylinders identified and stored separately. Full cylinders stored separately from empty cylinders.	
*Storage, issue and control of Hazardous Chemical Substances (HCS) (See Section 1 for designation and register)	HCS storage principles applied i.e. products segregated. Provision made for leakage and spillage containment. Emergency (serviceable) showers and eye wash facilities provided. HCS under lock and key as well as controlled by designated person. Decanted or issued in containers with information and warning labels. Disposal of unwanted HCS by recognised disposal agent.	

11. Excavations and demolition

Subject	Requirement	Yes/No
Excavations deeper than 1.5 m. (See Section 1 for designation and register)	Shored or braced to prevent caving or falling in. Provided with an access ladder. Excavations guarded, barricaded or lighted after dark in public areas. Soil dumped at least 1 m away from edge of excavation. On sloping ground soil dumped on lower side of excavation.	

12. Tools

Subject	Requirement	Yes/No
*Hand tools	Shovels, Spades and Picks: - Handles free from cracks and splinters; - Handles fit securely; and - Working end sharp and true. Hammers: - Good quality handles, no pipe or reinforcing steel handles; - Handles free from cracks and splinters; and - Handles fit securely. Chisels: - No mushroomed heads or heads chamfered; - Not hardened; and - Cutting edge sharp and square. Saws: - Teeth sharp and set correctly; and - Correct saw used for the job.	
*Explosive actuated fastening devices (See Section 1 for designation)	Only used by trained and authorised personnel. Prescribed warning signs placed or displayed where tool is in use.	

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Subject	Requirement	Yes/No
and register)	Inspected at least monthly by competent person and results recorded in on site register. Issue and return recorded including cartridges or nails and unused cartridges, nails, empty shells recorded. Cleaned daily after use in on site register.	

13. Cranes

Subject	Requirement	Yes/No
Tower crane (See Section 1 for designation and register)	Only operated by trained authorised operator with valid certificate of training. Certificate available on site. Structure - no visible defects. Electrical installation good and safe. Crane hook - throat pop marked, safety latch fitted and functional. SWL/MML displayed. Limit switches fitted and operational. Access ladder fitted with backrests or fall arrest system installed. Lifting tackle in good condition and inspection colour coding current.	
*Mobile crane (See Section 1 for designation and register)	Only operated by trained authorised operator with valid certificate of training. Certificate available on site. Rear view mirrors and windscreen visibility good. Windscreen wipers operating effectively. Indicators operational. Hooter working. Tyres safe with sufficient tread and pressure visibly sufficient. No missing wheel nuts. Headlights, taillights operational. Grease nipples and grease on all joints. No visible oil leaks. Hydraulic pipes visibly sound with no leaks. No undue corrosion on battery terminals. Boom visibly in good condition with no apparent damage. Cable and sheaves greased with no visible damage, split wires or corrosion. Brakes working properly. Crane hook - throat pop marked, safety latch fitted and functional. SWL/MML displayed. By-pass valves operational. Deflection chart displayed and visible to operator or driver. Outriggers functional used.	
*Gantry crane	Only operated by trained authorised persons. Correct slinging techniques used. Recognised displayed on chart signals used. Log book kept up to date. Prescribed inspections conducted on crane and lifting tackle. "Crane overhead" signage, where applicable. Crane hook - throat pop marked, safety latch fitted and functional. SWL/MML displayed and load limiting switches fitted and operational.	

14. Builder's hoist

Subject	Requirement	Yes/No
Builder's hoist (See Section 1 for designation and register)	"Hoist in operation" - sign displayed. General construction strong and free from latent defects. Tower: - Adequately secured and braced. - At least 900 mm available for over travel. - Barricaded at least 2 100 mm high at ground level and floors. - Landing place provided with gate at least 1 800 high. Platform: - No persons conveyed on platform. - Steel wire ropes with breaking strain of six times maximum weight. - Signal systems used. - Goods prevented from moving/falling off. - Effective brake capable of holding maximum weight.	

15. Transport and materials handling equipment

Subject	Requirement	Yes/No
*Site vehicles	All site vehicles, dumpers, bobcats, loaders etcetera checked daily before used by driver or operator. Inventory of vehicles used/operated on site. Inspection by means of a checklist and results recorded. No persons riding on equipment not designed for passengers. Site speed limit posted and not exceeded. Drivers and operators trained and licensed. Licenses available on site. No unauthorised persons allowed to drive or operate equipment.	
Conveyors	Conveyor belt nip points and drive guarded. Emergency stop and lever brake fitted, clearly marked and accessible.	

16. Site plant and machinery

Subject	Requirement	Yes/No
Brick cutting machine	Operator trained and only authorised persons use the machine. Emergency stop switch clearly marked and accessible. Area around the machine dry and slip or trip free as well as clear of off cuts. All moving drive parts guarded. Electrical supply cable protected. Operator using correct PPE i.e. eye, face, hearing, foot, hands and body.	
*Electric arc welder	Welder trained. Only authorised and trained persons use welder. Adequately earthed. Electrode holder in good condition and safe. Cables, clamps, lugs and connectors in good condition. Area in which welding machine is used is dry and protected from	

Subject	Requirement	Yes/No
	wet. Welder using correct PPE i.e. eye, face, foot, body and respiratory. Screens and warning signs placed.	
*Woodworking machines	Operator's trained and only authorised persons use machines. Provided with guards and guards used. Operators using correct PPE i.e. eye, face, foot and hearing.	
*Compressors	Relief valves set, locked and sealed. Maximum safe working pressure (MSWP) indicated on face of pressure gauge face and not on glass cover. All drives adequately guarded. Receiver and lines drained daily. Hoses good condition and clamped, not wired.	
Concrete mixer and bulk mixing plant	Top platform provided with guardrails. Dust abatement methods in use. Operators using correct PPE i.e. eye, hands and respiratory. All moving drive parts guarded. Emergency stops identified, indicated and accessible. Area kept clean, dry and free from tripping and slipping hazards. Banksman identified and crane signals displayed and used.	
*Gas welding and flame cutting equipment	Only authorised and trained persons use the equipment. Torches and gauges in good condition. Flashback arrestors fitted at cylinders and gauges. Hoses in good condition, correct type and all connections with clamps. Cylinders stored, used and transported in upright position, secured in trolley or cradle. Fire prevention control methods applied. Hot work permits.	

17. Plant and storage yard or site workshop specifics

Subject	Requirement	Yes/No
OHSACT, Section 8(2)(1) General Machinery Regulation 2(1) Supervision of the use and maintenance of machinery	Persons with specific knowledge and experience designated to supervise the use and maintenance of machinery. Critical items of machinery identified, numbered and placed on register or inventory. Inspection or maintenance schedules for abovementioned. Inspections or maintenance carried out to above schedules. Results recorded.	
General Machinery Regulation 9(2) Notices regarding operation of machinery	Schedule D notice posted in work areas.	
Pressure Equipment Regulations Supervision of the use and maintenance of pressure equipment such as pressure vessels (PV)	Persons with specific knowledge and experience designated to Supervise the use and maintenance of PVs. PVs identified, numbered and placed on register. Manufacturers plate intact. Inspection or maintenance schedules for abovementioned. Inspections or maintenance carried out to above schedules. Results recorded and test certificates available.	
Lock-out procedure	Lock-out procedure in operation.	
Ergonomics	Ergonomics survey conducted. Results on record. Survey results applied.	

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Subject	Requirement	Yes/No
Demarcation and colour coding	Demarcation principles applied. All services, pipes, electrical installation, stop-start controls, emergency controls etcetera colour coded to own published or SABS standard. Employees trained to identify colour coding.	
Portable and bench grinders	Area around grinder clear and trip/slip free. Bench grinders mounted securely and grinder generally in good condition. No excessive vibration. On and off switch or button clearly demarcated and accessible. Adequate guards in place. Tool rest – secure, square and maximum 2 mm gap. Stone or disk - correct type and size, mounted correctly and dressed. Use of eye protection enforced.	
Ancillary lifting equipment	Chain blocks, tirlors, jacks and mobile gantries etcetera identified and numbered on register. Chains in good condition and links no excessive wear. Lifting hooks – throat pop marked and safety latch fitted. SWL/MML marked or displayed.	
Presses, guillotines and shears	Only operated by trained and authorised persons. PPE used by operators Interlocks or lockouts fitted.	

18. Workplace environment, health and hygiene

Subject	Requirement	Yes/No
*Lighting	Adequate lighting in places where work is being executed for example stairwells and basements or after sunset. Light fittings placed and installed causing no irritating or blinding glare.	
*Ventilation	Adequate ventilation, extraction and exhausting in hazardous areas for example where chemicals and adhesives are stored, welding takes place and where petrol or diesel motors are running in confined spaces or basements.	
*Noise	Tasks identified where noise exceeds 85 dBA. All reasonable steps taken to reduce noise levels at the source. Hearing protection used where noise levels could not be reduced to below 85 dBA.	
*Heat stress	Measures in place to prevent heat exhaustion in heat stress problem areas e.g. steel decks, when the WBGT index reaches 30 (see Environmental Regulation 4). Cold drinking water readily available when extreme temperatures are experienced.	
*Ablution facilities	Sufficient toilets provided for men and women separately i.e. 1 per 30 employees (National Building Regulations prescribe chemical toilets for Construction sites). Toilet paper available. Sufficient showers provided for men and women separately. Facilities for washing hands provided. Soap available for washing hands. Means of drying hands available. Changing facilities or area provided for men and women separately. Ablution facilities hygienic and clean.	

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Subject	Requirement	Yes/No
*Eating and cooking facilities	Adequate storage facilities provided. Weather protected eating area provided, separate from changing area. Refuse bins with lids provided. Facilities clean and hygienic.	
*Pollution of environment	Measures in place to minimize dust generation. Accumulation of empty cement pockets, plastic wrapping or bags, packing materials etcetera prevented. Spillage or discarding of oil, chemicals and diesel into storm water and other drains prevented.	
*Hazardous chemical substances (See Section 1 for designation and register)	All substances identified and list available e.g. acids, flammables, poisons etc. Material Safety Data Sheets (MSDS) indicating hazardous properties and emergency procedures in case of incident on file and readily available. Substances stored safely.	

Name of person who have undertaken the assessment

Signature

Date

Received by

Designation

Date

Tabled at health and safety committee

King Cetshwayo District Municipality



Annexure 2

Measuring injury experience

Proudly prepared by

EMPOWERisk Management Services (Pty) Ltd



May 2019

Measuring injury experience

1. Background

Injury experience has traditionally been measured by the use of a disabling injury frequency rate, the so-called “DIFR”. The DIFR is calculated by multiplying the number of disabling injuries by 1 million and dividing by the number of person-hours worked.

The DIFR has recently been replaced internationally with a disabling injury incidence rate (DIIR). The only difference between the two rates are that the 1 million in the calculation is replaced with 200 000 (200 000 purported to be the number of hours and average person works in a lifetime).

The use of the two rates above has proved to be somewhat problematical as they are open to manipulation and disabling injuries are often “hidden” by returning the injured employee to the workplace so as not to lose a shift and therefore having to register a disabling injury.

The construction industry recently decided to promote the use of a new frequency rate based on the number of compensation injury claims, as these are more difficult to hide or manipulate because the reporting of compensationable injuries is a legal requirement.

The industry is hoping that adoption of this new measurement of injury experience will enable the industry to monitor itself as far as work related injuries are concerned.

2. Compensation Incidence Frequency Rate (CIFR)

2.1 Formula

$$\frac{\text{No of compensation claims} \times 200\,000}{220 \text{ person hours} \times \text{No of employees}}$$

2.2 Definitions

No of compensation claims:	The number of claims lodged with the Commissioner or COID insurer for the period under review.
200 000:	The fixed factor to align the rate with other rates used internationally.
Person hours worked Include:	Hourly paid employees Sub-contractors (No of employees X *220 each) Staff (No of employees X *220 hours each)

220 person-hours:

The *average number of hours worked by one employee in one month in the construction industry.

Note: * Overtime, absence on leave or sick leave, unrecorded after hours time worked by senior and middle management factored into this average.

No of employees:

The actual or average number of employees employed for the period under review.

King Cetshwayo District Municipality



Annexure 3

Safety, Health and Environment: Example of risk management report

Proudly prepared by

EMPOWERisk Management Services (Pty) Ltd



May 2019

Safety, Health and Environment (SHE): Example of risk management report

Please note that this is an example only and all information is fictitious.

XYZ Construction

SHE risk management report for the period January 2014 to March 2014

1. Introduction

We trust that this quarterly SHE Risk Management report will provide a clear picture of the company's performance as far as occupational health, safety and environment is concerned.

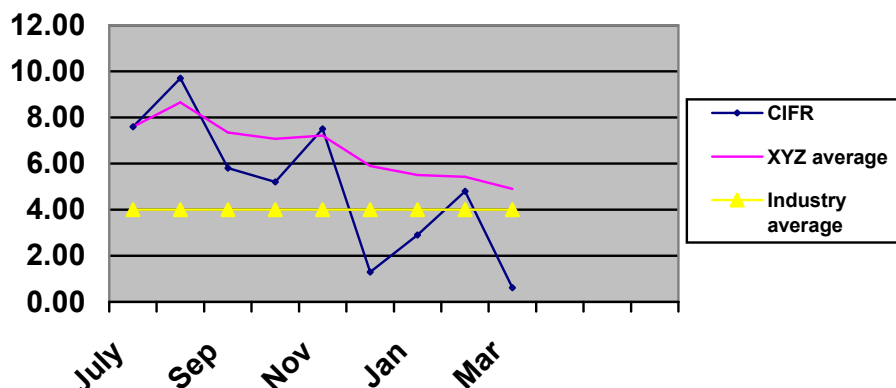
The first quarter of 2014 generally reflected an improvement in injury experience and indicates a decline in the number of injuries. Although Building was the only division where there was an increase in compensation claims, figures are still well down from the average 2013 figures. A sub-contractor experienced one fatality.

All divisions are eagerly awaiting the final implementation during May 2014 of the new electronic SHE Management system that will provide the tools to implement the SHE programme and make it available to all management and supervisory staff.

2. Incident statistics

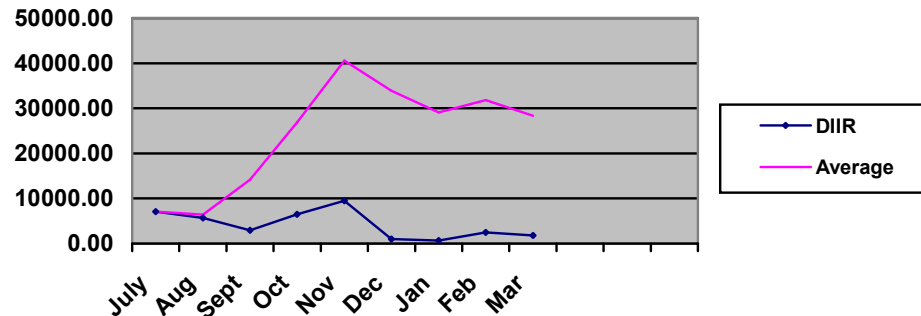
2.1 Compensation Incident Frequency Rate (CIFR)

$$\text{CIFR} = \frac{\text{No of compensation claims} \times 200\,000}{220 \text{ person hours} \times \text{No of employees}}$$



2.2 Disabling Injury Incidence Rate (DIIR)

$$\text{DIIR} = \frac{\text{No disabling injuries} \times 200\,000}{\text{Person hours worked}}$$



2.3. Other major incidents

Three other major incidents were experienced in the period under review:

- 2.3.1. A major trench collapsed at Job. 00123: XYZ Head Office, Braamfontein: No personnel injured, extensive damage to foundations: 3 days delay.
- 2.3.2. A concrete dumper ran away when its brakes failed. It smashed into the glass façade of the building on Job 00332: McDonalds, Randburg. The driver jumped off and was not injured. Cost of damage to façade: R45 000.
- 2.3.3. A storage hut on Job 00567: BP Petrol Station, Swartruggens was demolished by fire when the night watchman made a fire inside the storage hut which contained concrete vibrators and leveling machines. Cost of replacing the hut and machines: R30 000.

3. Risk areas

The following items of concern need priority consideration by management:

- 3.1. New employees must undergo pre-employment medical examinations to:
 - protect XYZ from possible claims at a later stage
 - ensure that only capable persons are employed
 - prevent injuries and illness in the workplace
 - enhance XYZ image
- 3.2. Vehicle drivers and plant operators must be instructed to inspect their vehicles daily before start-up using the prescribed checklists to ensure that these are safe to operate and in good condition.

4. Risk assessments

Three SHE risk assessments were conducted in February and March:

Job 00432:	Gillooly's Mall	Compliance: 56%
Job 00786:	Cullinan Head Office	Compliance: 83%
Job 00589:	Cleveland Station	Compliance: 76%

5. Training

One hundred and forty two employees, representing 7% of employees, attended nine training courses. *Our objective is to train 5,5% of employees on a quarterly basis.

Month	No. of Employees Trained	Course	Source
January	26	Induction	Internal
	15	OH&S Reps	Consultant
	3	Crane Drivers	External
February	23	Induction	Internal
	17	OH&S Reps	Consultant
March	43	Induction	Internal
	9	OH&S Reps	Consultant
	3	Bomag Rollers	Supplier
	3	First Aiders	St. John's

6. Legal matters

- 6.1. An inspector of the Department of Labour issued an improvement notice on Job 00987: Gillooley's Mall. The notice requires that all scaffolding comply with the SABS standards for the Erection and Maintenance of Access Scaffolding (SANS 085). This is currently being attended to and the inspector will return on 15 April 2014 to ascertain if the notice has been complied with.

7. Occupational health matters

7.1 HIV Aids

The proposed clinic will soon be operational and we will then be able to send our employees who have tested positive for HIV/Aids to the clinic for counseling and eventual treatment when necessary.

The mobile clinic attended to and tested fifty employees on a voluntary basis at 3 sites this month. Eighteen of them tested positive.

7.2 Tuberculosis (TB)

The mobile clinic will be calling at Gillooly's Mall and Cleveland Station on 15 and 16 April 2014 respectively to screen employees for TB.

7.3 Noise

All suspected noise pollution areas have been identified and tested and the results are awaited. Employees working in areas testing over 85dBa will be issued with suitable hearing protectors.

8. Environmental measures

Inspectors from the Botswana Department of Environment visited Djwaneng and inspected the site and yard. They gave it a "clean bill of health" and advised that we should increase the dust control measures by spraying roads three times per day with water instead of the present twice per day.

9. Achievements and awards

- 9.1 The client at Djwaneng (Job 00786) awarded the XYZ site first position in the housekeeping competition conducted bi-monthly by the client's SHE managers. The project manager and his team are to be congratulated for this sterling effort.
- 9.2 Job 0987: Refurbishment of Pretoria Main Railway Station has just completed 1 million compensation claim free days. This was no easy achievement if we consider the conditions being worked under after the extensive fire that caused major damage.

SHE Risk Manager

2014-03-31

Source: SAFCEC Occupational Health and Safety Committee

King Cetshwayo District Municipality



Annexure 4

Guide to risk assessments

Proudly prepared by

EMPOWERisk Management Services (Pty) Ltd



May 2019

Guide to risk assessments

1. Nine steps to effective risk assessments

- Step 1 : Identifying the current as well as emerging hazard, risks or exposures.
 Step 2 : Aim to identify major hazards, don't waste time on the minor and detail except if such hazard has the potential be repeat itself on a frequent basis.
 Step 3 : Involve as many people as possible in the ongoing risk assessment process especially those at risk.
 Step 4 : Gather all the information and analyse it.
 Step 5 : Look at what actually could or has occurred including non-routine operations.
 Step 6 : Use a systematic approach to ensure all hazards are adequately addressed.
 Step 7 : Assess the risks identified or the risk has occurred by taking into account the effectiveness of current as well as controls under consideration.
 Step 8 : Ensure the process is practical, realistic, cost and business effective.
 Step 9 : Always record the assessment in writing including i.e. assumptions, date and why a particular decision has been made.

2. How serious is it?

Probability

- A Common
 B Has Happened
 C Could Happen
 D Not Likely
 E Practically impossible

Consequences

- 1 Fatality or permanent disability.
 2 Major injury.
 3 Average Lost Time Injury.
 4 Minor Injury.
 5 Medical Treatment or less.

Probability

		A	B	C	D	E
Consequence	1	1	2	3	4	5
	2	2	3	4	5	6
	3	3	4	5	6	7
	4	4	5	6	7	8
	5	5	6	7	8	9

Risk rating

- 1 - 3 = Serious
 4 - 5 = High
 6 - 7 = Moderate
 8 - 9 = Acceptable

Action

- Immediate (within 1 week).
 Within 1 month.
 > 4 weeks.
 No action but will consider from time to time.

King Cetshwayo District Municipality



Annexure 5

List of risk assessments

Proudly prepared by

EMPOWERisk Management Services (Pty) Ltd



May 2019

List of risk assessments

Sand Delivery
 Arc welding
 Blasting
 Brickwork
 Compressed gas cylinders-handling
 Compressors – Air
 Cutting of pipes
 Demolition
 Distribution boards – Electrical
 Drivers – of vehicles
 Electrical installation – Maintenance of
 Excavation work
 Excavator
 Exposure to poisonous animals or insects
 Fire prevention and protection
 Front end loader
 Fuel supply
 Gas welding-cutting operations
 Hand tools
 Laying of pipes
 Laying of storm water drains
 Levelling – of materials
 Loading supervisor
 Loading/unloading - of trucks
 Machine operator
 Manholes – Laying of precast section
 Material delivery
 Material handling
 Mixer operator
 Placing concrete
 Portable ladders
 Pressure vessels
 Refuelling vehicles/plant
 Scaffolding
 Site establishment
 Temporary works
 Traffic control
 Unrest
 Use of portable electrical tools
 Work in elevated positions
 Working close to existing services i.e. electrical, waste water etc
 Working close to traffic
 Working close to water
 Working in inclement weather

King Cetshwayo District Municipality



Occupational health and safety specification for 2142D Middledrift SSA 3 – Potable Water Reticulation Addendum to provide for occupational health requirements

Proudly prepared by

EMPOWERisk Management Services (Pty) Ltd



March 2021

Occupational health and safety specification for 2142D Middledrift SSA 3 – Potable Water Reticulation – Addendum to provide for occupational health requirements

1. Occupational health

The principal contractor shall ensure that –

- a. the work area and surrounding site, which is part of the operational area, are at all times maintained to a reasonably practicable level of hygiene and cleanliness; and
- b. all areas, where work is performed, are kept neat, clean and orderly without any unnecessary waste.

1.1 Risk assessment

The principal contractor shall undertake a risk assessment to identify the potential health hazards that employees and other affected persons are or may be exposed to during the construction process and also identify the appropriate risk mitigation measures to be taken and maintained to ensure the health of employees and affected persons.

1.2 Health hazards

The principal contractor shall ensure that appropriate measures are put in place to prevent exposure to health hazards such as viruses, the accidental inhalation, ingestion, and absorption of any hazardous substance, high noise level exposure etcetera.

1.3 Medical surveillance

The principal contractor shall provide for the management of an employee medical surveillance program that will ensure the following:

- a. All employees on site undergo routine medical examinations specific to the work to be performed taking into account the hazard and risk exposures. This must address pre-employment examination, periodic examination as required, and exit examinations.
- b. Where medical examinations are governed by legislation, the principal contractor shall ensure the legislative requirements are complied with by all employees.
- c. All the employees performing work on site are declared medically fit for the work they are to perform.
- d. Employees are notified confidentially by the construction health and safety officer or other appropriate delegated person of the results and interpretation of their medical examinations on any abnormal findings, health conditions, referrals or recommendations made as well as any restrictions that may become evident from medical examinations.

- e. Maintain written confirmation/proof of the consultation, notification and communication with the employee, provided that, the required proof does not contain any confidential, sensitive, highly personal or information which might place the employee in an uncomfortable or disconcerting state or situation when such information is known by others.
- f. In the event of referrals or recommendations for additional testing or consultation with health specialists, proof of action taken by the principal contractor should be maintained. Action taken could be a scheduled appointment with a specialist, an appointment for the additional testing etcetera.
- g. Copies of valid medical certificates of fitness are available in the occupational health and safety file. The requirements above are founded on a duty of care towards employees to ensure employees are made aware of any health conditions or health restrictions which may have resulted from or may be aggravated by work activities on site or associated areas. The consultation, notification and communication with the employee should, with the employees' written consent, be made available upon request for verification by the client, regulatory authority or their representatives.

1.4 COVID-19

As a result of the current COVID-19 pandemic and subsequent exposure, the principal contractor must develop a COVID-ready Workplace Plan addressing among others the following:

- a. Appointment of a COVID-19 Compliance Officer.
- b. The date the construction site will open.
- c. The hours the site it will be open.
- d. A timetable setting out the phased return of employees to enable appropriate measures to be taken to avoid and reduce the spread of the virus.
- e. List of employees who can work from home, employees who are 60 years or older and those with comorbidities.
- f. Detailed procedure adopted to reduce the risk of infection or transfer to employees or affected persons. The procedure should among others provide for –
 - 1. An employee and visitor disclosure questionnaire.
 - 2. Staggering of entrance/exit.
 - 3. Access control.
 - 4. Thermal testing, i.e. who will be undertaking the testing, maximum thermal limit allowed as well as frequency of testing.
 - 5. Recordkeeping of entering and exiting the site as well as safe keeping of these records.
 - 6. Response when an infected person is identified.
 - 7. Isolation area to be provided and maintained on site to ensure that any person presenting symptoms could be isolated pending the undertaking of a second thermal test and/or whilst arrangements are made to transport the person to a facility for self-isolation, or for medical examination or testing

8. Return to work protocols, i.e. who will evaluate and what medical information to be submitted when an employee wants to return to work.
9. All employees, visitors, suppliers and sub-contractors be duly inducted as well as regularly informed to understand the severity, relevant information as well as control measures to comply with requirements.
10. Ways to be adopted to minimise the number of employees on site.
11. Measures taken to minimise contact between employees as well as employees and other persons.
12. Social distancing – how will that be implemented and maintained. If not practicable physical barriers to be placed between work stations.
13. Operational plant and construction vehicle sanitising and frequency i.e. 3 times daily including recordkeeping.
14. Sanitising of ablution facilities and eating areas as well as frequency i.e. 3 times daily including recordkeeping.
15. Sanitising of tools and shared equipment as well as work areas in general.
16. Ventilation inside confined spaces such as offices and stores.
17. Raise awareness among construction workers of the risk of infection, promote early diagnosis and assist affected persons.
18. Display suitable awareness posters at all applicable areas such as high-traffic areas as well as replacement to ensure relevancy.
19. Provide and display information regarding counselling, support and care for those that are affected.
20. Identify, provide and maintain the required personal protective equipment based on a relevant risk assessment, including the correct use, removing and replacement as well as disposal.
21. Encourage employees to report and undergo COVID-19 testing should they encounter any applicable symptoms.
22. Establish methods of identifying persons who may be at risk, and support them without attracting stigma and discrimination. This could include employees who have recently travelled to a high area, or who have conditions that put them at higher risk of serious illness (e.g. diabetes, HIV/AIDS, tuberculosis, heart and lung disease).
23. Management of medical surveillance.
24. Management of COVID-19 waste, i.e. used masks, gloves etcetera, as this is regarded as infected or when applicable hazardous waste and as such waste bins with lids and labelled as hazardous waste as well as sealed bags to be provided.
25. The procedure adopted to resolve any issue that may arise from the exercise by an employee of the right to refuse to work.
- g. Reporting of any incidents to the Project Manager and client.
- h. Development of project specific business continuity plan.

1.4.1 COVID-19 statutory reporting and administrative measures

- a. The principal contractor must report the following to the National Institute of Occupational Health -

1. the data of every employee who may be vulnerability to serious outcomes in case of COVID-19 infection on a once-off basis;
 2. the details of employees testing positive for the COVID-19 virus before Tuesday for the previous calendar week commencing on the Sunday (guideline requirements); and
 3. the details of post-infection outcomes of those who have tested positive, weekly before Tuesday until the employee returns to work.
- b. If the principal contractor employs more than 50 employees, it must submit a record of its COVID-19 risk assessment together with a written policy concerning the protection of the health and safety of its employees from COVID-19 to the Department of Employment and Labour.

2. Contact details

For any enquiries regarding this addendum to the occupational health and safety specifications, please contact –

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Annexure C5.3: Baseline Risk Assessment

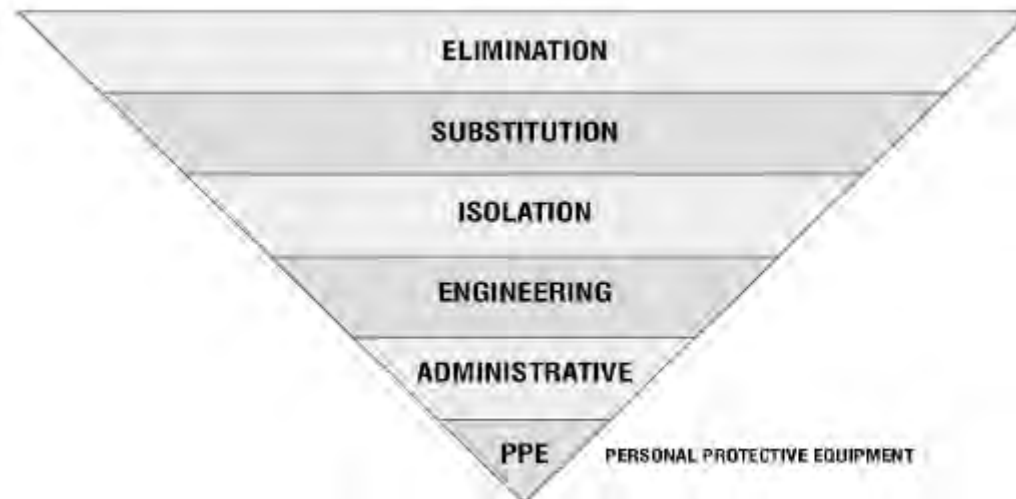


Baseline risk assessment undertaken in terms of Construction Regulation 5(1) to identify the operational risks to be addressed by the project specific health and safety specification

Client name: King Cetshwayo District Municipality
Project name: 2142D Middledrift SSA 3 – Potable Water Reticulation
Risk assessor: Gareth Bailey
Assessment date: 16 May 2019
Pr. CHSA: Karl Bailey



Hierarchy of controls



Definitions

Elimination	The most satisfactory method of dealing with hazards is to get rid of it. Once the hazard has been eliminated, the potential for harm has gone.
Substitution	This involves substituting a dangerous process or substance with one that is not as dangerous.
Isolation	Separate or isolate the hazard from the people
Engineering	Introduce or substitute an engineered device to eliminate or reduce the risk.
Administrative	Administrative solutions usually involve modification of the likelihood of an accident happening. Do this by reducing the number of people exposed to the hazard, and by ensuring that those who must remain exposed know about the hazard and how best to manage it. Administrative solutions also include danger signs, and written systems of work, such as those for working in confined spaces and lock-out procedures.
PPE	Provision of personal protective equipment should only be considered when all other control methods are impractical. They provide a means to increase control, and offer a last line of defence when used with another method higher up the hierarchy.

Key operational activities/risks that will form part of the project

Description of risk	Risk rating	Potential risk impact	Risk mitigation
Emergency preparedness, contingency planning and response	High 21	Inadequate emergency preparedness, contingency planning and response could result in the inability to effectively respond to emergencies and this could impact negatively on the health and safety of employees and other persons.	1. The principal contractor to appoint a competent person to act as emergency controller and/or coordinator. 2. The principal contractor to conduct an emergency identification exercise and establish what emergencies could possibly develop. He/she must then develop detailed contingency plans and emergency procedures, taking into account any emergency plan that the Client may have in place. 3. The principal contractor and the other contractors must hold regular practice drills of contingency plans and emergency procedures to test them and familiarise employees with them.
First-aid	High 22	Inadequate first-aid arrangements could impact negatively of the ability to respond to first-aid injuries or to stabilise injured employees or other persons that may require advanced health care. This could negatively impact of the injured person's prognosis, recovery and medical costs.	1. The principal contractor to provide first-aid equipment and have qualified first-aider(s) on site as required by General Safety Regulation 3 of the OHSACT. 2. The contingency plan of the principal contractor to include arrangements for the speedily and timeously transportation of injured and/or ill person(s) to a medical facility or getting emergency medical support to person(s) who may require it. 3. The principal contractor to have firm arrangements with his contractors in place regarding the responsibility of these contractor's first-aid arrangements as well as treatment of injured and/or ill employees.
Security	High 22	Inadequate security arrangements could result in unauthorised access by members of the public that could pose a risk to employees working on this site or could also result in the illegal removal of equipment and/or material from the site or injuries to these members of the public.	1. The principal contractor to establish site access rules and implement and maintain these throughout the construction period. Access control must, amongst other, include the rule that non-employees will not be allowed on site unaccompanied. 2. The principal contractor to develop a set of project applicable security rules and procedures and maintain these throughout the construction period.

Description of risk	Risk rating	Potential risk impact	Risk mitigation
Accommodation of traffic	Medium 12	Inadequate traffic accommodation pose a potential risk to employees as well as road users and could not only result in injuries and subsequent medical and other costs to employees, but also injuries to road users and damages to vehicles with subsequent claims against the principal contractor and the client.	1. The principal contractor to appoint a competent traffic safety officer to take responsibility for the accommodation of all traffic. 2. The principal contractor to undertake a detailed risk assessment to ensure that all traffic related risks are identified and appropriate risk mitigation measures be established, implemented and maintained. This risk assessment should be kept on the health and safety file and also duly communicated to all employees and especially operators and drivers of construction vehicles and plant. 3. The principal contractor to develop a comprehensive traffic accommodation plan to provide for traffic entering the site as well as traffic on site, i.e. internal roads and construction areas. 4. Where construction work is undertaken in, next to or close to a public road, the use of appropriate as well as a sufficient number of road signs to be of paramount importance to protect employees against traffic and to warn all road users of the presence of construction work as well as construction employees/risks/vehicles. 5. The principal contractor to ensure that appropriate as well as a sufficient number of road signs are posted to protect employees against traffic and to warn all road users of the presence of construction work as well as construction employees/vehicles. These signs shall be repeated and utilised, where appropriate, as actual construction work is approached. 6. The following signage to be provided as a minimum where construction work is undertaken in, next to or close to a public road: • “Construction work ahead” signs; • “Lane narrows” signs; • “Keep right/left” signs; and • Delineators and cones.

Description of risk	Risk rating	Potential risk impact	Risk mitigation
			7. Where construction work includes excavations in or next to a public road, warning lights or visible boundary indicators to be provided after dark or when visibility is poor. 8. The maintenance of all signage and especially those that is suitable after dark to be duly managed. 9. Where appropriate duly trained flag persons to be deployed a good distance ahead of areas where traffic is deviated or lanes closed off. These flag persons to be managed assertively to ensure that they add optimal value and should they not do so they should be retrained and if necessary replaced. 10. The community liaison officer (CLO) to be sensitised on the optimal management of traffic and the risks involved and then be instructed to increase community awareness through talking to all stakeholders including the distribution of suitable information brochures.
Fall protection	High 22	Inadequate fall protection arrangements could result in employees and other persons falling from elevated working areas and result in serious injuries or even fatalities.	1. A pre-emptive risk assessment to be carried out for any work undertaken from a fall risk position and will be classified as “work in elevated positions”. 2. As far as is practicable, any person working in an elevated position will work from a stable platform, ladder or other device that is at least as safe as if he or she is working at ground level and whilst working in this position be wearing suitable fall arrest equipment to prevent the person falling from the platform, ladder or other device utilised. This fall arrest equipment will be, as far as is possible, secured to a point away from the edge over which the person might fall and the lanyard must be of such a length and strength that the person will not be able to move over the edge. Alternatively any platform, slab, deck or surface forming an edge over which a person may fall may be fitted with suitable guard rails at two different heights as prescribed in SANS 10085 code of practice for the design, erection, use and inspection of access

Description of risk	Risk rating	Potential risk impact	Risk mitigation
			scaffolding. - Where the requirement in item 2 is not practicable, the person will be provided with a full body harness that will be worn and attached above the wearer's head at all times and the lanyard must be fitted with a shock absorbing device or the person must be attached to a fall arrest system that is approved by the Client. - Where the requirements in item 3 are not practicable, a suitable catch net, which is able to sustain the weight of at least the average person working in the elevated position, will be erected. - Employees working in elevated positions will be trained to do this safely and without risk to their or other person's health and safety. - Where work on roofs is carried out, the risk assessment must take into account the possibility of persons falling through fragile material, i.e. skylights and openings in the roof. - Updated records confirming the physical fitness of employees working at elevated positions will be kept on the health and safety file at all times. - Specifically focusing on the operational risks i.e. mountains.
Structures	Significant 20	Unsafe or sub-standard structures could collapse on employees and/or other persons with subsequent injuries to employees/persons or even fatalities and also impact negatively on project costs, and result is liability claims and reputation risks for all stakeholders.	- Only skilled employees to be allowed to erect structures and that the skills of these employees are being verified at regular intervals. - Steps to be taken to ensure that no structure becomes unstable or collapses due to construction work being performed on it or in the vicinity of it. - No structure to be overloaded to the extent where it becomes unsafe. - The following information to be requested from the designer and also duly considered: - Information on known or anticipated hazards relating to the construction work and the relevant information required for the safe execution of the

Description of risk	Risk rating	Potential risk impact	Risk mitigation
			construction work. • A geo-scientific report (where applicable). • The loading the structure is designed to bear. • The methods and sequence of the construction process. • Any other applicable information. 5. All drawings pertaining to the design to be on site, utilised and available for inspection.
Access scaffolding	Significant 19	Unsafe scaffolding structures could collapse or employees may fall from unprotected working platforms and result in injuries or even fatalities. Loose items falling from scaffolding structures could also cause injuries to employees or persons below as well as asset damages with claims.	1. Access scaffolding to be erected, used and maintained safely in accordance with Construction Regulation 16 and SA Bureau of Standards Code of Practice, SANS 10085 entitled, "The Design, Erection, Use and Inspection of Access Scaffolding". 2. Detailed consideration to be given to all scaffolding to ensure that it is properly planned to meet the working requirements, designed to carry the necessary loadings and maintained in a sound condition. It must also be ensured that there is sufficient material available to erect the scaffolding properly and safely. 3. Scaffolding to be erected, altered, maintained or dismantled by person(s) who has/have adequate training and experience in this type of work or under the continuous and direct supervision
Lifting equipment	High 21	The use of unsafe lifting equipment could result in loads being lifted to fail and fall with subsequent injuries or even fatalities as well as asset damages that will result in claims and reputation risks.	Lifting equipment to be designed and constructed in accordance with the manufactures/designers specifications as well as generally accepted technical standards and operated, used, inspected and maintained in accordance with the manufactures requirements as well as that of the Driven Machinery Regulation 18 of the OHSACT: The Driven Machinery Regulation requires that: a. Lifting equipment to be clearly and conspicuously marked with the maximum mass load (MML) that it is designed to carry safely. When the MML varies with the conditions of use, the table of maximum loads

Description of risk	Risk rating	Potential risk impact	Risk mitigation
			should be used by the driver/operator; b. Each winch on a lifting machine must at all time have, at least, three full turns of rope on the drum when the winch has been run to its lowest limit; c. Lifting equipment be fitted with a brake or other applicable device capable of holding the MML. This brake or device must automatically prevent the downward movement of the load when the lifting power is interrupted; d. Lifting equipment fitted with a load limiting device that automatically arrest the lift when the load reaches its highest safe position or when the mass of the load is greater than the MML; e. Every chain or rope on a lifting machine that forms an integral part of the machine must have a factor of safety as prescribed by the manufacturer of the machine and where no standard is available the factor of safety must be: 1. chains – 4 (four) 2. steel wire ropes - 5 (five) 3. fibre ropes- 10 (ten) f. Every hook or load attaching device must be designed as such or fitted with a device that will prevent the load from slipping off or disconnecting; g. Every lifting machine must be inspected and load tested by a competent person every time it has been dismantled and re-erected and every 12 months after that. The load test must be in accordance with the manufacturers prescription or to 110% of the MML in addition all ropes, chains, hooks or other attaching devices, sheaves, brakes and safety devices forming an integral part of a lifting machine must be inspected every 6 months by a competent person; h. All maintenance, repairs, alterations and inspection results must be recorded in a log book and each lifting machine must have its own log book; and

Description of risk	Risk rating	Potential risk impact	Risk mitigation
			i. No person may be lifted by a lifting machine not designed for lifting persons unless in a cradle approved by an inspector of the Department of Labour.
Lifting tackle	High 21	The use of unsafe lifting tackle could result in loads being lifted to fail and fall with subsequent injuries or even fatalities as well as asset damages that will result in claims and reputation risks.	The following requirements to adhered to when lifting tackle is utilised: a. Manufactured of sound material, well-constructed and free from latent defects; b. Clearly and conspicuously marked with an identity number; c. Maximum mass load factor of safety: • Natural fibre ropes - 10(ten) • Man-made fibre ropes and woven webbing - 06(six) • Steel wire ropes – single rope - 06(six) • Steel wire ropes – combination slings - 08(eight) • Mild Steel chains - 05(five) • High tensile/alloy steel chains - 04(four) d. Steel wire ropes must be discarded (not used any further for lifting purposes) when wear and corrosion is evident and must be examined by a competent person every three months for this purpose and the results recorded in a designated log book.
Construction vehicle and mobile plant operators	High 21	The use of vehicles and/or plant operators that are not competent could result in incidents with subsequent injuries or even fatalities as well as asset damage with subsequent costs/claims and reputation risks.	The following requirements to apply to construction vehicle and mobile plant operators: a. Only certified and/or competent employees may be allowed to operate any construction vehicle and mobile plant. b. Every lifting machine operator must be trained specifically for the type of lifting machine that he or she is operating. c. Only employees duly authorised to do so may operate any construction vehicle and mobile plant. d. Only employees physically and psychologically fit, i.e.

Description of risk	Risk rating	Potential risk impact	Risk mitigation
			in possession of a medical certificate of fitness, may be allowed to operate any construction vehicle and mobile plant.
Electrical installations	High 22	Unsafe electrical installations could result in employees and other persons being electrocuted with subsequent injuries or even fatalities as well as asset damage due to fire with subsequent costs and reputation risks.	Any electrical work undertaken as part of the project, including the installation of temporary electricity for construction use shall be in accordance with Construction Regulation 24 and the Electrical Installation Regulations. The principal contractor to ensure that: - Existing services are to be located and clearly marked before construction commences and during the progress thereof; - Where the abovementioned is not possible, employees with jackhammers etc. will be protected against electric shock by the use of suitable protective equipment e.g. rubber mats, insulated handles etcetera; - Electrical installations and -machinery are sufficiently robust to withstand normal working conditions on site; - Temporary electrical installations must be inspected at least once per week by a competent person and a record of the inspections kept on the occupational health and safety file; - Electrical machinery used on a construction site must be inspected daily before start-up by the competent driver/operator or any other competent person and a record of the inspections kept on the occupational health and safety file; and - A competent person appointed in writing must control all temporary electrical installations.
Electrical and mechanical lockout	High 22	The lack of suitable lock-out procedures may result in employees and other persons being electrocuted with subsequent injuries or even fatalities with resulting costs and reputation risks.	An electrical and mechanical lockout procedure to be developed by the principal contractor and submitted to the Client for approval before construction commences. All contractors on site must be informed of and adhere to this lockout procedure.

Description of risk	Risk rating	Potential risk impact	Risk mitigation
Use and storage of flammables	Significant 18	The unsafe use and/or storage of flammables could result in fires or explosions with subsequent injuries or even fatalities as well as asset damage due to fire with subsequent costs and reputation risks.	The principal contractor to ensure that: a. No person is required or permitted to work in a place where there is the danger of fire or an explosion due to flammable vapors being present unless adequate precautions is taken; b. Flammables stored on a construction site are stored in a well-ventilated, reasonably fire-resistant container, cage or room that is kept locked with consistent access control measures in place and sufficient fire fighting equipment installed and fire prevention methods practiced for example proper housekeeping; c. Only one day's quantity of flammable is to be kept in the workplace; d. Containers (including empty containers) to be kept closed to prevent fumes/vapors from escaping and accumulating in low lying areas; and e. Welding and other flammable gases to be stored segregated as to the type of gas and empty and full cylinders.
Hazardous chemical substances	Significant 18	The unsafe use of hazardous chemical substances could result in fires with subsequent injuries or even fatalities as well as asset damage due to fire with subsequent costs/claims. Spilled chemical substances may also impact negatively on the health of employees and other persons or negative implications for the environment including legal and claim exposures.	The principal contractor to ensure that: a. Employees receive the necessary information and training to be able to use, handle and store hazardous chemical substances safely; b. The risk assessments required in terms of Construction Regulation 9 include employee exposure to hazardous chemical substances and that the necessary measures be taken to protect persons from being detrimentally affected by hazardous chemical substances present or used in the workplace; c. Suppliers provide the necessary information in the form of material safety data sheets regarding hazardous chemical substances required to ensure the safe use, handling and storage of these

Description of risk	Risk rating	Potential risk impact	Risk mitigation
			substances; d. An up-to-date list is kept on site of hazardous chemical substances stored and used together with the material safety data sheet of the said hazardous chemical substances; e. Hazardous chemical substances containers be clearly marked as to the contents and main hazardous category e.g. "Flammable" or "Corrosive" and the reference number of the hazardous chemical substances on the list indicated above; f. No person eats or drinks in a hazardous chemical substances workplace; and g. Hazardous chemical substances waste is disposed of safely in terms of hazardous waste disposal requirements.
Fire prevention and protection	High 22	Inadequate fire prevention and protection measures may impact negatively on the ability to fight fires that may cause injuries or even result in fatalities as well as asset damages with subsequent costs/claims.	The principal contractor to ensure that: a. The risk of fire is avoided; b. Sufficient and suitable storage of flammables is provided; c. All employees are instructed in the use of the fire fighting equipment and know how to attempt to extinguish a fire; d. A sufficient number of employees are appointed and trained to act as an emergency team to deal with fires and other emergencies; e. Employees are informed regarding emergency evacuation procedures and escape routes; f. Emergency escape routes are kept clear at all times and clearly marked; g. Evacuation assembly points are demarcated and made known to employees; h. Evacuation is regularly practiced to ensure that all persons are evacuated timeously and; i. Roll call is held after evacuation to account for all employees and to ensure that no-one including

Description of risk	Risk rating	Potential risk impact	Risk mitigation
			visitors and disabled persons have been left behind; and j. A clearly audible, to all persons on site, siren or alarm is fitted and regularly tested.
Housekeeping	Significant 18	Poor housekeeping may impact negatively on productivity, result in employees/persons tripping and falling or even cause a fire with subsequent asset damage and cost/claims as well as reputation exposures.	The principal contractor to ensure that: a. Housekeeping is continuously implemented and maintained; b. Materials and equipment is properly stored; c. Scrap, waste and debris is removed off site regularly; d. Materials placed for use are placed safely and not allowed to accumulate or cause obstruction to the free-flow of pedestrians and vehicular traffic; e. Where practicable, construction sites are fenced off to prevent entry of unauthorised persons; f. An unimpeded work space is maintained for every employee; g. Every workplace is kept clean, orderly and free of tools and the likes that are not required for the work being done; and h. As far as is practicable, every floor, walkway, stair, passage and gangway is kept in good state of repair, skid-free and free of obstruction, waste and materials; i. The walls and roof of every indoor workplace be sound and leak-free.
Stacking and storage	High 21	Unsafe stacking and storage practices may result in stacked items collapsing with subsequent injuries or even fatalities as well as asset damage with associated losses and costs.	The principal contractor to ensure that: a. A competent person is appointed in writing to supervise all stacking and storage on a construction site; b. Adequate storage areas are provided and demarcated; c. The storage areas are kept neat and under control; d. The base of any stack is level and capable of sustaining the weight exerted on it by the stack; e. The items in the lower layers can support the weight

Description of risk	Risk rating	Potential risk impact	Risk mitigation
			exerted by the top layers; f. Cartons and other containers that may become unstable due to wet conditions are kept dry; g. Pallets and containers are in good condition and no material is allowed to spill out; h. The height of any stack does not exceed 3 times the base unless stepped back at least half the depth of a single container at least every fifth tier or the approval of an inspector of the Department of Labour has been obtained to build the stacks higher with the aid of a machine. (The operator of the machine must be protected against items falling from overhead or off the stack and no items may overhang); i. The articles that make up a single tier are consistently of the same size, shape and mass; j. Structures for supporting stacks are structurally sound and able to support the mass of the stack; k. No articles are removed from the bottom of the stack first but from the top tier first; l. Anybody climbing onto a stack can and does do it safely and that the stack is sufficiently stable to support him or her; m. Stacks that are in danger of collapsing are broken down and restacked; n. Stability of stacks are not threatened by vehicles or other moving plant and machinery; o. Stacks are built in a header and stretcher fashion and that corners are securely bonded; and p. Persons climbing onto stacks do not approach unguarded moving machinery or electrical installations.
Eating, changing, washing and toilet facilities	Significant 18	Inadequate provision of welfare facilities may have negative implications on the health of employees and other persons as well as the environment with associated claims and costs.	Toilets 1. The provision of toilets for each sex is required in terms of the National Building Regulations and Construction Regulation 30.

Description of risk	Risk rating	Potential risk impact	Risk mitigation
			2. Chemical toilets are allowed instead of the water borne sewerage type. Toilets have to be provided at a ratio of at least 1 toilet per 30 employees. Showers At least cold-water showers of some sort for each sex have to be provided at a ratio of at least 1 shower per 15 employees. Change rooms Some form of screened off changing facility must be provided separately for each sex. Eating facility Some form of eating facility sheltered from the sun, wind and rain must be provided. Living accommodation Where the site is in a remote location and transport to home is not readily available, reasonable and suitable living accommodation must be provided after obtaining of the necessary permission from authorities and adhering to requirements such as Bylaws of the local municipality.
Personal and other protective equipment	High 21	Inadequate provision and/or use of unsuitable PPE could cause injuries or even fatalities with associated claims and costs including legal and reputation exposures.	The principal contractor to proactively identify the hazards in the workplace and deal with them on an ongoing basis. He/she to either remove them or, where impracticable take steps to protect employees and make it possible for them to work safely and without risk to health under the hazardous conditions. Personal protective equipment should, however, be the last resort and there should always first be an attempt to

Description of risk	Risk rating	Potential risk impact	Risk mitigation
			apply re-engineering and other solutions to mitigating hazardous situations before the issuing of personal protective equipment is considered. Where it is not possible to create an absolutely safe and healthy workplace the principal 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 principal contractor maintain the said equipment, that he/she instructs and trains the employees in the use of the equipment and ensures that the prescribed equipment is used by the employee/s in a consistent and correct manner. Employees do not have the right to refuse to use and/or 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 valid 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 the employee. The principal contractor may not charge any fee for protective equipment prescribed by him or her but may charge for equipment under the following conditions, - Where the employee requests additional issue in excess of what is prescribed; following a disciplinary hearing: - Where the employee has blatantly abused or

Description of risk	Risk rating	Potential risk impact	Risk mitigation
			neglected the equipment leading to early failure; and Where the employee has lost the equipment.
Portable electrical tools and equipment	High 22	The use of unsafe and/or unsuitable portable electrical tools and equipment could result in employees and other persons being electrocuted with subsequent injuries or even fatalities as well as asset damage due to fire with subsequent claims and costs.	Portable electrical tools and equipment includes every unit that takes electrical power from a 15 ampere plug point and is moved around for use in the workplace i.e. drills, saws, grindstones, portable lights, etcetera. In addition electrical appliances such as fridges, hotplates, heaters, etcetera must be inspected regularly but at least on a weekly basis and maintained to the same standards as portable electrical tools and appliances. The use, inspection and maintenance of portable electrical tools and equipment must be governed by the following: - Regular inspections by a competent person appointed in writing; - Inspection results must be recorded in a register; - Only competent authorised persons are allowed to use portable electrical tools and equipment; and - The correct protective equipment is worn/used whilst operating portable electrical tools and equipment. This equipment - - Must be maintained in good condition at all times to prevent an electrical shock to the user; - The main source should incorporate an earth leakage protection device or receive power through a double wound transformer or be double insulated and clearly marked as such; and - All equipment must be fitted with a switch to allow for safe and easy starting and stopping.
Public health and safety	High 24	The disregard of the public's health and safety could result in injuries or even fatalities with associated claims and reputation risks	The principal contractor will responsible for ensuring that non-employees affected by the construction work are made aware of the dangers likely to arise from said construction work as well as the precautionary measures to be observed to avoid or minimise those dangers. This includes among others:

Description of risk	Risk rating	Potential risk impact	Risk mitigation
			a. Non- employees entering the site for whatever reason; b. The surrounding community; and c. Passers by the site. Appropriate signage must be posted to this effect and all employees on site must be instructed to ensure that non-employees are protected at all times. All non-employees entering the site must receive site applicable induction into the hazards and risks and the control measures for these.
Excavations	High 25	Excavations excavated in an unsafe manner could collapse with subsequent injuries and fatalities or even damages to adjacent structures/services with resultant claims and costs. Excavations that are not suitably barricaded could result in employees, other persons, animals or even vehicles falling into them resulting in damages, injuries or even fatalities.	All excavation work to comply with the following: a. Excavation work must be carried out under the supervision of a competent person with at least two years practical experience in excavation work who has been appointed in writing. b. Before excavation work begins the stability of the ground must be evaluated. c. Whilst excavation work is being performed, the principal contractor must take suitable and sufficient steps to prevent any person from being buried or trapped by a fall or dislodgement of material. d. No person may be required or permitted to work in an excavation that has not been adequately shored or braced. e. Where the excavation is in stable material or where the sides of the excavation are sloped back to at least the maximum angle of repose measured relative to the horizontal plane, shoring or bracing may be left out but only after written permission has been obtained from the appointed competent person. f. Shoring and bracing must be designed and constructed to safely support the sides of the

Description of risk	Risk rating	Potential risk impact	Risk mitigation
			excavation and prevent it from collapsing. g. Where uncertainty exists regarding the stability of the soil the opinion of a competent professional engineer or professional technologist must be obtained, before excavation proceeds, whose opinion will be decisive. The opinion must be in writing and signed by the engineer or technologist as well as the appointed excavation supervisor. h. No load or material may be placed near the edge of an excavation if it is likely to cause a collapse of the excavation, unless suitable shoring has been installed to be able to carry the additional load. Best practice requires a one meter clearance so as to reduce the pressure on the side walls as well as risk of material falling onto persons inside the excavation. i. Every excavation must be provided with means of access that must be within 6 metres of any employee within the excavation at any time. Should ladders be utilised for this purpose they should be duly secured. j. The location and nature of any existing services such as water, electricity, gas, telecommunication etcetera must be established before any excavation is commenced with and any service that may be affected by the excavation must be protected and made safe for employees working in or near in the excavation. k. Every excavation, including the shoring and bracing or any other method to prevent a possible collapse, must be inspected by the appointed competent person as follows: • Daily before work commences • After every blasting operation • After an unexpected collapse of the excavation or part thereof • After substantial damage to any support • After rain

Description of risk	Risk rating	Potential risk impact	Risk mitigation
			l. The results of any inspections must be recorded in a register kept on site in the health and safety file. m. Every excavation accessible to the public or that is adjacent to a public road or thoroughfare or that threatens the safety of persons, must be adequately barricaded or fenced off, on all sides, to at least one meter high and as close to the excavation perimeter as practicable. All such excavations must also be provided with warning lights or visible boundary indicators after dark or when visibility is poor.
Blasting	24 High	Unsafe blasting activities could result in injuries, fatalities and/or damage to structures/services that may result in claims and costs.	1. Blasting activities to be carried out under the supervision of a competent person with at least five years practical experience in blasting who has been appointed in writing. 2. A method statement to be developed in accordance with all applicable explosives legislation, by an appointed person who is certified as a competent person in the use of explosives. 3. The necessary permits to be in place for the transportation of explosives to be used. 4. Access to the blasting area to be strictly restricted. 5. No smoking or hot work to be allowed close to explosives or the blasting areas. 6. Reasonable steps to be taken to prevent damage to structures in the vicinity of the blasting area. 7. Any other industry required safety measures to be considered and implemented specifically taking the construction site's specific requirements into account including the removal of any surplus explosives off the site.
Working over or next or close to water or similar substances	High 23	Working close to or over water without the necessary risk mitigation (such as life buoys/life jackets/lifelines) may result in employees and other persons drowning with subsequent claims and costs.	1. A competent person to be appointed in writing to supervise, control and inspect any work on or over or in close proximity of the water as well as the construction, installation, and dismantling of caissons and/or cofferdams and/or other support or safety structures;

Description of risk	Risk rating	Potential risk impact	Risk mitigation
			2. Written proof of the competence of above appointee to be available on site; 3. Risk assessments to be carried out by the competent person before any work is undertaken, mitigation measures documented as well as implemented and thereafter evaluated on a daily basis; 4. The necessary induction and refresher training to be undertaken; 5. Measures for the timeous warning of flooding to be in place; 6. Provision to be made to prevent employees from falling into the water and the rescuing of employees in danger of drowning; 7. Ensure that where an employee is exposed to the risk of drowning by falling into the water, a lifejacket is provided to and worn by the employee; and 8. Provide applicable personal protective equipment such as safety harnesses etcetera and enforce the utilisation thereof.
Temporary work	High 23	Unsafe temporary work may cause the temporary structures to collapse with subsequent injuries, fatalities and/or even damages to assets with subsequent claims and costs.	1. Temporary work to be carried out under the supervision of the competent person designated in writing. 2. Temporary work structures to be so designed, erected, supported, braced and maintained that they will be able to support any vertical or lateral loads that may be applied. 3. No load to be imposed onto a structure that the structure is not designed to carry. 4. Temporary work to be erected in accordance with the structural design drawings for such temporary work and if there is any uncertainty, the designer must be consulted before proceeding with the erection/use of the temporary work. 5. All drawings pertaining to the temporary work to be kept and be available on site. 6. All equipment used in the erection of temporary work

Description of risk	Risk rating	Potential risk impact	Risk mitigation
			to be checked by a competent person before use. 7. The foundation or base upon which the temporary work is erected to be able to bear the weight and keep the structure stable. 8. Employees erecting temporary work to be trained in the safe work procedures for the erection, moving and dismantling of the temporary work. 9. Safe access and emergency escape to be provided for employees. 10. A competent person to inspect the temporary work structures that have been erected before, during and after pouring of concrete or the placing of any other load and thereafter daily until the temporary work is stripped. The dismantling also to be undertaken under the direct supervision of the appointed competent person. The results of all inspections must be recorded in a register kept on the site health and safety file. 11. The temporary work to be left in place until the designated competent person has authorised its stripping in writing. 12. Any damaged temporary work to be repaired and/or rectified without delay. 13. Deck panels to be secured against displacement. 14. The slipping of employees and other persons on release agents on deck panels to be prevented at all times. 15. Employees' health to be protected against the use of solvents, oils or other similar substances.
Welding and flame cutting	High 21	The unsafe use of welding and flame cutting equipment could result in employees and other persons suffering from burns or even result in fires that could cause injuries and fatalities as well as damage to property with subsequent claims and costs.	1. A competent person to be appointed to supervise welding, flame cutting or similar operations on site. 2. The following rules to govern all welding and flame cutting or similar operations: a. The welder will be trained regarding the safe use/operation of the equipment. b. The welder and his assistant will be provided

Description of risk	Risk rating	Potential risk impact	Risk mitigation
			with effective and appropriate personal protective equipment and/or clothing. c. Cables and electrode holders will be effectively insulated. d. The workplace will be effectively screened off to prevent bystanders from being affected by the welding rays or they will be provided with personal protective equipment. e. Special precautions will be taken where welding is undertaken in confined spaces e.g. proper and sufficient ventilation will be provided. f. In wet or damp conditions the welding equipment and the welder will be properly insulated and someone will be on standby to assist in the event of any emergency. g. A qualified person will certify in writing that it is safe to enter and work in a specific confined space before welding or flame cutting is undertaken. h. No welding, flame cutting, grinding, soldering or similar work shall be undertaken in respect of any drum, vessels or similar object or container where such object or container- • is completely closed, unless the rise in internal pressure cannot render it dangerous; or • contains any substance which, under the action of heat may explode or react to form dangerous or poisonous substances. i. Where pressure vessels/welding cylinders containing oxygen or acetylene are transported or used, the proper precautionary measures will be taken against bumping, falling, rolling etcetera. j. Gas welding hoses may only be joined with

Description of risk	Risk rating	Potential risk impact	Risk mitigation
			approved connectors and clamps. k. No oil or grease may be applied to oxygen valves and fittings. l. It is a sound practice to store pressure vessels and/or welding cylinders vertically and to secure them by means of a chain. m. Acetylene cylinders may never be inclined in excess of 45°. n. Proper and adequate fire prevention measures will be instituted and maintained for as long as the welding continues. o. Where explosive and/or flammable vapours are present welding will only be done under "hot work" permits.
Transportation of employees	High 24	The unsafe transportation of employees could result in injuries and/or fatalities with subsequent costs and claims.	1. Any vehicle used to transport employees must have seats firmly secured and adequate for the number of employees to be carried. 2. Regulation 247 of the National Road Traffic Act, Number 93 of 1996 (NRTA) stipulates that the principal contractor shall not allow employees to be transported in a vehicle unless the portion of the vehicle in which the employees are being conveyed is enclosed to a height of – a. at least 350 mm above the surface on which employees are seated; or b. at least 900 mm above the surface on which employees are standing, in a manner and with a material of sufficient strength to prevent employees from falling from such vehicle when it is in motion. 3. Regulation 247 of the NRTA also stipulates that the principal contractor shall also not allow any employees to be conveyed in the goods compartment of a vehicle together with any tools or goods, except their personal

Description of risk	Risk rating	Potential risk impact	Risk mitigation
			effects, unless that portion in which the employees are being conveyed is separated by means of a partition, from the portion in which such goods are being conveyed.
Working under or close to overhead power lines	High 23	Unsafe working under or close to overhead power lines could result in accidental contact or an arch and employees and other persons being electrocuted with subsequent injuries or even fatalities as well as asset damage with subsequent costs and reputation risks.	The principal contractor to ensure that the following requirements are duly considered and adhere to: 1. Passing underneath overhead lines to access the site Some of the access roads to the site could cross under existing power lines. The principal contractor to – a. keep the number of passageways to a minimum; b. define the route of the passageway; c. ensure the surface of the passageway is as levelled as possible; d. put warning notices at either side of the passageways; e. enforce strict speed control measures; and f. make sure that the barriers and goalposts are maintained. 2. Working underneath overhead lines a. The principal contractor to confirm with the local authority or if applicable Eskom what the standard is for working close to and under these overhead lines. b. A risk assessment to be undertaken taking into account any situations that could lead to danger from the overhead wires, for example, consider whether someone may need to stand on top of a machine or lift a long item above their head, or if

Description of risk	Risk rating	Potential risk impact	Risk mitigation
			the combined height of a load on a low truck breaches the safe clearance distance. If this type of situation could exist, applicable precautionary measures have to be taken. c. Where there is a risk of contact from, for example, the upward movement of excavators or tipper trucks or employees carrying tools and equipment, the principal contractor to carefully assess the risks and precautionary measures. d. Vehicles, plant, machinery, equipment, or materials that could reach beyond the safe clearance distance not to be taken near the line. e. Under no circumstances may any part of plant or equipment such as ladders, poles and hand tools be able to be utilised within the danger zone or make contact with the lines. f. The principal contractor to allow for uncertainty in measuring the distances and for the possibility of unexpected movement of the equipment due, for example, to wind conditions. g. Long objects to be carried horizontally and close to the ground and vehicles positioned so that no part can reach into the danger zone, even when fully extended. h. Construction vehicles and plant working underneath overhead lines such as excavators to be modified by the suppliers with the addition of suitable physical restraints so that they cannot reach beyond the safe clearance distances, measures should be put in place to ensure these restraints are effective and cannot be altered or tampered with. i. Operators of high machinery to be instructed not carry out any work on top of the machinery near overhead power lines. j. Make sure that employees, including any sub-

Description of risk	Risk rating	Potential risk impact	Risk mitigation
			contractors, understand the risks and are provided with instructions about the risk prevention measures. k. Arrange for the work to be directly supervised by a competent person at all times who is familiar with the risks and can make sure that the required safety precautions are observed. 3. Emergency procedures If someone or something comes into contact with an overhead line, it is important that everyone involved knows what action to take to reduce the risk of anyone sustaining an electric shock or burn injuries. Key points include – a. Never touch the overhead line's wires. b. Always assume that the wires are live, even if they are not arcing or sparking, or if they otherwise appear to be dead. Even if lines are dead, they may be switched back on either automatically after a few seconds or remotely after a few minutes or even hours if the line's owner is not aware that their line has been damaged. c. In the event of accidental contact call the emergency services. Give them the location of the incident, tell them what has happened and that electricity wires are involved. d. Should any employee or other person come in contact with, or close to, a damaged wire, he must away as quickly as possible and stay away until the line's owner advises that the situation has been made safe. e. In the event of a vehicle touching a wire, the driver and occupants should either stay in the

Description of risk	Risk rating	Potential risk impact	Risk mitigation
			vehicle or, should the need to get out, jump out of it as far as you can. Never touch the vehicle while standing on the ground. Do not return to the vehicle until it has been confirmed that it is safe to do so. f. All employees and other persons should be aware that if a live wire is touching the ground the area around it may be live. A safe distance from the wire or anything else it may be touching should therefore be maintained. g. Only duly competent and authorised persons may work on electrical wires and installations.
Exposure to poisonous animals or insects	Significant 18	Interaction with poisonous animals or insects could result in injuries or even fatalities.	The principal contractor to ensure that the following are duly adhered to: a. the emergency procedure to be expanded to provide for the effective treatment of employees or other persons visiting exposed to bites or stings from poisonous animals and insects, i.e. the contact details of the nearest medical unit that could treat employees exposed to bites or stings be obtained and arrangements be made with this service provider on the procedures to be followed to ensure swift response when required; b. confirmation to be obtained from this medical unit that they have anti venom reserved to treat employees or other persons visiting that may be exposed to snake bites or scorpion stings; c. competent first aiders to be available to facilitate the treatment of employees or other persons visiting exposed to stings or bites; and d. the potential exposure posed by poisonous animals or insects and awareness thereof to be discussed with all employees as part of the toolbox talks and general awareness training and other persons visiting as part of the pre-site visit induction process.

Description of risk	Risk rating	Potential risk impact	Risk mitigation
Working in inclement weather	High 21	Inclement weather conditions encountered during construction work could result in injuries or even fatalities and/or even damages to assets with subsequent claims and costs.	The principal contractor to implement an early warning system to identify inclement weather and to prevent such weather from posing negative implications on the safety of employees and other persons visiting. The early warning system to, as a minimum. provide for the following: 1. Construction work done during electrical storms a. The principal contractor to ensure that all employees are removed from heights and all employees are as safe as possible, in inclement weather conditions. b. No work to be allowed on the construction site during electric storms where employees cannot be protected from it. Protection involves: • eating area fitted with a lightning mast • workshops • inside buildings c. No work to be allowed in electrical storms on top of open structural steel, even when earthed. d. No work to be allowed on height where the lightning is within a 10 kilometre radius. e. After inclement weather on-site risk assessments to be reviewed to include wet conditions. 2. Crane operations during inclement weather a. Crane operations to stop during lightning within a 10 kilometre radius and wind above 28 km/h, crane driver will not be allowed to leave the crane with the booms extended. b. Lifting operation to stop during rain, rigging and hand lifts. c. Booms on all cranes to be retracted.

Description of risk	Risk rating	Potential risk impact	Risk mitigation
			d. All rigging operations to stop and employees will be removed from site. or 2. Lifting equipment operations during inclement weather a. Lifting operations will stop during lightning within a 10 kilometre radius and wind above 28 km/h, and the lifting equipment operator will not be allowed to leave the lifting equipment with the booms extended. b. Lifting operations will stop during rain, rigging and hand lifts. c. Booms on all lifting equipment will be retracted. d. All rigging operations will stop and employees will be removed from site. 3. Construction work done during rain a. During rainy conditions all work on steel structures to stop. b. No electrical tools to be used during rainy weather in open areas. c. If necessary work only to be done in water proof areas where there is a zero risk for electrocution. d. Areas to be cleared for work during rain: • workshops • offices • work on ground level with the provision that the area is maintained in a safe dry condition 4. Scaffolding activities during inclement weather conditions

Description of risk	Risk rating	Potential risk impact	Risk mitigation																		
			During inclement weather only limited scaffolding actions to be permitted i.e. erecting and dismantling activities. Guidelines for safe choices: <table><tr><th>Weather type</th><th>Building and dismantling of scaffolding</th></tr><tr><td>Lightning</td><td>Stop all activities</td></tr><tr><td>Light rain</td><td>Stop all activities</td></tr><tr><td>Heavy rain</td><td>Stop all activities</td></tr><tr><td>Wind <28 km/h</td><td>Full use</td></tr><tr><td>Wind >40 km/h</td><td>Stop all activities</td></tr><tr><td>Light mist</td><td>Full use</td></tr><tr><td>Heavy mist</td><td>Full use</td></tr><tr><td>Hail</td><td>Stop all activities</td></tr></table> When absolutely necessary to allow scaffolding activities to continue during abnormal equipment and process conditions so not to impair personnel safety or pose an environmental risk. In such cases, scaffolding activities may continue with the provision that the relevant team ensures that a comprehensive risk assessment is done, whilst considering both work and weather conditions. All scaffold users to: a. Ensure that scaffolding is inspected immediately after inclement weather conditions. b. Ensure that the risks associated with working at heights during inclement weather are identified and reasonably mitigated. c. Be cautious of slip/trip hazards when performing activities during inclement weather.	Weather type	Building and dismantling of scaffolding	Lightning	Stop all activities	Light rain	Stop all activities	Heavy rain	Stop all activities	Wind <28 km/h	Full use	Wind >40 km/h	Stop all activities	Light mist	Full use	Heavy mist	Full use	Hail	Stop all activities
Weather type	Building and dismantling of scaffolding																				
Lightning	Stop all activities																				
Light rain	Stop all activities																				
Heavy rain	Stop all activities																				
Wind <28 km/h	Full use																				
Wind >40 km/h	Stop all activities																				
Light mist	Full use																				
Heavy mist	Full use																				
Hail	Stop all activities																				

Description of risk	Risk rating	Potential risk impact	Risk mitigation
			d. Take note of the weather when completing the daily safe task instructions on site, where applicable. 5. Driving in inclement weather The principal contractor to ensure that the danger of driving in wet conditions is adequately covered in a risk assessment. The risk assessment to include, but not limited to: a. route planning b. speed reduction c. planning for emergency situations d. driving precautions for slippery surfaces e. visibility hazards

Risk areas arising from the activities outlined above that the principal contractor's operational risk assessments to be undertaken in terms of Construction Regulation 9(1) should cover

- a. Sand Delivery
- b. Arc welding
- c. Blasting
- d. Brickwork
- e. Compressed gas cylinders-handling
- f. Compressors – Air
- g. Cutting of pipes
- h. Demolition
- i. Distribution boards – Electrical
- j. Drivers – of vehicles
- k. Electrical installation – Maintenance of
- l. Excavation work
- m. Excavator
- n. Exposure to poisonous animals or insects
- o. Fire prevention and protection

- p. Front end loader
- q. Fuel supply
- r. Gas welding-cutting operations
- s. Hand tools
- t. Laying of pipes
- u. Laying of storm water drains
- v. Levelling – of materials
- w. Loading supervisor
- x. Loading/unloading - of trucks
- y. Machine operator
- z. Manholes – Laying of precast section
- aa. Material delivery
- bb. Material handling
- cc. Mixer operator
- dd. Placing concrete
- ee. Portable ladders
- ff. Refuelling vehicles/plant
- gg. Scaffolding
- hh. Site establishment
- ii. Temporary works
- jj. Traffic control
- kk. Use of portable electrical tools
- ll. Work in elevated positions
- mm. Working close to existing services i.e. electrical, waste water etc
- nn. Working close to traffic
- oo. Working close to water
- pp. Working in inclement weather

Please note some photographs to depict the operational areas as well as risks identified at the time of the baseline risk assessment concerned with the 2142D Middledrift SSA 3 the project.

The physical assessment was conducted on 16 May 2019.

Steep slopes in a large percentage of the project making access from excavators etc. difficult and dangerous.



Some areas noted to be particularly dusty with soft/sandy roads.



Possible entrances to resident's homes affected during construction as well as difficult access to some residences.





Large amount of livestock noted in the area.



Roads in the areas as well as traffic concerns for where secondary roads are crossed also to be considered.



Existing services and overhead power lines to be considered.



Number of seasonal rivers (with unsafe single lane bridges) noted as well as some crossings of permanent rivers.



A number of schools noted along the route of the pipeline.



Possible cultural heritage sites to be considered so as not to cause community unrest



Some areas where pump stations and reservoirs would need to be connected into.



Sign-off by Professional Construction Health and Safety Agent

This serves as confirmation that I, Karl Bailey, have developed this baseline risk assessment in terms of Construction Regulation 5(1)(a) and that the results were duly taken into consideration during the development of the project specific occupational health and safety specification developed in terms of Construction Regulation 5(1)(b).

Signed on this 18th May 2019

A handwritten signature in black ink, appearing to read 'K Bailey', enclosed within a thin black rectangular border.

Karl Bailey Pr. CHSA
CHSA/022/2015

Annexure C5.4: Signboard

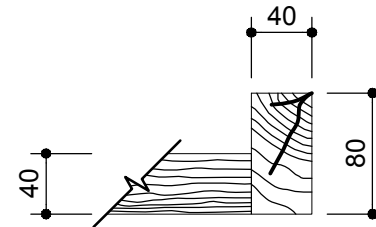
KING CETSHWAYO
DISTRICT MUNICIPALITY

DESIGNED: EYETHU ENGINEERS
ABAQAMBI: ☎(031) 303 7630


water affairs
 Department:
 Water Affairs
 REPUBLIC OF SOUTH AFRICA


public works
 Department:
 Public Works
 REPUBLIC OF SOUTH AFRICA


EXPANDED PUBLIC WORKS PROGRAMME



SCALE: 1:5

- A. RAISED SURROUND PAINTED WHITE.
- B. WHITE LETTERS.
- C. ROYAL BLUE BACKGROUND -
REF. BLUE 0-013.
- D. GREY BACKGROUND -
REF. GREY 8-089.(AT THE BACK OF THE SIGN)
- E. WHITE DIVIDING LINES.

THE FACE TO BE TEMPERED HARDBOARD IN
ONE PIECE.
THE COLOUR NUMBERS REFER TO THOSE ON
THE COLOUR CARDS OF BRITISH STANDARD
2660 OF 1955.

FOR TENDER



KING CETSHWAYO
DISTRICT MUNICIPALITY



**EYETHU
ENGINEERS**
Consulting Engineers & Project Managers

BULK PIPELINE AND RESERVOIR AT MIDDLEDRIIFT SSA3: PHASE 1B

CONTRACT NOTICE BOARD

01 of 01

lo:	Revision
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REVD

Annexure C5.5 PROFORMA

PERMISSION TO ACCESS PRIVATE PROPERTY FOR
BULK PIPELINE AT MIDDLEDRIFT SSA3: PHASE 1b UNDER NKANDLA LOCAL MUNICIPALITY

To the Owner/Occupant (s)

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 ND500 welded steel pipeline.

I/We hereby confirm that we agree to a ND500 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

Sankofa Insurance Brokers (Pty) Ltd
Postnet 221
Private Bag X51
Rivonia
2128
Friday, February 12, 2021

Contracts and Engineering Policy Schedule

Insured: King Cetshwayo District Municipality
Policy Number: JCE/ECARSP/000175491

The policy and / or endorsements for King Cetshwayo District Municipality, policy number JCE/ECARSP/000175491, are attached.
Please check the details carefully and let me know as soon as possible if any amendments need to be made.

Thank you for your support.

Sizwe Mashinini

Contractors & Engineering Policy New Business Policy

This schedule should be read in conjunction with the policy wording

Policy Number	JCE/ECARSP/000175491		
Version Number	1		
Insured	King Cetshwayo District Municipality		
Insured's VAT Number	4600115499	Company Reg No.	N/A
Insured's Business Description	Municipality		
Insured's Postal Address	Private Bag X 1025 Richard's Bay Richard's Bay/Kwazulu-Natal South Africa 3900		
Intermediary	Sankofa Insurance Brokers (Pty) Ltd FSB/FSP number44269	Postnet 221 Private Bag X51 Rivonia 2128 VAT Registration Number: 2128	Telephone Number: (011) 025-6566 Fax Number: (086) 636-5835
Insurer	The Hollard Insurance Company Limited (Reg. No. 1952/003004/06) <i>A Licensed Financial Services Provider</i> <i>(FAIS Licence No 17698)</i>	Hollard Arcadia Campus 22 Oxford Road Parktown Gauteng 2193	
Period of Insurance	From: Monday, February 01, 2021 To: Monday, June 28, 2021 (both dates inclusive) and any subsequent period for which the Company agrees to extend this policy or any section thereof subject to any revised terms required by the Company. Type of Contract: Specific Payment Method: Once Off Cash		
Effective Date	Monday, February 01, 2021		
Signed on behalf of the Company on Friday, February 12, 2021			

Premium Schedule and Index of Sections

Policy Sections Available	Section Selected	Annual Premium	Add/Refund Premium
Contract All Risk	Yes	R 11 000.00	R 11 000.00
Total premium		R 11 000.00	R 11 000.00

In terms of a ruling issued by SARS, this document together with proof of payment of premium constitutes an alternative to a tax invoice, debit note or credit note as contemplated in sections 20(7) and 21(5) of the VAT Act respectively. Insured amounts are inclusive of VAT at 15%.

VAT Registration number 4450117405. Excesses are not subject to VAT when recovered by an insurer from an insured.

All Premiums and Fees are VAT inclusive; the total payment due for this transaction includes Broker Commission of R 2 200.00.

Broker commission rate for non-motor classes is 20%

Broker commission rate for motor classes is 12.5%.

Property Damage - Contract All Risk

Effective Date: Monday, February 01, 2021
Total Premium: R 11 000.00

Site Address

UMLALAZI L.M
WARD 27, KWAHLAZA
ESHOWE
ESHOWE/KWAZULU-NATAL
3815

Insured Details

Principal	Contractor
N/A	Mfondo Grading

Cover Details

Patent Defect Limitation Period/Maintenance Period (Months)	Description of Contracts Insured
3	Construction of Water Reticulation

Contract Values

Description	Contract Value	Rate	Premium
Construction of Water Reticulation	R 4 200 738.00		
Total	R 4 200 738.00	0.1071%	R 4 500.00

Property Damage - Contract All Risk Extensions

Item	Limit of Indemnity	Rate %	Premium
Removal of debris	R 150 000.00	N/A	N/A
Expediting Expenses	R 100 000.00	N/A	N/A
Supervisory Charges	R 100 000.00	N/A	N/A
Claims Preparation Cost	R 100 000.00	N/A	N/A
Transit	R 100 000.00	N/A	N/A
Escalation	R 840 148.00	N/A	N/A
Professional Fees	R 100 000.00	N/A	N/A
Surrounding Property	R 500 000.00	N/A	N/A
Temp Storage Limitation	R 100 000.00	N/A	N/A

Property Damage - Contract All Risk Deductibles

Item	Deductible %	Deductible Minimum Amount	Deductible Maximum Amount	Basis of Deductible
Surrounding Property	N/A	R 10 000.00	N/A	Per Event
All Perils	N/A	R 10 000.00	N/A	Per Event

Public Liability - Premium Details

Limit of Indemnity	Rate	Premium
R 10 000 000.00	0.1547%	R 6 500.00

Public Liability Extensions

Item	Limit of Indemnity	Rate %	Premium
Emergency Medical Expenses	R 250 000.00	N/A	N/A
Legal Defense Costs	R 250 000.00	N/A	N/A
Wrongful Arrest / Defamation	R 250 000.00	N/A	N/A

Public Liability Deductibles

Item	Deductible %	Deductible Minimum Amount	Deductible Maximum Amount	Basis of Deductible
All claims	N/A	R 10 000.00	N/A	Per Event

Endorsements

Contract Value

Contract value is to be inclusive of ALL costs including Free issue materials & fees.

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Work already commenced

Any losses arising from defects existing at the time the cover incepts (whether known to the insured or not) are excluded.

Any work that has commenced at the time the policy incepts is to be declared.

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Open Trench Limitation

500m per section - 500m in the aggregate

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Retaining Walls and Earthworks

Cover is subject to all Retaining Walls and Earthworks being done in accordance with qualified engineer's design and specification.

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Blasting

Not Insured

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Removal of Lateral Support

Not Insured

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Hot works Permit

This policy is subject to a hot works permit system & procedure being in place as well as necessary Authorization to be signed off prior to works Starting. Hot work is carried out only in the presence of at least one worker equipped with a fire extinguisher and trained in fire-fighting.

The area of any hot work is examined one hour after the work has finished.

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Pipe Laying

- the pipes, immediately after laying, have been secured in such a manner by backfilling that they cannot be displaced if the trench is flooded;
- the pipes, immediately after laying, have been closed to prevent water, silt or the like from penetrating;
- the trenches of tested pipe sections have been backfilled immediately upon completion of the pressure test.

Underground cables, pipes and other facilities

- Loss of or damage to such underground facilities which are in the same position as shown on the underground maps (drawings indicating the position of the underground facilities) shall be payable after applying a deductible of 20% of the loss amount or the deductible stated under a below, whichever is the greater. Claims in respect of loss of or damage to underground facilities incorrectly shown on the underground map shall be payable after applying the deductible R20 000.

COMMUNICABLE DISEASE ENDORSEMENT
(For use on property policies)

1. This policy, subject to all applicable terms, conditions and exclusions, covers losses attributable to direct physical loss or physical damage occurring during the period of insurance. Consequently and notwithstanding any other provision of this policy to the contrary, this policy does not insure any loss, damage, claim, cost, expense or other sum, directly or indirectly arising out of, attributable to, or occurring concurrently or in any sequence with a Communicable Disease or the fear or threat (whether actual or perceived) of a Communicable Disease.
2. For the purposes of this endorsement, loss, damage, claim, cost, expense or other sum, includes, but is not limited to, any cost to clean-up, detoxify, remove, monitor or test:
 - 2.1. for a Communicable Disease, or
 - 2.2. any property insured hereunder that is affected by such Communicable Disease.
3. As used herein, a Communicable Disease means any disease which can be transmitted by means of any substance or agent from any organism to another organism where:
 - 3.1. the substance or agent includes, but is not limited to, a virus, bacterium, parasite or other organism or any variation thereof, whether deemed living or not, and
 - 3.2. the method of transmission, whether direct or indirect, includes but is not limited to, airborne transmission, bodily fluid transmission, transmission from or to any surface or object, solid, liquid or gas or between organisms, and
 - 3.3. the disease, substance or agent can cause or threaten damage to human health or human welfare or can cause or threaten damage to, deterioration of, loss of value of, marketability of or loss of use of property insured hereunder.
4. This endorsement applies to all coverage extensions, additional coverages, exceptions to any exclusion and other coverage grant(s).

All other terms, conditions and exclusions of the policy remain the same.

Disclosure Notice to Short-Term Insurance Policyholders

IMPORTANT - PLEASE READ CAREFULLY DISCLOSURE AND OTHER LEGAL REQUIREMENTS

As a short term policyholder, or prospective policyholder, you have the right to the following information:

1. About your Financial Services Provider (Insurance Broker) and/or Binder Holder

- a) Name, physical address, postal address and telephone number.
- b) Legal status of your broker/binder holder.
- c) Whether services are rendered under supervision.
- d) Whether more than 10% of the insurer's shares are held by your broker/binder holder and whether more than 30% of the broker/binder holder's total remuneration was received from the insurer.
- e) Whether or not professional indemnity insurance is held and the details thereof.
- f) Details of how to institute a claim.
- g) Details of broker/binder holder's complaints procedure and compliance arrangements.
- h) Details of fees, commission or any other valuable consideration payable.
- i) The contractual relationship with the insurer and whether the broker/binder has contractual relationships with other insurers.
- j) The conditions or restrictions imposed by the insurer (if any).
- k) Details of the financial services which the broker/binder holder is authorized to provide in terms of the relevant licence and of any conditions or restrictions applicable thereto.
- l) Exemption/s that the Registrar has granted to the Intermediary in terms of the Financial Advisory and Intermediary Services Act (FAIS).
- m) How the Broker deals with conflicts of interest.

If the above information is not provided by the broker and/or binder holder, please contact your insurer.

2. About your Product Supplier (Insurer)

a) Name, Address and contact details of the product supplier.

Name: THE HOLLARD INSURANCE COMPANY LIMITED, a registered Short Term Insurer

Physical Address:

Hollard Arcadia Campus
22 Oxford Road
Parktown
Johannesburg 2193

Postal Address:

P O Box 87419
Houghton
2041

Contact Details:

Tel No. (011) 351 2500

FAIS Licence Information:

Services: Advice and Intermediary

Categories: Short-Term Insurance (Personal and Commercial Lines)
FSB Number: 17698

b) Complaints Resolution Procedure

If you have a complaint about this product, please contact your broker or your local office of the insurer. If the matter cannot be resolved, please submit a complaint in writing to the insurer's Complaints Officer as follows:

The Hollard Insurance Company Limited
P O Box 3501
Johannesburg
2000

Tel No. (011) 351-2500
Email: HBMcomplaints@hollard.co.za

The Compliance Officer

Physical Address:

Hollard Arcadia Campus
22 Oxford Road
Parktown 2193

Postal Address:

P O Box 87419
Houghton
2041

Tel No. 011 351 5000
Email: Compliance@hollard.co.za

c) Details of how to report a claim

Procedures for the submitting of a claim are set out in full detail in your policy document. If you require assistance contact your broker or your local office of The Hollard Insurance Company Ltd.

Please note that claims must be reported as soon as possible after the event giving rise to the claim and must be submitted in writing with documentary proof of your loss.

You will be required to notify the police in the event of theft or where a criminal act is suspected.

If you have a dispute regarding a claim that is not resolved to your satisfaction by the broker or the insurer, you may submit the complaint to the Ombudsman for Short-Term Insurance as per the details in 5 below.

d) Type of policy involved

Please refer to your policy document which contains the name, class, policy number and type of policy involved.

e) The extent of premium obligations you assume as a policyholder

Premium: As per policy document and schedule
Due date: As per policy inception and method of payment agreed

f) Due date of premiums and consequences of non-payment (see also 'e' above)

The insurance contract is conditional upon and will only come into effect following payment of the premium by the insured and the receipt thereof by or on behalf of the insurer, and such premium is payable on or before inception date or renewal date, as the case may be.

You are entitled to a period of 15 days from the due date within which to pay your premium; however this period of grace applies from the second month on monthly policies only.

Please check your policy for the due date.

3. Other matters of importance

- a) You must be informed of any material changes to the information provided above.
- b) A polygraph or any lie detector test may be required in the event of a claim. The failure of such a test may not be the sole reason for repudiating a claim.
- c) If the premium is paid by debit order, the debit order must be in favour of either the broker or the product supplier (insurer). It may also not be transferred without your approval.
- d) The product supplier (insurer) must give you 30 days notice in writing of his intention to cancel your debit order.
- e) The product supplier (insurer) may not cancel your insurance by merely informing your broker. There is an obligation to make sure that the notice has been sent to you.
- f) You are entitled to a copy of the policy free of charge.

4. Warning

- a) Do not sign any blank or partially completed application form.
- b) Complete all forms in ink.
- c) Keep all documents handed to you and make notes of what is said.
- d) Ask for a letter of representation from your advisor and do not be pressurised into buying the product.
- e) All material facts must be accurately, fully and properly disclosed by you. All information provided by you or on your behalf is your responsibility. You need to be satisfied with the accuracy of any transaction submitted by your broker on your behalf.
- f) Misrepresentation, incorrect or non-disclosure by you of any material facts or circumstances may impact negatively on any claims arising from your insurance contract.

5. Particulars of the Short Term Insurance Ombudsman

The Short Term Insurance Ombudsman is available to advise you in the event of claims problems that are not satisfactorily resolved by your broker and/or the product supplier (insurer).

P O Box 32334
Braamfontein
2017

Tel No. (011) 726 8900
Fax No. (011) 726 5501
Website <http://osti.co.za>

6. Particulars of the FAIS Ombud

Should you have a complaint regarding the financial service (advice or intermediary service) that was rendered to you which was not resolved to your satisfaction, you may contact the FAIS Ombud.

P O Box 74571
Lynnwood Ridge
0040

Tel No. 021 470 9080
Fax No. 021 348 3447
Website www.faisombud.co.za
Email info@faisombud.co.za

7. About the Insurer/Product Supplier with whom your SASRIA policy is placed

The SASRIA policy covers events such as riot and strike and is underwritten by SASRIA Limited.
SASRIA's contact details are:

36 Fricker Road
Illovo
Sandton, 2196

Tel No. 011 214 0800
Fax No. 011 447 8630

If you have a complaint about the SASRIA policy, please contact:

The Compliance Department
Email Contactus@sasria.co.za

Tel No. 011 214 0800
Fax No. 011 447 8630

Hand written letters can be posted to:

Compliance Officer
Sasria SOC Limited
P.O Box 653367
Benmore
2010

The SARIA premium payable is reflected on your Certificate of Insurance.
The full SASRIA policy is available on request from The Hollard Insurance Company Limited.



Nash Omar

(This notice does not form part of the insurance contract or any other document)

Annexure C5.7: Environmental Management Plan



IN ASSOCIATION WITH INKANYEZI YETHU



APRIL 2019
DRAFT ENVIRONMENTAL MANAGEMENT PROGRAM
CONSTRUCTION OF THE MIDDLEDRIFT WATER
SUPPLY SCHEME
KING CETSHWAYO DISTRICT MUNICIPALITY

EVP1138

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This report was prepared by EnviroPro Environmental Consulting

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Tertiary Education:	BSc (Hons) MSc	Zoology By thesis in estuarine fish ecology.
Work Experience:	2001 – 2002 2003 – 2010 2010 – Present	MSc formed part of EIA for National Ports Authority Senior Manager for KSEMS cc. Managing Member of EnviroPro Environmental Consulting

Iain Jourdan Bsc (Hons) (Dbn)

Tertiary Education:	BSc (Hons)	Geographical Science
Work Experience:	2006 – 2007 2007 – 2010 2010 – Present	Environmental Manager service for Inhlanhla Civils (Pty) Ltd Senior Manager for KSEMS cc Managing Member of EnviroPro Environmental Consulting

Anthony Mader BSc (Hons)

Tertiary Education:	BSc (Hons) PhD	Ecology, Environment, and Conservation (Currently Completing)
Work Experience:	2015 2017 - Present	Research Assistant at the Ecological Engineering and Phytotechnologies Program (EEPP), University of the Witwatersrand Environmental Consultant at EnviroPro

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SECTION 1 INTRODUCTION, PROJECT AND SITE DESCRIPTION

1.1. Background

The King Cetshwayo District Municipality propose to upgrade the bulk water supply and reticulation to Middelrift Water Supply Scheme (WSS) for Sub Supply Area 3 (SSA 3). The Middelrift SSA 3 is located in Ward 13 and Ward 14, Nkandla Local Municipality within the King Cetshwayo District Municipality. Water for the supply scheme will be obtained from the Thukela-Mhlathuze Transfer Scheme or the Nsuze River and pumped to the Middelrift water treatment works. The Middelrift SSA 3 is an existing bulk water supply and reticulation network that is currently being utilised by the public. However the existing infrastructure was designed to meet RDP level service, which does not allow for yard connection. The area boundary is identified by the Nsuze River to the east, uThukela River in the west and the Nkandla Forest to the north. The entire supply area is approximately 6 100 hectares and includes the construction of:

- 15km, 200Ø pipeline serving the regional bulk supply to SSA 3;
- 90Ø to 50Ø bulk main pipelines;
- 174km pipework comprising of pipelines ranging from 160Ø to 25Ø diameter; and
- Reservoirs at eight (8) locations with a capacity ranging from 100 – 450kl.

Where possible, the pipeline route where possible, will run along road reserves. The pipeline trench will be up to 1.5m wide and 2-4m deep. The portions of the pipeline that cross watercourses require environmental authorisation, for the sections located within (and within 32m of) a watercourse that require the infilling /excavation of more than 10m³ of material and for the larger watercourse crossings that may exceed a footprint area of 100m² within the watercourse. There are seventy-two (72) watercourse crossings (WC) proposed, of which eighteen (18) have associated wetland that will be affected by the pipeline crossing. This report and EMPr focus on these sections of the pipeline.

The construction of the Middelrift WSS will have a positive impact for local potable water access for the residents living in this area. The King Cetshwayo District Municipality believes that the construction of the pipeline will improve the longevity of this essential public service for the residents of Middelrift.

1.2. Scope of Work

Prepare a site specific EMPr for the construction of Middelrift Water Supply Scheme in order to manage and mitigate potential environmental impacts during construction. The provisions of this EMPr are binding on the contractor throughout the life of the contract.

1.3. General Principles and Purpose of This EMPr

The purpose of this EMPr is to provide guidance to all contractors and site workers on how to operate in a responsible manner to achieve these goals and ensure that the requirements of the legislation are met. This EMPr is a working document to be used during construction and has been generated to ensure that:

- The protection of the environment during the construction period.
- All emissions to air, water and soil are controlled and managed to mitigate their impacts on the environment and surrounding communities.
- Nuisance factors associated with construction are controlled as far as is reasonably possible.
- The correct principles are followed from the very beginning during site set up thereby reducing frustrations on the part of the contractor when asked to comply with the strictures of the EMPr and relevant environmental legislation.
- The post construction clean-up is carried out correctly so as to avoid environmental impacts and meet the legislated requirements.

This EMPr is subject to change as brought about by variations in the project specification and any changes must be approved by the relevant authorities.

1.4. Responsibilities

The Project Applicant (The King Cetshwayo District Municipality) is responsible for:

- Ensuring that the engineer and contractors comply with the approved EMPr.
- Ensuring compliance with the provisions for duty of care and remediation of damage in accordance with section 28 of the National Environmental Management Act (NEMA), (No. 107 of 1998) and its obligations regarding the control of emergency incidents in terms of Section 30 of NEMA.
- Notifying the relevant authorities (EDTEA) of any incident as defined in subsection 30(1) (a) of NEMA.
- Ensuring that the mitigation measures to address environmental impacts identified are carried out by the contractor.

The Project Manager or Engineer (BJFC) is responsible for:

- Appointing a qualified contractor and ensuring that they have read and understood the EMPr.
- Ensuring all work undertaken is in accordance with the EMPr.
- Ensuring adherence to safety, health and environment (SHE) standards and ensuring the construction activities comply with the EMPr.
- Arranging for the site to be monitored on a daily basis to ensure compliance with the EMPr.
- Overall responsibility and accountability for the site during the construction phase.
- Mitigating impact on the environment through responsible operation and adherence to the EMPr.
- Ensuring transparency in their operation and environmental management of the site.
- Managing the contractor to ensure that they adhere to the EMPr and ensuring that all necessary documentation is maintained on site.
- Ensuring that the contractor has a copy of the EMPr and Method Statements.

The Site Contractor(s) is/are responsible for:

- Providing a suitable person to operate as Environmental Officer (EO) to undertake the monitoring of the day to day requirements of the EMPr.
- Operating in accordance with the EMPr and carrying out construction activities with due care and diligence.
- Ensuring that any communications from stakeholders are reported to the Environmental Control Officer (ECO).
- Maintaining relevant documentation for review by the ECO.
- Undertaking the mitigation measures to address environmental impacts identified.

The Environmental Officer (EO) or designated Safety Health Environment (SHE) officer is responsible for:

- Daily compliance monitoring of construction against the requirements set out in this EMPr, and the environmental authorization.
- Undertaking the mitigation measures to address environmental impacts identified.
- Ensuring that all site staff are adequately trained in environmental matters.
- Liaising with site staff and I&APs through the Community Liaison Officer (CLO), if required.
- Must be conversant with the applicable legislation pertaining to the environment.
- Liaise directly with the ECO on the monthly audit findings.
- Identification of possible areas of improvement during construction.
- Monitoring the construction site on a regular basis and recording key findings.
- Advising the Project Manager and the contractors on environmental matters.
- Provide recommendations to address and rectify these matters.

- Monitoring implementation of the EMPr by the contractor.
- Work hand in hand with the health and safety officer.
- Maintain records pertinent to the requirements of the EMPr.

The Environmental Control Officer (ECO or Independent environment practitioner) is responsible for:

- Conducting regular auditing against the requirements of the EMPr and Environmental Authorization.
- Liaising directly with the EDTEA and supplying them with copies of the audit reports.
- Liaising directly with the contractor and EO and supplying them with a copy of the audit reports.

1.5. Monitoring

The key to a successful EMPr is effective monitoring and review to ensure effective functioning of the EMPr and to identify and implement corrective measures in a timely manner. The EO must be responsible for day-to-day monitoring and reporting while the ECO must undertake to monitor the site on a monthly basis. The day-to-day monitoring must be conducted by the EO in conjunction with the contractor and the engineer. The monthly audit report by the ECO can then be used to provide external monitoring and reporting to EDTEA Compliance and Enforcement. Paramount to the reporting of non-conformances or incidents is that corrective and preventive action plans are developed and adhered to. Photographic records of all incidents and/ or non-conformances must be retained. Non-compliances identified by the ECO must be resolved within fourteen days of being noted, incidents that are deemed by the ECO to have a large environmental impact must be resolved immediately.

1.6. Applicable Legislation

The site engineer must be aware of any compliance issues raised by the EO and ECO and must ensure that the necessary corrective measures are implemented. As per the National Environmental Management Act No 107 of 1998 (Section 28), offending parties may be held financially accountable for any pollution or environmental damage.

The following environmental legislation must be adhered to:

- Constitution of South Africa (Act No. 108 of 1996)
- National Environmental Management Act (Act No 107 of 1998) – NEMA
- Environment Conservation Act (Act No 73 of 1989)
- National Heritage Resources Act (Act No 25 of 1999)
- National Water Act (Act No 36 of 1998)
- Hazardous Substances Act (Act No. 15 of 1973)
- National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
- Occupational Health and Safety Act (Act No 85 of 1993)
- National Environmental Management: Waste Management Act (Act No. 59 of 2008)
- National Building Regulations and Building Standards Act 103 of 1977
- Relevant local bylaws

This EMPr meets the requirements of the stipulations provided in Appendix 4 of NEMA, 1998 (Act No. 107 of 1998) Environmental Impact Assessment Regulations, 2014 with regards to the content of EMPr. This EMPr has been developed to specifically address the impacts related to this project in each phase of development.

1.7. Layout of the EMPr

The EMPr is divided into five sections dealing with an Introduction and description of the proposal and the site, Pre Construction and Site Set Up, Construction Activities and Post Construction, Rehabilitation and Operation Activities. Sections 4 and 5 provide definitions and records that can be used to record training, incidents, and complaints. Under the construction section, each section deals with a specific aspect of the development i.e. administration and records. Within these sections, the specific activity is described and the mitigation action required is provided. The tables have been set up to enable ease of auditing with a section for the EO/SHE officer or ECO to state whether mitigation measures have been put in place and to make comment about any problems noted.

1.8. Project Details

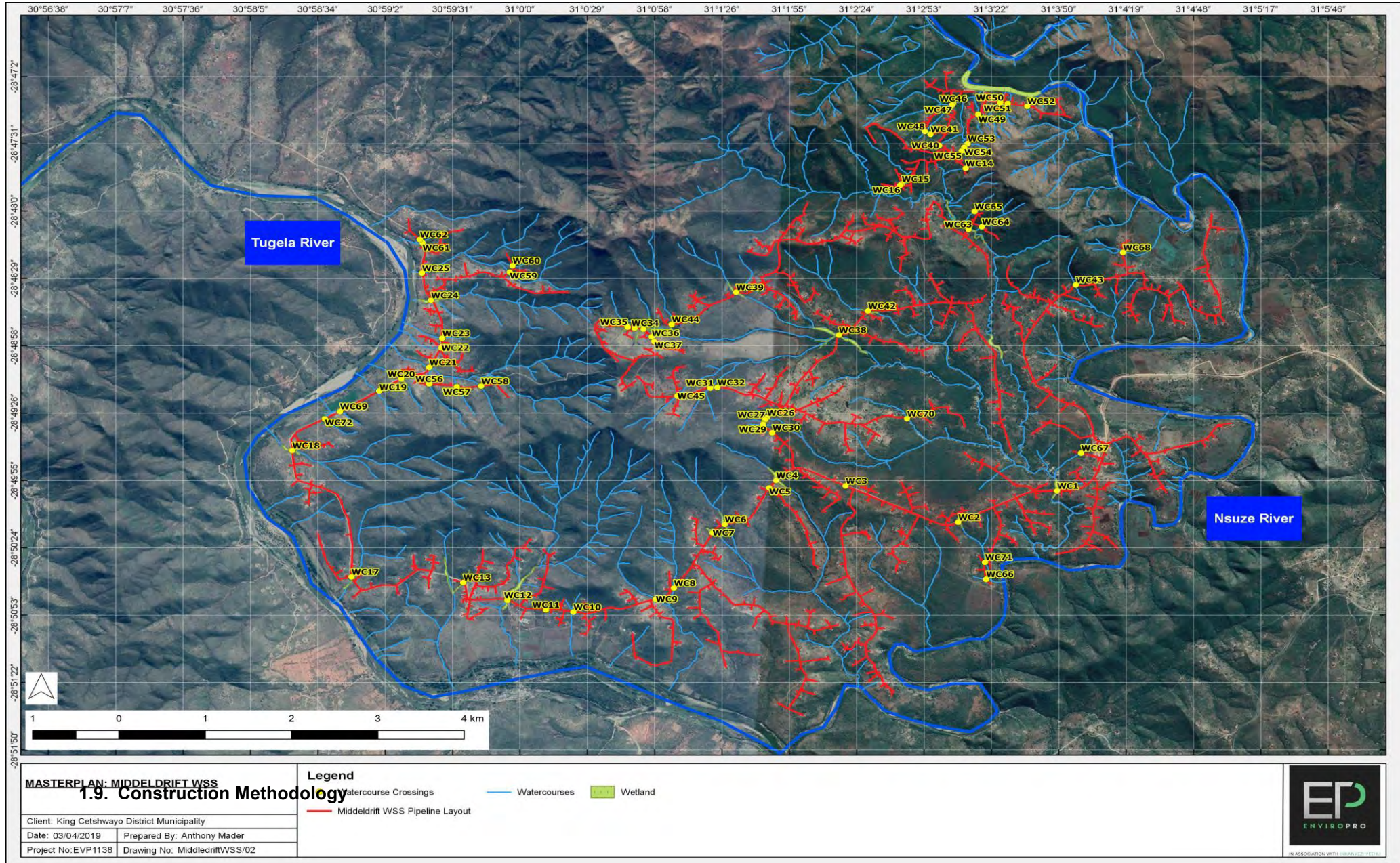
The King Cetshwayo District Municipality propose to upgrade the bulk water supply and reticulation to Middelburg Water Supply Scheme (WSS) for Sub Supply Area 3 (SSA 3). The Middelburg SSA 3 is located in Ward 13 and Ward 14, Nkandla Local Municipality within the King Cetshwayo District Municipality. Water for the supply scheme will be obtained from the Thukela-Mhlathuze Transfer Scheme or the Nsuze River and pumped to the Middelburg water treatment works. The Middelburg SSA 3 is an existing bulk water supply and reticulation network that is currently being utilised by the public. However the existing infrastructure was designed to meet RDP level service, which does not allow for yard connection. The area boundary is identified by the Nsuze River to the east, uThukela River in the west and the Nkandla Forest to the north. The entire supply area is approximately 6 100 hectares and includes the construction of:

- 15km, 200Ø pipeline serving the regional bulk supply to SSA 3;
- 90Ø to 50Ø bulk main pipelines;
- 174km pipework comprising of pipelines ranging from 160Ø to 25Ø diameter; and
- Reservoirs at eight (8) locations with a capacity ranging from 100 – 450kl.

Where possible, the pipeline route where possible, will run along road reserves. The pipeline trench will be up to 1.5m wide and 2-4m deep. The portions of the pipeline that cross watercourses require environmental authorisation, for the sections located within (and within 32m of) a watercourse that require the infilling /excavation of more than 10m³ of material and for the larger watercourse crossings that may exceed a footprint area of 100m² within the watercourse. There are seventy-two (72) watercourse crossings (WC) proposed, of which eighteen (18) have associated wetland that will be affected by the pipeline crossing. This report and EMPr focus on these sections of the pipeline.

The construction of the Middelburg WSS will have a positive impact for local potable water access for the residents living in this area. The King Cetshwayo District Municipality believes that the construction of the pipeline will improve the longevity of this essential public service for the residents of Middelburg.

Figure 1: Aerial Photograph Showing an Overview of the Land Use and Locality of the Middeldrift Water Supply Scheme. Generated using QGIS, version 3.4.4.



Please note construction of the pipeline at the watercourse crossings points (WC1 – 72) and wetlands should commence in the dry season to ensure there is less water within the watercourses/ wetlands during construction. If required for construction purposes the water within the watercourses will be redirected around the active work zone, however the flow of the watercourse will still remain in the river channel. Sand bags acting as impeding structures will be manually placed within the watercourses to redirect the flow. Once work has been completed or there is no longer the need to redirect the flow the sand bags will be removed allowing the water to flow on its most desired course.

1.10. Table of Responsibilities

This is to state that the undersigned have received a copy of the Environmental Management Plan (EMPr) developed for this site by EnviroPro dated April 2019. Any contravention of the EMPr must be recorded and corrective action must be carried out. Any changes to the EMPr must be approved by the Environmental Control Officer (ECO), the consultant (EnviroPro) and the relevant authority. Such changes are to be made in writing and a record must be maintained.

The undersigned do hereby agree to abide by the structures of the Environmental Management Plan (EMPr) and accept responsibility for ensuring adherence to the Construction EMPr as it relates to the following areas:

Table of Responsibilities				
Job description / title	Scope of work or area of responsibility i.e. camp drainage, construction camp , housekeeping etc.	Responsible person (Name)	Signature	Date

1.11. Names and Telephone Numbers of Contact Persons

The following list of contacts must be printed and made clearly visible on the site.

Contact List			
Designation	Organisation	Name	Contact number
Applicant	The King Cetshwayo District Municipality	Themba Tshabalala	035 799 2513 tshabalalat@kingcetshwayo.gov.za
Consulting Engineer	Eyethu Engineers	Johann Du Preez	johanndp@eyethu.co.za
Independent Environmental Practitioner and ECO	EnviroPro	Josette Oberholzer Iain Jourdan	031 765 2942
Environmental Authority (Enforcement & Compliance)	EDTEA	Compliance Officer	
Reporting for Incidents involving Watercourses	DWS	Compliance Officer	
Wildlife Related Incident	Ezemvelo KZN Wildlife	Dominic Wieners	033 845 1455
Heritage Resources	AMAFA	Weziwe Tshabalala	033 394 6543
Fire Emergency	Fire Department	-	10111
Crime Emergency	Police	-	10111

SECTION 2 SITE SPECIFIC IMPACTS AND MITIGATIONS AS IDENTIFIED IN THE BAR

Nature and Consequences of impact	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Person	In place (Yes / No)	Comments
There is the potential for impact on existing services i.e. power lines, water pipes, infrastructure, etc.	As standard construction practice the engineer and contractor will identify all existing services that may be affected along the route prior to construction. Any infrastructure that is removed must be replaced and any damage caused from construction must be repaired or replaced by the contractor. For the most part the pipeline will be laid within the road reserves, and along existing foot paths however if any properties are affected, the contractor must liaise with the landowner prior to infrastructure interference. A complaints register must be maintained on site. All complaints must be recorded.	CON/EO		
Deposition of eroded material into water bodies when laying pipe across the 72 watercourse crossings impacting water quality (increased turbidity, reduction of dissolved oxygen).	Caution must be exercised when working near the watercourse crossings. The following mitigation measures must be carried out during construction: - All construction activities occurring within the watercourses must be carried out with extreme care to avoid damage to the watercourse. - No heavy vehicles may work in any watercourse unless exceptionally hard material is encountered and the trench cannot be dug by hand. Pipework within 32m of the river and wetland banks (sensitive areas) must be dug and laid by hand. - No storage of materials will be permitted within these sensitive areas or within 32m of these areas. - Where larger river crossings are required, the type of in-situ material will be confirmed. In places with bed-rock, the rock will be blasted such that the water pipes could be encased in concrete and the top of the encasement at the same level of the undisturbed river bed. Soft material banks would be crossed the same except gabions will be used instead of concrete (gabions paced downstream of pipe). - The contractor must ensure that stream bed work is carried out in the dry season when flow rates are low to non-existent (i.e. June – August). - It is unlikely that any of the streams will need to be temporarily diverted however if this is the case, a suitably qualified contractor will be appointed to handle the temporary stream diversion work to ensure that the flow rate and stream morphology are taken into account. - In order to prevent long-term deposition of material into the watercourses, areas exposed to erosion must be protected through the use of sand bags, gabions, berms and efficient construction processes i.e.: limiting the extent (footprint) and duration period that areas are exposed.	CON/EO		

Nature and Consequences of impact	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Person	In place (Yes / No)	Comments
Erosion of exposed soil prior to the rehabilitation of the construction area (i.e. trenches).	Exposed soil is very susceptible to erosion and therefore erosion control is critical, especially around the watercourse crossings. - Exposed areas will be rehabilitated and re-vegetated as soon as possible during construction. - Cleared areas may not be left exposed for long periods of time and should be re-vegetated in stages on completion of a section of the pipework. - Small inspection holes may be left open along the route but the rest of the trench must be closed once the pipe has been laid. - In certain steeper sections additional precautions to manage erosion will be required (e.g. sand bags or gabions). - During the exaction of trenches, flows must be diverted around the active work areas to prevent channelled flow. - Temporary stormwater channels and preferential flow paths should be filled with aggregate and/or logs (branches included) to dissipate and slow flows thereby limiting erosion.	N/A		
Trenches remaining open for long periods of time, causing them to collapse, creating an erosion and safety hazard.	Trenches must not be left open for longer than 2 weeks at a time. Trench work must be completed in sections and then closed once the pipe has been laid in that section. Small inspection holes may be left open along the route but the rest of the trench must be closed. Cleared areas may not be left exposed for long periods of time and must be re-vegetated as each stage of pipework is completed. Trenches must not remain open during building shut down periods i.e. over Christmas and Easter. Trench work must be planned so that trenches are closed before these shut down periods as there is a risk that the trenches will either collapse or fill with water if left unattended and this can create a hazard for children and animals. Trenches must be demarcated.	CON/EO		
Incorrect filling of trenches on completion creating points of erosion, especially on slopes and near watercourses.	Care must be taken to ensure that when closing trenches, soil is compacted sufficiently and left so that the level of the trench is slightly higher than the surrounding land, to allow settling. Should soil settle below the level of the surrounding land, it will leave a depression along which water will travel and this could create a focal point for erosion. This can occur on sloped sections where water will follow the depression along the pipeline route, building up speed down steeper sections and creating furrows. If this occurs near watercourses, it will erode the river banks and cause them to collapse. Rehabilitation through replanting of indigenous grass species soon after closure will aid in stabilising soil and preventing erosion and will also assist in dust control.	CON/EO		
Excavations within the	Since the pipeline will be placed in areas previously disturbed by roads, footpaths and current pipeline routes, it is not anticipated that there are heritage or cultural significant aspects associated	CON/EO		

Nature and Consequences of impact	Proposed mitigation and Extent to which impact can be reversed / avoided, managed or mitigated:	Person	In place (Yes / No)	Comments
community impacting on features with heritage value (i.e. graves).	with the project area. Should any graves be identified within the project area, a 20m buffer will be maintained around the grave. Construction workers will however be cautioned to operate with care on site and should a culturally sensitive aspect be discovered on site that has not been previously identified, construction activities stop temporarily and the issue assessed and the authorities (AMAFA) notified if need be.			
Clearing of indigenous vegetation during the laying of the pipeline and temporary access points.	The majority of the pipeline will be on existing road and pipeline servitudes which means that the vegetation has been previously disturbed. In order to minimise the amount of vegetation cleared, the following measures have been included. One protected plant species was identified, namely Aloe marlothii between 28°50'17.72"S; 31°1'22.33"E and 28°50'41.26"S; 31°1'5.78"E. Should any protected species (prior or post environmental authorisation) be identified within the pipeline servitude, these plants must be avoided and protected or a permit must be applied for from KZN Wildlife to remove or relocate these species. - A maximum trench servitude of 10m (5m on either side of the trench) must be adhered to for this pipeline construction. - A maximum width of 5m must be managed within the watercourse crossing points. - The relatively small trench size (1.2m) should result in the loss of only a narrow strip of vegetated area, which must then be re-vegetated on completion of construction. - Clearing of vegetation and excavating of the trench in close proximity to the watercourses will need to be done by hand, where possible. - Vehicle access will be restricted as there is a higher risk of damage and disturbance to surrounding vegetation. - All access routes are to follow the existing roads / access tracks. - The contractor must ensure that invasive species do not gain a foothold along the cleared route until the indigenous vegetation has had time to re-establish.	CON/EO		
Encroachment of alien vegetation into disturbed areas during construction.	Alien vegetation were noted along the roadside and some watercourse crossings, due to previous disturbance associated with construction of roads, and pipeline infrastructure. The Contractor is to ensure that the alien vegetation does not further establish within the disturbed areas associated with the excavation of the trench. Any cleared area for the pipeline is the contractor's responsibility to keep free from alien vegetation encroachment. - Alien vegetation within the construction footprint must not be allowed to encroach onto the site and must be continually removed (monthly) during construction. - All soil stockpiles must be free from alien invasive species before they are used to backfill the trenches.	CON/EO		

SECTION 3 CONSTRUCTION MITIGATION MEASURES

3.0 Site Camp, Storage & Handling of Hazardous and Non Hazardous Materials & Stockpiling

Activity	Required Action / remediation to control environmental impact	Person	In place (Yes / No)	Comments
Location & Establishment of the construction camps along the Bosworth Pipeline	The construction camps must be marked out with the approval of the ECO.	CON		
	- The site camps must be located on a flat portion of land. - Do not set up the construction camps within 32m a watercourse or wetland.	CON		
	The site camps must be clearly demarcated and fenced off to prevent illegal entry.	CON		
	- The following areas must be demarcated and clearly marked within the construction camps: - A waste storage area - A materials storage area - Areas for fuel and hazardous chemical / flammable goods - Stockpile areas - Vehicle servicing and wash bay areas (if required) - Parking area	CON		
Establishing storage areas & Stockpiles	- A waste storage area must be demarcated and suitable and sufficient waste bins must be provided within the camps. Storage of waste must be on a hard surface, and under cover. Liquid waste must be situated within a bunded area. - Liquid waste and accumulated waste must be removed from site monthly by a recognized Waste Contractor.	CON		
	A materials storage area must be identified and designated within the construction camps which must be located more than 32m from any watercourse. Materials, specifically liquid and potentially environmentally hazardous materials must be stored within a bunded area (110% capacity of largest container) and on a hard surface. The storage area must be under cover.	CON		

	• Areas for fuel and hazardous chemical / flammable goods must be identified and clearly signposted within the construction camps. An inventory of the materials and volumes stored must be maintained and updated once a week. These areas must be located within a bunded, hard surfaced impermeable area.	CON		
	• Bulk fuel storage: No bulk fuel storage to occur on site.	CON		
	• Designated areas for stockpiling of raw materials must be demarcated within the construction camps. No stockpiling is to occur on or near slopes where they could be washed into the surrounding properties or into the river. All stockpiling areas must be approved by ECO and must be located more than 32m from the edge of any watercourse.	CON		
	• Parking: The contractor must designate parking areas on the sites and ensure that only these parking areas are used. • Vehicles must not park within 32m of any watercourse.	CON		
	• Vehicle servicing and washing: only emergency (breakdown where equipment is no longer mobile) and minor maintenance (e.g. greasing) may be done on the sites. - o A designated area must be set aside for this, which must be hard surfaced and bunded. - o If emergency repairs are required, this must not be conducted within 32m of any watercourse, riparian zone or wet area. - o Drip trays must be used during servicing and under all leaking vehicles and plant. - o Any other planned or required maintenance must be done off site at a suitable location. - o Vehicle washing must be conducted off site at a designated vehicle wash bay, the washbay must be lined with impermeable material and must drain to a sump to ensure hydrocarbons, and other contaminants are separated out of the effluent prior to remaining runoff being discharged into municipal sewer. - o No cement vehicles may be washed on site.	CON		
Handling of liquids on site	• Decanting of any liquids / chemicals paints etc. must be done within the confines of a drip tray or on a hardened surface within a bunded area. • This must not be carried out within 32m of any watercourse.	CON		

	- Decanting from large containers (e.g. 210L drums) must be done using a hand pump, where possible. If no hand pump is available, liquids must be decanted on a drip tray using a funnel. - This must not be carried out within 32m of any watercourse.	CON		
	- All handling of hazardous materials including cement must take place on a hardened surface or within a drip tray or cement mixing tray. - This must not be carried out within 32m of any watercourse.	CON		
	Decanting of hazardous materials must take place within the site camp above drip trays or containers to prevent the potential spillage into these areas.	CON		
Inventory and record of substances stored on site	A full inventory of hazardous substances and Material Safety Data Sheet (MSDS) for each substance stored on site must be maintained and each substance must be stored and managed in accordance with the MSDS.	CON		
Storage of hazardous materials	Hazardous materials and liquids to be stored in the assigned storage area as per Section 3.0 of this EMPr.	CON		

3.1 Administration & Records

Activity / Document	Required Action	Person	In place (Yes / No)	Comments
Site Specific EMPr	Keep a hard copy of the Site Specific EMPr on site and ensure that it has been signed and received by the contractor and engineer.	CON		
	All contractors, the engineers and the ECO must have a copy of the EMPr before coming on to site.	ECO/ ENG		
Records	Keep records and proofs of all agreements, meetings etc. to demonstrate compliance with this EMPr.	CON		
Proof of raw material sourcing and resource use	- Proof of sustainable source of all materials used must be obtained and documented especially for raw material i.e. topsoil, sands, natural gravels, crushed stone, clay liners, timber etc. <u>In other words, documented proof that materials have been sustainably sourced must be maintained on site for review by EDTEA.</u> - E.g.: sand may only be obtained from an approved sand winning operation, which is licensed by the Department of Mineral Resources (DMR) and has an approved EMPr for operation.	CON/ EO		

	o Where materials are borrowed (mined), proof must be provided of authorization to utilise these materials from the landowner / mineral rights owner and the Department of Minerals and Energy.			
Water abstraction for dust suppression	• Water used on site must be obtained from a municipal source. If this is not available and water needs to be obtained from a nearby water resource then the following will apply: - o If water is to be extracted it must be from an approved source and permission from the land owner must be obtained. - o If water is extracted no more than 50 000l per day may be extracted. All water use must be registered with DWS. - o If water is extracted, a daily record of the volume of water extracted must be retained and: ▪ The driver must record each truck load that is removed and this will be used to determine the volume of water extracted. ▪ These records must be provided to the ECO for record and review. ▪ The ECO must monitor volumes to ensure that usage remains below 50 cubic metres per property per day or that abstracted amounts remain within those allowed by the permit that must then need to be applied for. - o Water use must be controlled and reduced wherever possible.	CON/ EO		
Maintenance of the extraction point	• One point of entry must be established and approved by the ECO. Multiple entry points and pathways will not be permitted. • Multiple abstraction points are not permitted. • The abstraction point must not be established within wetland areas or in areas thickly vegetated by riparian vegetation. • The abstraction point must be easily accessible and where possible, located in close proximity to an established road to avoid creation of additional tracks. • The abstraction area must not be located on steep slopes where the point may be come eroded. • Vehicles approaching the extraction point must remain 32m away from the edge of the water resource except where required to pump directly from the stream/river. • No vehicle repairs or maintenance or refuelling may be conducted at the abstraction point. • Damage to the banks of any water resource must not take place.	CON/ EO		

	- Should the area become damaged or eroded, erosion protection measures such as sand bags or hessian sheeting must be put in place to allow the re-establishment of vegetation and stabilisation of the area. - Once an abstraction point is no longer being used, the area must be rehabilitated to its former state.			
Proof of training	Keep training attendance registers on file at all times.	EO		
Incident records & Photographs	- Keep records of incidents that have occurred and how they were remediated. It is a good idea to take photographs when incidents occur and then to take follow up pictures to demonstrate remediation and keep these on record. - These records must be kept on site for review by EDTEA.	EO		
Appointment of ECO / EO	Appoint an ECO (Environmental Control Officer) prior to commencement of construction to monitor the entire construction phase.	ENG		
	Keep proof of appointment and contact details as well as dates of audits.	APP		
Emergency response plan	An emergency response plan must remain on site as must a copy of the EMPr and the Environmental Authorization.	ECO		
Audits	A record of audits conducted on the site as well as findings must be kept on site.	CON/ EO		
Permits & Approvals	- Keep all necessary permits and approvals on file i.e. construction licences etc. - These must be kept on site for review by EDTEA.	CON		
MSDSs	Material Safety data Sheets (MSDSs) are to be kept on site for all hazardous materials.	CON		

3.2 Training & Awareness

Activity	Required Action / remediation to control environmental impact	Person	In place (Yes / No)	Comments
Who should be trained & Frequency of training	All construction staff must have basic environmental awareness training, which can be conducted at the same time as the required health & safety training.	EO		
	Staff must be trained on their environmental responsibilities before commencing work and refresher sessions can be conducted during toolbox talks on specific areas causing problems.	EO		
	- Staff must sign training register and Records of training must be kept. - These records must be maintained on site for review by EDTEA.	EO		
	- Training must include - The definition of environment (people + air + soil + water +business); - Reasons for conserving and protecting the environment; - How the following activities can impact the environment: - Not using assigned ablutions, hazardous materials, uncleaned spills, mixing of cement or paint on soil or grass surfaces, waste management i.e. use of waste receptacles and waste separation for recycling, vehicle washing polluting soil & ground water; litter; - What to do to prevent the above impacting the environment i.e. assign impermeable mixing areas, no vehicle washing on site, use of waste receptacles and separation of waste to allow for recycling, how to respond in an emergency and deal with a spill; - Consideration of neighbours. - Do not play music or create any other disturbance to neighbours. - Use only the chemical toilets provided. - No dumping to occur in sensitive areas on site. - Use waste bins provided. - Use drip trays provided. - Do not build fires for any purpose on the site. - Behave in socially acceptable manner and do not use drugs or alcohol on site. - There is to be no hunting of wildlife on the site and no setting of snares or traps. No animals are to be harmed or harassed.	EO		

Neighbours & Working hours	Local community members must be notified of the project through community leaders and must be notified of the existence of any hazardous storage areas as well as the type of chemicals being used on site. This can be achieved through placement of signboards.	CON		
	Limit hours of operation to weekdays 7-5pm and Saturday mornings 7-12pm. Neighbours to be notified before construction on weekends takes place.	CON		
	Advise the adjoining neighbours of the work and hours of work at least one week prior to commencement. This can also be indicated on the signboards.	CON		
	Neighbours to be advised prior to periods where work will be done outside normal working hours.	CON		

3.3 Sensitive Social Areas, Environmental Areas, Vegetation and Vegetation Clearing and Wildlife

Activity	Required Action / remediation to control environmental impact	Person	In place (Yes / No)	Comments
Community	The surrounding stakeholders must be made aware of the commencement of construction 30 days prior to construction. Alternate temporary access routes must be determined prior to the commencement of the construction.	CON		
Water Resource Mitigation Measures (WC1-72)	- The footprint area of the pipeline must be kept a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas; - The footprint area must be aligned in existing road reserves wherever possible. Disturbed areas should be sought as the preferred alignment area; - The pipeline must be aligned as close to the road as possible; - Pipeline trenches and sandy bedding material may produce preferential flow paths for water across the project area perpendicular to the general direction of flow instead of angle. This risk can be reduced by installing clay plugs at intervals down the length of the trench to force water out of the trench and down the natural topographical gradient; - Pipelines crossing drainage areas, should preferably span the drainage lines above ground. This prevents disruptions to sub surface flow dynamics and allows the pipeline to be monitored for leaks. Pipelines buried underground should be buried at a sufficient depth below ground level such that the pipelines do not interfere with surface water movement or create obstructions, where flows can cause erosion;	CON/ EO		

	- When a pipeline spans a river, drainage line or wetland, it should be attached to any existing crossing or bridge structures. This will limit the need to disturb new areas of the river system with the construction of new structures; - The pipeline must be attached to existing infrastructure at all crossing structures, where the pipeline is not aligned with infrastructure it must be re-aligned to follow existing infrastructure - If pier support structures are needed for the pipeline to span a wide drainage line or river, then piers should be placed outside of preferential flow paths with the least number of pier structures used as possible; - Contamination of aquatic systems with unset cement or cement powder should be negated as it is detrimental to aquatic biota. Pre-cast structures should be made use of (where possible) to avoid the mixing of these materials on site, reducing the likelihood of cement in the river systems; - During the excavation of trenches, flows should be diverted around active work areas where required. Water diversion must be temporary and re-directed flow must not be diverted towards any stream banks that could cause erosion; - Cut off valves should be placed at regular intervals to shut down the pipeline in case of leaks, bursts and repairs; - The pipeline should be regularly inspected (quarterly) for any signs of failure, damage or leaks. Adequate maintenance measures need to be implemented upon finding pipeline issues and failures.			
Top soil	- Top soil removed during the excavations must be kept to one side (stored more than 32m from all watercourses). - This must then be re-used for rehabilitation purposes. Soil must be replaced in the same area that it was excavated from. Much of this topsoil, especially the top 30cm will retain grass and vegetation seeds. - Soil stockpiles must not exceed 2m in height, must be covered, or grassed to prevent erosion caused by exposure to heavy wind or rain.	CON/ EO		
Vegetation clearing and planting	- Only vegetation within the development footprint may be cleared. Any vegetation clearing must be done under the supervision of the ECO and Engineer. - No non-indigenous garden variety plants must be used.	CON/ EO		
Alien vegetation control	On-going control of alien vegetation within the construction area must be maintained.	CON/ EO		
	An alien eradication program must be in place to control the spread of alien invasive species on site.	CON/ EO		

Cultural and Heritage items	Should any items with historical or archaeological value be found during construction, these must be reported to AMAFA and work in the affected area must be stopped immediately.	CON		
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3.4 Soil, Stormwater Runoff; Erosion

Activity	Required Action / remediation to control environmental impact	Person	In place (Yes / No)	Comments
Stormwater system	Temporary stormwater protection measures must be established before construction activities commence.	CON		
	No contaminated runoff or grey water is allowed to be discharged from the Site Camps into the watercourses or surrounding environment.	CON		
	Storm water must not be allowed to flow into surrounding properties and must enter existing stormwater channels.	CON		
Storm water Quality	Only clean stormwater may be diverted to the Watercourses and then precautions must be in place to prevent erosion of the riverbanks. These precautions can include gabion baskets, berms or diversion ditches, and sandbags.	CON		
	Washings from any vessels or any containers must not enter the Watercourses or storm water. These washings are to be contained and removed as waste.	CON		
Incidents	Entry of any substance (i.e. any material or substance that is not clean stormwater) into the storm water or a water body is considered an incident and must be reported to the ECO <u>immediately</u> for the purposes of maintaining the site's incident records.	CON/ EO		
Storm water flow	- The drainage system must be regularly checked to ensure an unobstructed water flow. - Channelled flow must not be permitted to enter the Watercourses where it erodes the banks and damage the streams.	CON		
Erosion Control	Install erosion barriers (gabion baskets, berms or diversion ditches, sandbags) and other sediment control structures (grates or grids, geofabric) before clearing in order to prevent substances from entering exposed drains or channels.	CON		
	Identify any steeper areas where erosion is more likely to occur. These areas must be protected from erosion. This can be achieved through planting of vegetation, placement of berms or use of hessian material.	CON/ EO		

	Regularly check and clean material from behind erosion barriers.	CON/EO		
	Sediment / soil must not be permitted to enter the Watercourses. The contractor must install erosion barriers (gabion baskets, berms or diversion ditches, sandbags) and other sediment control structures (grates or grids, geofabric).	CON/EO		

3.5 Housekeeping, Waste Storage Handling and Disposal

Activity	Required Action / remediation to control environmental impact	Person	In place (Yes / No)	Comments
General Waste Storage	The waste area to be designated and demarcated within the construction camp (as per section 3).	CON		
	- Solid waste must be stored in covered, tip proof metal drums to be collected and disposed of by a certified waste contractor. - Proof of safe disposal of solid waste must documented and these records must be maintained on site for review by EDTEA.	CON		
	Hazardous materials that require disposal (cement, paints, solvents, old fuel/oil etc.) must be disposed of at a registered hazardous landfill site.	CON		
Hazardous waste	- These materials must be removed by a hazardous waste contractor. Proof of disposal must be available to the ECO for scrutiny and kept on record. - Proof of safe disposal of solid waste must documented and these records must be maintained on site for review by EDTEA.	CON		
Waste from Chemical toilets	Install chemical toilets and insure disposal of waste at a licenced disposal facility. Proof of disposal must be kept on site at all times.	CON		
	Waste from the toilets must be collected on a weekly basis by a registered and reputable company.	CON		
	Safe disposal certificates for toilet waste must be obtained and kept on site as assurance that the waste was properly disposed of.	CON		
	Toilets must not be situated on slopes or within 32m of any watercourse and must be secured to prevent them tipping over.	CON		
	Staff must use facilities provided and are not permitted to use any other areas on site as toilet facilities.	CON		

	Chemical toilets must be checked daily and cleaned.	CON		
Waste storage and handling	No waste may be buried or burned on site or dumped on surrounding properties and farmland. All waste must be disposed of at a licenced waste disposal facility. Proof of disposal must be kept on site at all times.	CON		
	All skips must be covered to contain odours and prevent waste from blowing around the site.	CON		
	A register of all waste generated and disposed of must be maintained.	CON/ EO		
	- No dumping is permitted. There must be no dumping on site under any circumstances. The contractor is liable to a fine should there be any evidence of illegal dumping. - The ECO to review damage and advise on rehabilitation measures if required.	CON		
	Do not place waste containers, skip bins or building materials on steep slopes or within 32m of the stream.	CON/ EO		
	Waste accumulated on site must be removed on a weekly basis. The waste must be moved to a licenced waste disposal facility.	CON		
	Provide litterbins throughout the site for use by all staff on site.	CON		
Waste separation	Hazardous: Hazardous waste must be stored separately from general waste. - Hazardous waste must be disposed of at an approved hazardous waste landfill and safe disposal certificates must be obtained. - Hazardous waste includes used oils, lubricants, solvents, solvent based paints, concrete waste, and cement.	CON/ EO		
	Oils must be within a bunded storage area and treated as flammable waste. - Where possible used oils must be recycled. - Safe disposal certificates must be kept on site demonstrating disposal or recycling of the used oils. - Solid paint waste may be disposed of as general waste.	CON/ EO		

	• Concrete waste: - o Return excess concrete with the delivery truck to supplier for recycling or proper disposal. - o Any other excess concrete i.e. on-site mixed concrete can be stored in a lined bin for eventual recycling or disposal.	CON/ EO		
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3.6 Noise

Activity	Required Action / remediation to control environmental impact	Person	In place (Yes / No)	Comments
Noise Generation and suppression	• All construction vehicles must be fitted with standard silencers and be well maintained.	CON		
	• Workers must be trained regarding noise on site and construction hours must be kept to working hours (07h00 to 17h00).	CON		

3.7 Dust & Emissions

Activity	Required Action / remediation to control environmental impact	Person	In place (Yes / No)	Comments
Dust from stockpiles	• Cover any stockpiled fine material that may release dust with plastic.	CON		
Dust from surfaces	• Damp down surfaces and stockpiles as required to reduce windblown dust.	CON		
	• A water cart may be used which must remain on designated roadways if required.	CON		
	• If dust from the site is likely to create problems for nearby residents, these areas must be shielded with shade cloth.	CON		

3.8 Vehicle Maintenance, Operation, Driving On Site and Vehicle Washing

Activity	Required Action / remediation to control environmental impact	Person	In place (Yes / No)	Comments
Access points	Haulage roads must be demarcated at site set up.	CON		
	Turning areas must be located within the construction footprint and must be clearly designated.	CON/EO		
	Temporary access roads must not be located within adjoining properties.	CON/EO		
	No ad hoc haulage roads or turning areas may be created.	CON/EO		
	Limit vehicle entry point to the designated access point and ensure no other point of entry is used.	CON/EO		
	All vehicles to remain in the parking area designated within the construction site.	CON/EO		
Vehicle servicing and repairs	No major equipment or vehicle servicing to occur on site i.e. major disassembly and repair work, clutch replacements and oil or lubricant changes must be carried out at a suitably equipped workshop.	CON		
	Only minor emergency repairs, i.e. those necessary to get the vehicle moving so that it can be taken to a repair facility to be carried out i.e. stopping of oil leaks, lubricating of hydraulics, changing of buckets / breakers on Excavators and TLBs or changing of tyres. This must be carried out in designated work shop areas within the allowed construction camps. These areas to be hard surfaced and bunded.	CON		
	Drip trays are to be used by all leaking vehicles and equipment.	CON/EO		
	All vehicles to be equipped with drip trays.	CON/EO		
	All small machinery used on site must be situated on a drip tray (i.e. pumps, generators, compressors etc.).	CON/EO		
	All vehicles to be regularly maintained and maintenance records must be made available on request.	CON/EO		

	No leaking vehicles to be allowed on site.	CON/EO		
	Any vehicles that are leaking must not be allowed entry to site.	CON/EO		
	No vehicles to be washed on site - cement trucks are not permitted to wash out cement mixers on site.	CON/EO		
	Only emergency (breakdown where equipment is no longer mobile) and minor maintenance (e.g. greasing) may be done on site. Any other planned or required maintenance must be done offsite at a suitable location.	CON		

3.9 Incidents, Spills and Emergency Response

Activity	Required Action / remediation to control environmental impact	Person	In place (Yes / No)	Comments
Spill kits	Adequate spill kits and containers for spilled and contaminated material to be on standby on site.	CON/EO		
	Keep clearly marked booms and/or absorbent material on site to contain spills if they occur.	CON/EO		
	All staff must be trained on how to react in the case of an emergency.	CON-SHE		
	If a spill occurs, stop the source, contain it, clean up in accordance with MSDSs and notify relevant authorities.	CON/EO		
	Make staff aware of emergency phone numbers to use in the case of a large spill.	CON/EO		
Definition of incidents	All incidents are to be recorded.	CON/EO		
	Minor incidents: small spills less than 5 l that do not enter stormwater or the stream/river, minor non-compliance with EMP that does not cause major environmental impact i.e. housekeeping issues etc. Action: Supervisor and staff on site to record and address and notify ECO. Take photos of spill. Prevent spill from spreading and contain.	CON/EO		

	Collect spilled material and contaminated soil and place in sealed container for disposal. ECO to advise on remediation measures and to follow up on actions taken to address incident. o Records: On site incident register.			
	• Major incidents: Large spills or any spills that enter stormwater or the stream/river, fires, explosions. Please see definition of a reportable incident provided below. - o Action: Report immediately to ECO, action to be taken to prevent further damage and incident to be reported to authorities. ECO to advise on remediation measures and to follow up on actions taken to address incident. - o Records: On site incident register and report to authorities.	CON/ EO		

3.10 Sewage and Grey Water Management

Activity	Required Action / remediation to control environmental impact	Person	In place (Yes / No)	Comments
Sewage	• Adequate toilet facilities (such as chemical toilets) sufficient in number to cater for the number of staff on site must be provided. One toilet per 15 staff must be provided.	CON		
	• Waste must be managed as per section 3.5 namely removed by licensed contractor and safe disposal certificates retained to prove proper disposal. • Safe disposal certificates must be kept on site for review by the EDTEA.	CON/ EO		
	• Grey water must not be permitted to enter the surrounding properties or stormwater.	CON/ EO		
Grey water / wash water	• Vehicles, especially cement trucks, must not be washed on site these must be washed at a wash bay facility off site.	CON/ EO		
	• Alternately the wash water can be collected and returned with the supplier's truck for disposal by the supplier.	CON/ EO		

SECTION 4 POST CONSTRUCTION, REHABILITATION AND OPERATION

4.0 Post Construction Activities

Activity	Required Action / remediation to control environmental impact	Person	In place (Yes / No)	Comments
Post Construction Audit	Clearance from the ECO must be obtained to ensure the all of the requirements of the EMPr have been complied with.	ECO		
Stormwater	The Contractor must check that the stormwater channels are free from building rubble, spoil materials, and waste materials.	CON		
	Ensure that in the long term; stormwater is protected from ingress by potential pollutants.	CON		
Waste & Spills	All spillages must be cleaned and contaminated soil must be removed and disposed.	CON/EO		
	All remaining waste bins and / or skips must be removed and disposed of. Records of disposal must be retained.	CON/EO		
	All excess concrete must be removed from site on completion of works and disposed of. Washing of the excess into the ground is not allowed.	CON/EO		
	All excess aggregate must also be removed.	CON		
	Used oil must have been collected by a registered used oil contractor and documentation to this effect provided.	CON		
	Surfaces are to be checked for waste products from activities such as concreting are cleared in a manner approved by the ECO.	CON		
	No litter must be left on site.	CON/EO		
Structures, materials and stockpiles	Any fences, barriers, or demarcations utilized for the construction phase must be removed and disposed of.	CON		
	All structures and imported materials within the construction camp must be removed.	CON		

	The remaining building materials must be removed from the site.	CON		
Damage	Any damage incurred on the neighbouring homesteads by the contractor must be repaired by the contractor.	CON		
	Any damage to existing infrastructure must be repaired or replaced on completion of the upgrade.	CON		
Close Out	A meeting must be held between Engineer, the ECO, and the contractor to approve all remediation activities and ensure that the site has been restored to a condition, which has been approved by the Engineer.	ENG		
Vegetation	All vegetation planting must be completed and any areas that have been disturbed or cleared must have been rehabilitated and re vegetated.	ECO		
	Re-vegetation of cleared land must utilize only 100% locally indigenous plant material to ensure no erosion occurs once the site is vacated.	CON/EO		
	Ensure that no sensitive habitats have been damaged during the construction phase.	ECO		
	Where habitats have been damaged these must be reported to the ECO and procedures for rehabilitation of these habitats must be undertaken.	CON/EO		
Erosion	Any eroded soil on paths / roadways / other areas must be collected and replaced in the area from which it was eroded. These high risk erosion areas must be protected from further soil erosion.	CON/EO		

4.1 Rehabilitation

Activity	Required Action / remediation to control environmental impact	Person	In place (Yes / No)	Comments
Rehabilitation of the excavated pipeline route and site camps.	- Cleared areas to be re-grassed on completion. Indigenous grasses to be used and the use of vetiver or kukuyu grass is not supported. Rather an indigenous grass seed mix must be used to rehabilitate the site. - Compacted cleared areas (site camps) must be ripped to allow for vegetation regrowth.	CON/EO		

	- Where possible, vegetation that was removed during clearing must be kept aside and re-used. This can be kept on site in nursery areas or if the replanting occurs within a few days of clearing, can be kept to one side and immediately re-planted. - Grass can be reintroduced by Hydroseeding or planting of grass plugs. - Where serious habitat damage has taken the damaged must be reported to the ECO. Consultation between the ECO, contractor, and engineer must take place. Whereby the contractor must develop and suitable method statement which must focus on the rehabilitation of the damaged area. This method statement must be approved by both the ECO and engineer. The contractor must then implement this method statement under the supervision of the ECO.			
Top Soil	- Top soil removed during the excavations must be kept to one side (stored more than 32m from Watercourses) and re-used in the same area that it was excavated from. Much of this topsoil, especially the top 30cm will retain grass and vegetation seeds. - This top soil to be used when re-vegetating and rehabilitating areas cleared for construction/ excavation.	CON/ EO		
Rehabilitation of eroded areas	- Any erosion damage caused during construction must be repaired. The affected area must be reshaped and soil replaced. - The eroded area must be re-vegetated or measures put in place to control further erosion. The contractor must install erosion barriers (gabion baskets, berms or diversion ditches, sandbags) and other sediment control structures (grates or grids, geofabric).	CON/ EO		
Removal of alien invasive plants	- Alien invasive species must be removed on an on-going basis. - Use of chemical pesticides must be avoided and mechanical removal by hand is preferred.	CON/ EO		
Damage to the Watercourses	- Where the Watercourses have been damaged the following measures are to be taken to ensure restoration of the habitat: - ECO must assess the damaged area - Any construction debris or contaminants within the Watercourses must be removed - Original soil structure must be restored - Any impedance or diversion to water flow must be removed - Area must be vegetated with suitable riparian or wetland species - No loose soil or damaged banks can be left behind after construction.	CON/ EO		

4.2 Operation				
Activity	Required Action / remediation to control environmental impact	Person	In place (Yes / No)	Comments
Soil Erosion	The erosion protection features installed on the site must be checked to ensure, they continue to perform their function during the operational phase of the project.	APP		
Vegetation	- Alien vegetation must be monitored and removed on an on-going basis. - Indigenous vegetation planting must continue on an on-going basis if it is required.	APP		

SECTION 5

DEFINITIONS

Stormwater

Clean rainwater, must be allowed to enter the stormwater system or natural water bodies without causing erosion. Stormwater must not be contaminated with any other substance including soaps, washings, hazardous materials, soil etc.

Grey water

This is wash water that may contain non-hazardous soaps i.e. bath water, vehicle wash water etc. This must not be permitted to enter the stormwater system but can be disposed of in the sewage system or as effluent. If no sewage system is available on site the grey water must be collected and disposed of.

Sewage

Human excrement from chemical toilets.

Raw materials for which source statement must be obtained

Topsoil, sands, natural gravels, crushed stone, asphalt, clay liners, timber etc. E.G.: sand may only be obtained from an approved sand winning operation, which is licensed and has an approved EMPr for operation.

Incidents

All incidents must be recorded. Minor incidents could include small spills of less than 5l that do not enter a water body or any stormwater drains, as well as housekeeping issues and general small non-compliances with the requirements of the EMPr. Major incidents are those that must be reported to the authorities and include all incidents involving contamination of a water body or stormwater or other reportable incidents as defined below.

Reportable incident is defined as 'an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed' NEMA Section 30, 'includes any incident or accident in which a substance (a) pollutes or has the potential to pollute a water resource; or (b) has, or is likely to have, a detrimental effect on a water resource.' NWA Section 20.

SECTION 6

RECORDS

Training Register – Record any training that has taken place.

Training Conducted:

Training provided by:

[illegible]

[illegible]

[illegible]

Environmental Emergency Response and Definition of an Incident

Aim of this document	- To effectively manage response to emergency incidents and control these incidents should they occur. - To ensure that such incidents are recorded and, where possible, all measures are taken to prevent them from re-occurring. - To provide a definition for what would be considered a reportable incident in terms of the environmental legislation. Activities covered in this procedure include: - Identification and definition of an incident and whether or not it needs to be reported to the authorities. - Reporting to the relevant authorities in the event that a reportable incident occurs - Procedure to follow in the event of a spill or fire.
Personnel Duties and Responsibilities	The contractor is responsible for: - Ensuring all activities are carried out as per this procedure and that the company complies with relevant legislation. - Maintaining a register of all incidents as well as ensuring that an incident report is generated for each incident, including details of the incident and how it was closed out. - Ensuring that safe disposal certificates are obtained for any waste materials generated as a result of an incident and that this waste is recorded. - Providing the necessary spill kit equipment and drums for storage of contaminated soil etc.
Training Requirements	All personnel and manpower to undergo a site safety and environmental induction prior to starting work on site. All employees to be trained on how to respond to an environmental incident and who to contact in order to ensure that the incident is addressed and recorded and if necessary reported.
Definition of a “reportable incident”	In terms of the National Environmental Management Act, major incidents must be reported to the authorities. In terms of the National Water Act, any incident involving a substance which has the potential to pollute a water resource must be reported i.e. any spill of into a watercourse or into the stormwater system must be reported. The relevant sections from the legislation are provided below:
National Environmental Management Act	<i>As defined by NEMA, section 30 “Control of emergency incidents”.</i> <i>(1) In this section—</i> <i>(a) “incident” means an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed;</i> <i>(b) “responsible person” includes any person who—</i> <i>(i) is responsible for the incident;</i> <i>(ii) owns any hazardous substance involved in the incident; or</i> <i>(iii) was in control of any hazardous substance involved in the incident at the time of the incident;</i> <i>(c) “relevant authority” means—</i> <i>(i) a municipality with jurisdiction over the area in which an incident occurs;</i>

	(ii) a provincial head of department or any other provincial official designated for that purpose by the MEC in a province in which an incident occurs; (iii) the Director General; (iv) any other Director General of a national department.
National Water Act	As defined by the National Water Act section 20 "Control of emergency incidents" (1) In this section "incident" includes any incident or accident in which a substance - (a) pollutes or has the potential to pollute a water resource; or (b) has, or is likely to have, a detrimental effect on a water resource.
Reporting to the authorities	In the event that a reportable incident occurs, the Site Agent / Project Manager and Environmental Control Officer must be notified immediately. No site staff may communicate directly with the authorities. The relevant sections from the legislation are included below: As taken from NEMA, section 30: Control of Emergency Incidents: (3) The responsible person or, where the incident occurred in the course of that person's employment, his or her employer must forthwith after knowledge of the incident, report through the most effective means reasonably available— (a) the nature of the incident; (b) any risks posed by the incident to public health, safety and property; (c) the toxicity of substances or byproducts released by the incident; and (d) any steps that should be taken in order to avoid or minimise the effects of the incident on public health and the environment to— (i) the Director General; (ii) the South African Police Services and the relevant fire prevention service; (iii) the relevant provincial head of department or municipality; and (iv) all persons whose health may be affected by the incident. (4) The responsible person or, where the incident occurred in the course of that person's employment, his or her employer, must, as soon as reasonably practicable after knowledge of the incident— (a) take all reasonable measures to contain and minimise the effects of the incident, including its effects on the environment and any risks posed by the incident to the health, safety and property of persons; (b) undertake cleanup procedures; (c) remedy the effects of the incident; (d) assess the immediate and long term effects of the incident on the environment and public health. (5) The responsible person or, where the incident occurred in the course of that person's employment, his or her employer, must, within 14 days of the incident, report to the Director General, provincial head of department and municipality such information as is available to enable an initial evaluation of the incident, including— (a) the nature of the incident; (b) the substances involved and an estimation of the quantity released and their possible acute effect on persons and the environment and data needed to assess these effects; (c) initial measures taken to minimise impacts; (d) causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure; and

	(e) measures taken and to be taken to avoid a recurrence of such incident. (6) A relevant authority may direct the responsible person to undertake specific measures within a specific time to fulfil his or her obligations under subsections (4) and (5): Provided that the relevant authority must, when considering any such measure or time period, have regard to the following: (a) the principles set out in section 2; (b) the severity of any impact on the environment as a result of the incident and the costs of the measures being considered; (c) any measures already taken or proposed by the person on whom measures are to be imposed, if applicable; (d) the desirability of the State fulfilling its role as custodian holding the environment in public trust for the people; (e) any other relevant factors. (7) A verbal directive must be confirmed in writing at the earliest opportunity, which must be within seven days. (8) Should— (a) the responsible person fail to comply, or inadequately comply with a directive under subsection (6); (b) there be uncertainty as to who the responsible person is; or (c) there be an immediate risk of serious danger to the public or potentially serious detriment to the environment, a relevant authority may take the measures it considers necessary to— (i) contain and minimise the effects of the incident; (ii) undertake cleanup procedures; and (iii) remedy the effects of the incident.
National Water Act section 20: Control of emergency incidents	(2) In this section, "responsible person" includes any person who - (a) is responsible for the incident; (b) owns the substance involved in the incident; or (c) was in control of the substance involved in the incident at the time of the incident. (3) The responsible person, any other person involved in the incident or any other person with knowledge of the incident must, as soon as reasonably practicable after obtaining knowledge of the incident, report to - (a) the Department; (b) the South African Police Service or the relevant fire department; or (c) the relevant catchment management agency. (4) A responsible person must - (a) take all reasonable measures to contain and minimise the effects of the incident; (b) undertake clean-up procedures; (c) remedy the effects of the incident; and (d) take such measures as the catchment management agency may either verbally or in writing direct within the time specified by such institution.

Spill response	
Responsible Person/s	The spill is reported to the site foreman who must notify his superior. All employees must be made aware of the procedure in case of a spill.
Procedure	1. Identify nature of spill e.g. paint, oil or lubricants 2. Locate spill kit 3. Contain spill according to the training provided 4. Where necessary, contact external spill control contractors 5. Ensure spill does not cause any external contamination (such as storm/ground water or soil) 6. Ensure that cleanup measures are taken if any contamination has occurred 7. Record in emergency response record the: • Nature of incident • Cause of incident • Clean up measures • Mitigation measures taken 8. Record in non-conformance register 9. The ECO and Project Manager will determine if the event qualifies as an incident and take steps to report the incident to the necessary authorities i.e. EDTEA and DWA. 10. The ECO shall review all spill reports
Fire	
Responsible Person/s	The fire is reported to the site foreman All employees must be made aware of the procedure in case of fire.
Procedure	1. Identify source and nature of fire. 2. In case of small fire extinguish with material appropriate to the nature of the fire 3. In case of a large fire contact Fire Department 4. In the site camp, seal off exposed stormwater drains to ensure firewater does not cause any external contamination. If on site, take measures to prevent firewater entering any water body. 5. Ensure that clean-up measures are taken if any contamination has occurred 6. Record in emergency response record the: • Nature of incident • Cause of incident • Clean up measures • Mitigation measures taken 7. Record in non-compliance register 8. The ECO and Project Manager will determine if the event qualifies as an incident and take steps to report to the authorities. 9. The EO shall review incident / nonconformance reports 10. Adjustments will be made, if necessary, to the operational and emergency procedures and the Environmental Management System to prevent future occurrences

Explosion	
Responsible Person/S	The explosion is reported to the site foreman who must notify his superior. All employees must be made aware of the procedure in case of explosion.
Procedure	1. Identify source and nature of explosion. 2. In case of small fire as a result of the explosion, extinguish with material appropriate to the nature of the fire 3. In case of a large fire as a result of the explosion contact Fire Department 4. In the site camp, seal off exposed stormwater drains to ensure firewater does not cause any external contamination. If on site, take measures to prevent firewater entering any water body. 5. Ensure that clean-up measures are taken if any contamination has occurred 6. Record in emergency response record the: • Nature of incident • Cause of incident • Clean up measures • Mitigation measures taken 7. Record in non-compliance register 8. The ECO and Project Manager will determine if the event qualifies as an incident and take steps to report the incident to the necessary authorities i.e. EDTEA and DWS. 9. The ECO shall review spill reports
Resource Requirements	
Materials	• Separate drums for contaminated soil. • Spade and clean soil • Fire equipment

Alien Plant Control Plan

Activity	Site Mitigation Measures to control alien plants
Training and expertise of personnel involved in Alien plant management on site	- It is rare that either a contractor has employees or members respectively with good knowledge of alien plants and their eradication, who can then eradicate these plants effectively and on a near-complete basis. Partial knowledge means that some alien species are missed or ignored or indigenous plants harmed. Partial work, or work that is not sustained is also ineffective in the long run as any residual presence can regenerate and expand quickly, particularly if live material or many seeds still in the ground. - As a result, the contractor must continually train their works as to the importance of alien plant control and at the same time providing them with the correct knowledge as to which plant must be removed and what method must take place.
Alien Invasive Plant Management in construction area	- The construction area must be kept free of alien invasive plants. Regular inspections of the site must take place. The following methods of alien plant control can be adapted: - Mechanical Control - Hand pulling - Manual removal using hand tools - Manual removal using mechanized tools - Chemical Control - Foliar spraying - Handheld spraying - High pressure spraying - The construction area must be rehabilitated immediately following the completion of construction to ensure that alien invasive plants do not become established. - The construction area must be regularly inspected following rehabilitation and alien invasive plants removed if they have become established.
Responsible Use of herbicides	- Problem plants in construction areas usually short-lived weeds for which mechanical methods alone are not successful some use of herbicides may be unavoidable. The following must be followed with the use of herbicides: - Do not spray herbicides in windy conditions - Preferably spray in dry conditions and not prior to any predicted heavy rainfall as most pesticide movement either to the surface or to the groundwater will occur in the first major storm event after application. Heavy losses are reported when application occurs immediately before a major storm. - A buffer zone which must remain untreated must be retained around Watercourses. A minimum buffer of 10m must be retained. This are will have to be managed by mechanical means. - Empty containers or unused herbicides must be disposed of correctly and may not be dumped on site.

Annexure C5.8: Geotechnical Report



GEOTECHNICAL REPORT

***BULK WATER SUPPLY SSA3
MIDDLEDRIFT
KWAZULU - NATAL***

***Requested by
Eyethu Engineers***

***Project GA0126/2012
October 2012***



GEOTECHNICAL REPORT

**BULK WATER SUPPLY SSA3
MIDDLEDRIFT
KWAZULU - NATAL**

***Requested by
Eyethu Engineers***

***Project GA0126/2012
October 2012***

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GEOTECHNICAL REPORT
BULK WATER SUPPLY
MIDDLEDRIFT, KWAZULU - NATAL

1. INTRODUCTION

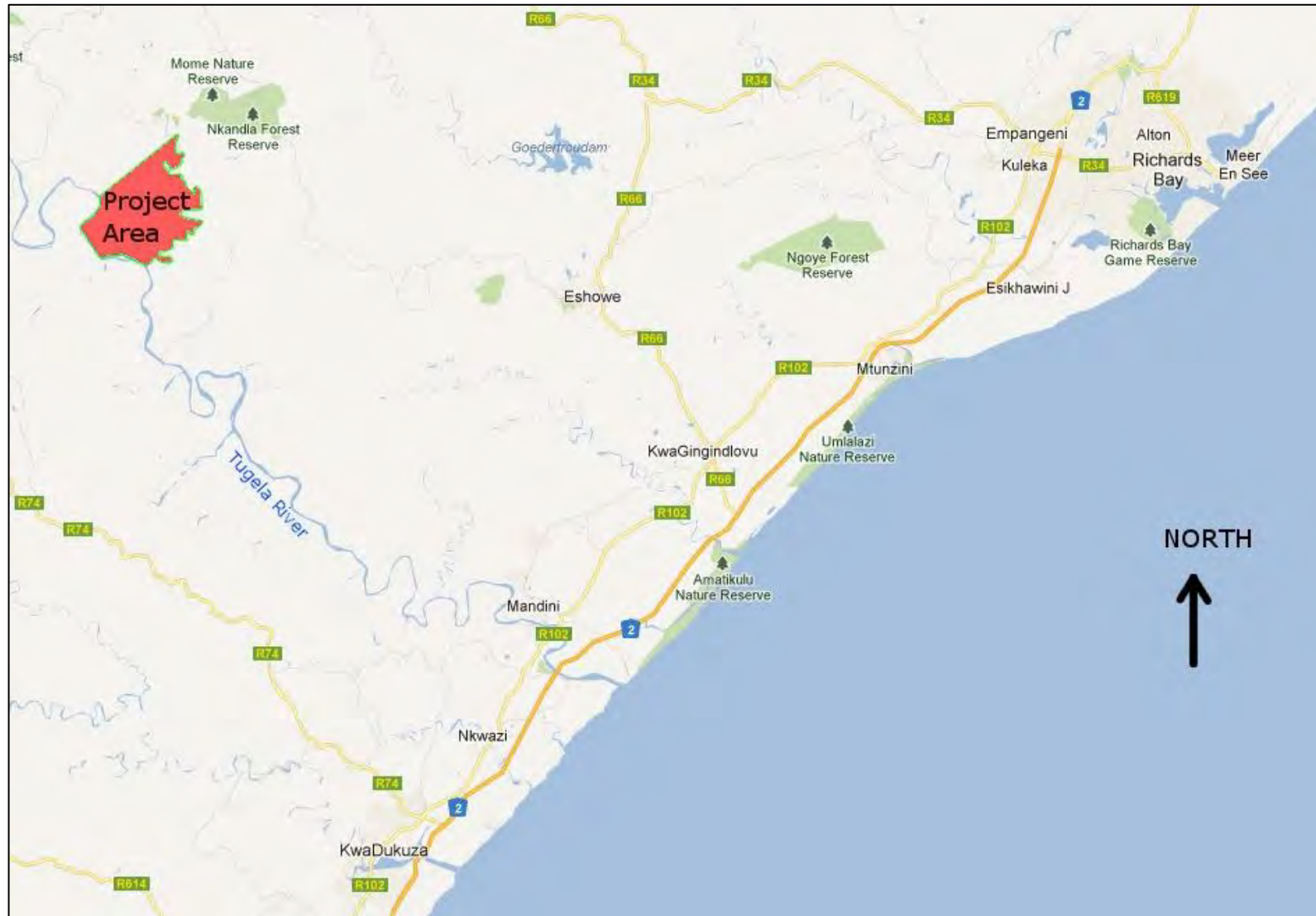
This report refers to the findings and recommendations emanating from a geotechnical investigation undertaken between the 25th September 2012 and the 18th October 2012. The geotechnical investigation forms part of the proposed design process for the upgrade and extension of the bulk water supply infrastructure for the rural areas near Middledrift, located along the Tugela River, KwaZulu-Natal. The fieldwork was carried out by Ground Africa Consulting Geotechnical Engineers and undertaken at the request of Eyethu Engineers.

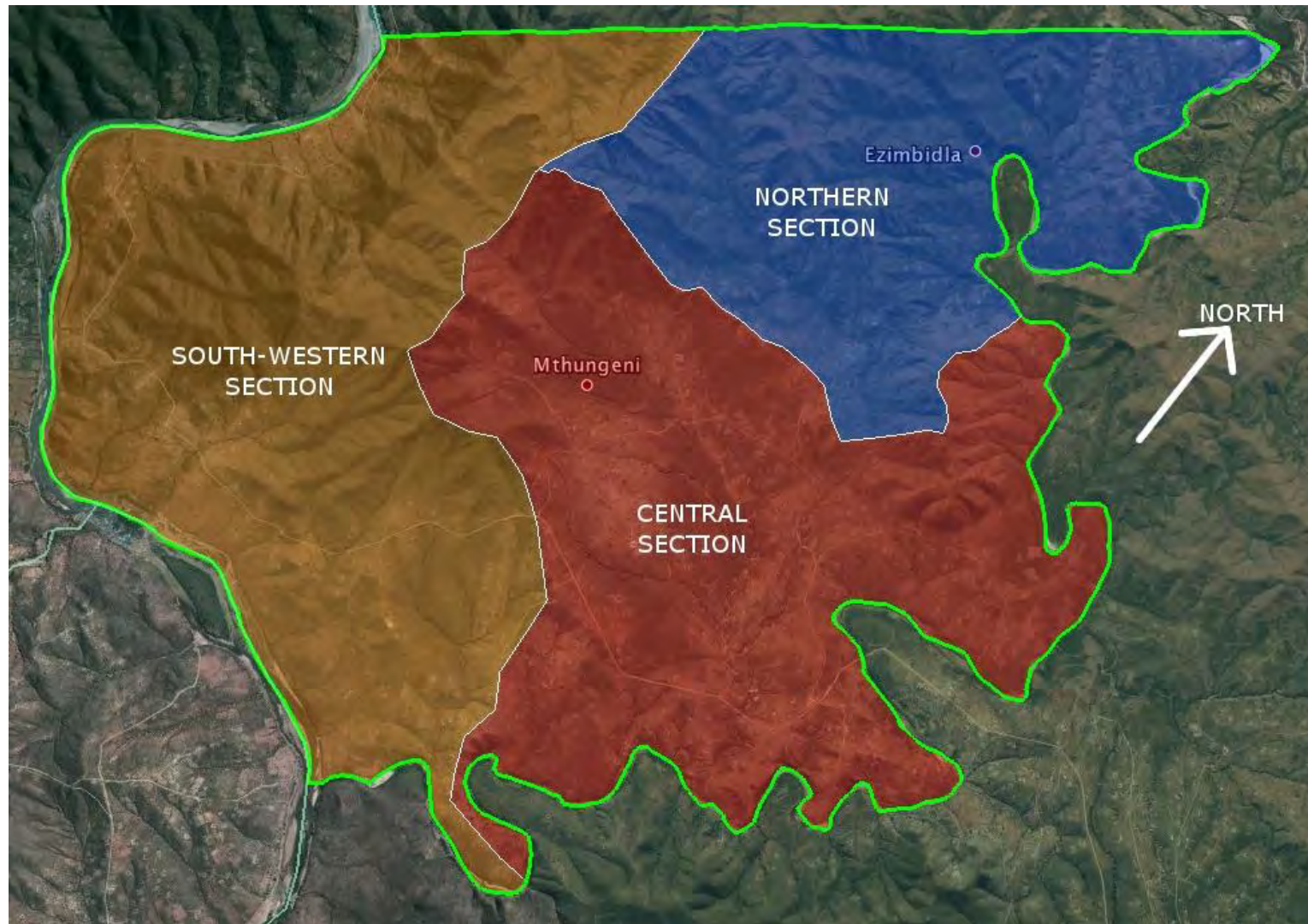
The geotechnical investigation was undertaken to ascertain the general ground conditions underlying the proposed site and seeks to provide the design engineers with geotechnical information and recommendations pertaining to the design of the proposed new and extended bulk water network near Middledrift. The report also seeks to outline potential geotechnical concerns that may have an impact on the design, construction and later operation of the new infrastructure.

Site drawings were supplied by Eyethu Engineers for use in the investigation on a Compact Disc on the 21st of September 2012. These drawings show the overall water supply network, positions of a number of reservoirs and proposed trial hole positions.

2. SITE DESCRIPTION AND LOCATION

The project site is located approximately 45km due West of Eshowe in KwaZulu-Natal. The project area is approximately 80km² in extent. The site is bordered by the Tugela River and the Nsuze River. The Nsuze River is a tributary of the Tugela River. For investigative and reporting purposes, the site has been considered to comprise of 3 sections, namely the South Western Section, the Central Section and the Northern Section. A site locality plan, relative positions of the site sections and site descriptions with photographs are included over-page.







2.1 South-Western Section

The South-Western section lies along the northern bank of the Tugela River. A well maintained gravel road runs lengthwise through most of this section. The ground slopes steeply towards the Tugela River which is drained by a number of smaller streams into the Tugela. The north-eastern part of this section of the site is dominated by steep terrain.

Most of the population living within this section is concentrated in the south-east and north-west of the section, with sparsely scattered homesteads found throughout the rest of the section. Homesteads are in small, randomly positioned clusters. Most houses in this area have a small access road connecting to the main road. The majority of these houses appear to have piped water, with a number of concrete pipeline markers evident along the left side of the main gravel road.

The topography is best described as hilly with steep sided stream valleys flowing into the Tugela River. Sharp ridges of higher ground separate this section to the neighbouring central section.

Natural vegetation comprises of sparsely scattered indigenous bushes and small trees. Thicker vegetation occurs along river valleys. A number of fields have been cleared for subsistence agriculture. A number of schools are located along the main gravel road.

General pictures of the south western section have been included over-page.



Picture 1: Small streams within this section of the site flow into the Tugela River.



Picture 2: The Tugela River forms the border of the south western section of the site.



Picture 3: The general topography of the section can best be described as hilly.



Picture 4: Housing on the site is scattered in an ad hoc manner, with no overall formal layout evident.



Picture 5: The main road through the site is gravel and appears to be in good condition.



Picture 6: Some of the streamlines were found to be deeply eroded.



Picture 7: The vegetation comprises of sparsely scattered trees and shrubs with short grass.



Picture 8: A ridge of higher ground forms the boundary between the south western section and the central section.

2.1 Central Section

The central section of the site makes up the majority of the investigated area. It lies between the Nsuze River to the east and south and the ridge of higher terrain to the north.

The majority of the site comprises of rolling hills, with some high ground to the north and west. A number of deep ravines are also found. The land tends to slope down towards the Nsuze River in the south and east. The central section has relatively gentle sloping terrain compared to the other parts of the project area.

The majority of the central section is drained by one major catchment area which flows into a main tributary of the Nsuze River located to the south east. Many of the stream banks are deeply incised, with some erosion gullies being up to 5m below the surrounding ground level. Parts of the north-west of this section has smaller streams that drain directly into the Nsuze River.

The area is well-populated, and it appears that the majority of dwellings are serviced with both electricity and water. A number of water meters were observed throughout the area. Dwellings are grouped into informal clusters, with no overall organised pattern being evident.

Vehicle access to most of the area is easy, with the gravel road network being generally in a good condition.



Picture 9: Vegetation comprises short, scrub savannah with some larger trees.



Picture 10: Boulders litter the general ground surface in this area.



Picture 11: The central section comprises relatively gentle sloping topography compared to the other sections.



Picture 12: A good network of gravel roads provides vehicle access to most parts of the central section.



Picture 13: Current housing is in small clusters, many on small cut and fill platforms.



Picture 14: The central section is separated from the northern section by a ridge of higher ground.



Picture 15: Existing homesteads appear to have access to electricity, water as well as telephone networks.



Picture 16: The central section comprises of rolling hill topography.

2.1 Northern Section

The northernmost area is the least developed of the three areas investigated. Much of the area is steeply-sloping and with sharp ridges of higher ground. There are relatively few roads located in the southern part of the northern section and these are generally in a poor condition. The northern part of the site was found to be inaccessible to vehicles, with no formal roads coupled with steep terrain. The investigation was carried out on foot and manual excavation methods were used in this part of the project area.

The Nsuzi River forms the northern area's north eastern border. The area is drained by a number of small streams, the majority of which drain in an easterly direction.

Most of the population who live in this area, live on the southern side of the section. A number of abandoned homesteads were also noted. Existing and presently occupied homesteads have been built on the edge of the steep slopes on levelled cut platforms.



Picture 17: The Nsuzi River forms the eastern boundary of this section.



Picture 18: The northern section is characterised by a series of valleys and high ridges.



Picture 19: The northern section is the least populated section within the project area.



Picture 20 The homesteads that do exist in this area have been founded on small terraces on the slopes of the steep terrain.



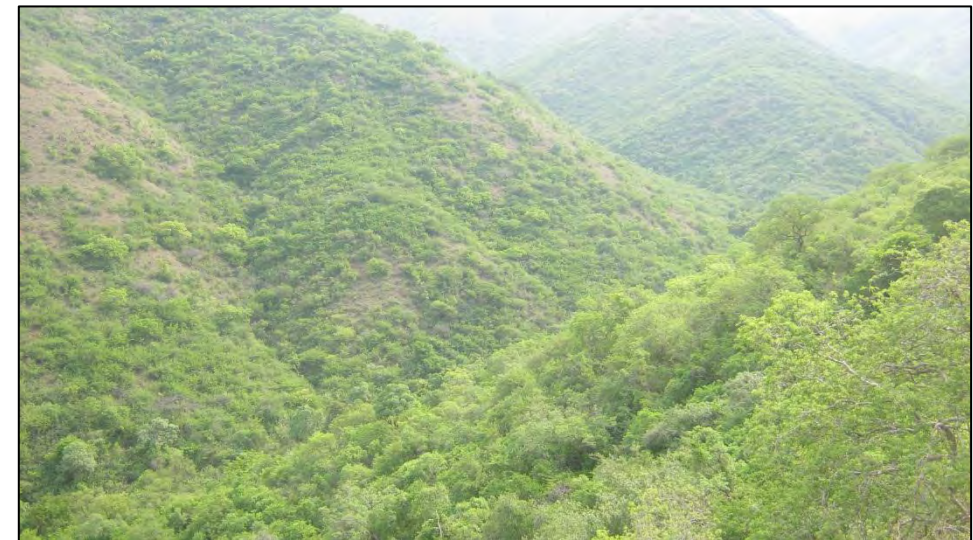
Picture 21: Nsuze River



Picture 22: Northern part of the northern section looking in a southerly direction towards a section of the Nsuze River..



Picture 23: Much of the northern section is undeveloped.



Picture 24: The valleys tend to be densely vegetated, and access to or through them is difficult at best.

3. GEOLOGY AND ENGINEERING GEOLOGY

Geological mapping of the area shows the site to be underlain by rocks of the Natal Structural and Metamorphic Province. The rocks of this province, which is also generally known as the Natal Mobile Belt comprise of metamorphic type rocks. Metamorphic rocks are sedimentary or igneous rocks that have been subjected to heat from molten magma or crushed by enormous pressure, such as from forces involved in the movement of tectonic plates, that they are altered beyond recognition. The crystals they are made from re-form so completely under these immense pressures or temperatures that they become new rock, called metamorphic rock.

The site is underlain namely by metamorphic rocks of the Tugela Group which is the collective name for a group of four sub-horizontal-thrust sheets. These thrust sheets crop out in an ascending structural sequence from east to west and comprise the Nkomo, Madidima, Mandleni and Tugela Nappes. A number of formations have been recognised in each thrust sheet or nappe. The rock formations pertinent to the project area have been listed in **Table T1** over the following page. The formations and the rocks belonging to them have been clustered within their respective nappes.

The more commonly occurring rock types underlying the project area, are as follows:

- Schists – Schist is a resilient metamorphic rock which is a result of extreme regional metamorphism of mudrocks. Schists have distinctive layering or “schistosity” and are usually medium to coarse grained. Schist tends to break along layers of mica within the rock, giving the misleading impression that it is entirely made up of glistening mica. Quartz is also a major constituent but tends to be only identifiable when the rock is cut across the grain. Schists tend to break into sheets like slate.
- Gneiss – Gneiss is an incredibly tough metamorphic rock that can be formed by the metamorphism of both sedimentary and igneous rocks. Unlike Schist, gneiss is not dominated by long, planar crystals; however, it can often be markedly striped due to alternating bands of light and dark minerals. The bands in gneiss are not like the layers in schist, which are made from sheets of mica, and therefore gneiss does not split easily in the same way.

- **Amphibolite** – Amphibolite is a metamorphic rock that is a result of regional metamorphism of mafic igneous rocks. It is a coarse grained rock composed mostly of hornblende and plagioclase. Amphibolite is resistant to shear stress and usually remains unfoliated and survives intact as fragments within other metamorphosed rocks.

Soil profiles noted in the side walls of steep ravines indicate the overlying residual soils to be deep masking the underlying rock at depth. These ravines were commonly characterised by deeply eroded gullies, exposing the dark brown to red residual soils.



Picture 25: Deeply eroded gullies along stream lines show the increased thickness of residual soils in these parts. In some places, the soils appear to have slight dispersive properties.



Picture 26: Deeply eroded gullies along stream lines show the increased thickness of residual soils in these parts.



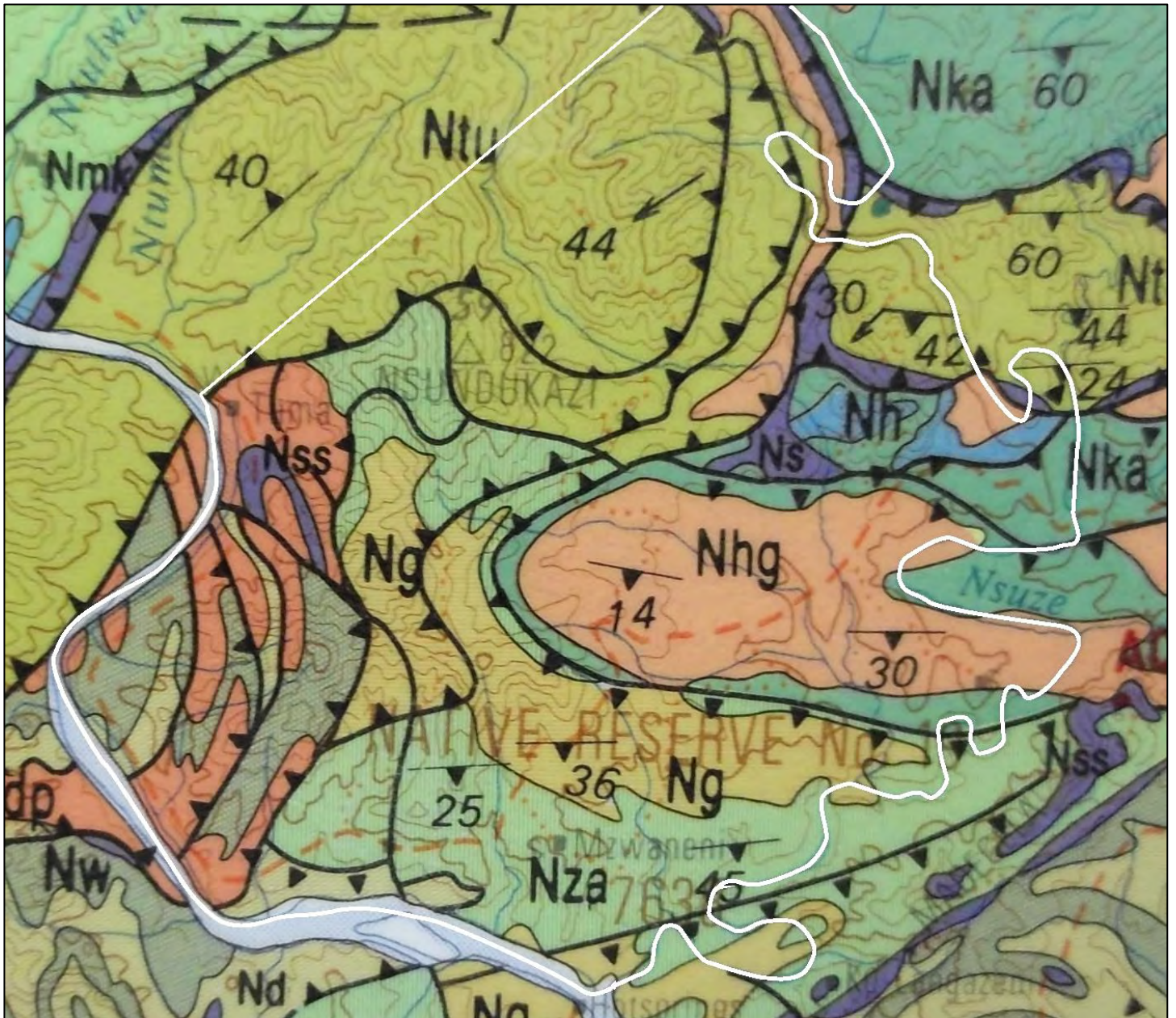
Picture 27: In certain locations, the erosion has become extensive .



Picture 28: The metamorphic rocks underlying the site were found to be steeply dipping and thinly foliated..

Table T1

Group	Nappe	Formation	Intrusive	Lithology
Tugela	Nkomo		Ns	Serpentinite
			Nh	Hornblendite
		Nhg - Halambu Granitoid-Gneiss Formation		Granite gneiss, grandodiorite gneiss
		Nka – Khomo Formation		Amphibolite
	Tugela		Nd - Mkondeni Diorite	Diorite, biotite-hornblende gneiss, migmatite
		Ntu – Tuma Formation		Muscovite and biotite gneiss, graphitic schist, chlorite-actinolite schist, amphibolite
	Madidima	Ng – Gazeni Formation		Micaceous gneiss and schist, garnetiferous in places
		Nza – Zwaneni Formation		Amphibolite
	Mandleni		Nss - Sithilo Complex	Serpentinite-talc Schist
		Nw – Wosi Formation		Amphibolite, Magnetite quartzite, Quartzite
		Ndp – Dulumbe Formation		Quartz-biotite gneiss, quartz-sillimanite-garnet-biotite gneiss



Picture 29: Geological Map of the project area, showing the various outcrops of the Tugela Group formations.

4. FIELD WORK

4.1 Methodology

The geotechnical fieldwork was carried out over a number of weeks between the 25th of September 2012 and the 18th of October 2012. Fieldwork undertaken by representatives of Ground Africa Consulting included the following:

- The excavation of Eighty-Three (83) trial holes to depths of approximately 1.1m – 2.8m;
- Eighty-Two(82) dynamic cone penetrometer light tests (DPL's);
- Retrieval of disturbed samples from excavated material;
- Inspection of existing structures and infrastructure;
- Inspection of existing erosion gullies and rock exposed in steep hill sides.

The locations of the trial holes are shown in **Appendix A**. The depths of the trial holes were determined by tape measurement from natural ground level (NGL). 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 fixed height. The number of blows measured to drive the rod over 300mm increments into the ground is recorded. These values are used to assess the density/consistency of the soils and obtain an indication of likely bearing capacities with the aid of numerical calculation. Locations of DPL tests are presented in **Appendix A** while DPL field results are presented in **Appendix C**.

4.2 Soil Profiles

The 83 trial hole excavations located within the project area, as well as the soil profiles exposed in road cuttings in the vicinity, reveal that the natural ground profile underlying the site comprises of two simplified soil profiles. The first type comprises predominantly deep residual soils, with little or no rock encountered, while the second type comprises relatively thin, unconsolidated colluvial and residual clayey silts and sands overlying steeply dipping, foliated weathered rock of varying hardness. The more common rock types intersected, being Amphibolite, Schist and Gneiss.

The vast majority of the trial hole excavations through the whole project area intersected near surface weathered rock. A large proportion of this rock was found to be steeply dipping and thinly foliated. Associated ground horizons, such as thin pebble marker layers and calcrete horizons were also noted in a few trial holes.

The deep colluvial and residual soil profiles with no rock being intersected, appeared to predominantly occur within riverine depression areas underlain by Halambu Gneiss of the central section of the site. This deep weathered profile was also evident along river courses in other parts of the project area to some extent.



Picture 30 Weathered rock close to surface.



Picture 31: Deep colluvial and residual soils with no rock intersection.

Individual soil profiles have been included in **Appendix B. Table T2** over- page, summarises the various depths to rock intersected in each trial hole and the overall trial hole depth.

Table T2

Trial Hole	Depth to Weathered Rock	Depth to Base of Hole	Trial Hole	Depth to Weathered Rock	Depth to Base of Hole
TH01	0.6	1.6	TH43	0.6	1.6
TH02	0.7	1.5	TH44	2	2.1
TH03	0.7	1.6	TH45	1.5	1.8
TH04	0.5	1.1	TH46	0.6	0.8
TH05	1.3	1.7	TH47	0.4	1.4
TH06	0.6	1.2	TH48	1.1	2.1
TH07	0.6	1.3	TH49	2.2	3.5
TH08	0.4	1.9	TH50	None	2.3
TH09	0.4	1.8	TH51	2	2.2
TH10	0.5	1.9	TH52	1.2	1.25
TH11	0.5	1.6	TH53	1	1.5
TH12	0.4	1.8	TH54	0.8	1.45
TH13	0.5	1.7	TH55	None	2.5
TH14	0.5	1.6	TH56	None	2.7
TH15	0.5	1.4	TH57	0.8	1.2
TH16	0.6	1.7	TH58	1.5	2.5
TH17	0.6	2.2	TH59	2.3	2.4
TH18	None	2.0	TH60	None	2.5
TH19	0.4	0.65	TH61	0.5	1.6
TH20	1.1	2.5	TH62	1.1	2.0
TH21	1.1	2.7	TH63	1.9	2.0
TH22	0.4	1.7	TH64	1.55	1.6
TH23	0.4	1.4	TH65	1	1.5
TH24	0.4	1.5	TH66	None	2.0
TH25	None	2.5	TH67	1.4	1.5
TH26	0.2	1.3	TH68	None	2.6
TH27	0.3	1.5	TH69	0.1	0.9
TH28	0.6	2.5	TH70	0.8	0.9
TH29	None	3.1	TH71	1.1	1.2
TH30	0.4	1.1	TH72	0.5	1.3
TH31	0.8	2.1	TH73	1.7	2.5
TH32	None	2.7	TH74	None	2.2
TH33	None	2.0	TH75	0.9	1.8
TH34	1.3	1.6	TH76	0.3	2.0
TH35	0.5	1.5	TH77	None	1.5
TH36	0.6	1.5	TH78	1.6	1.8
TH37	1.3	2.0	TH79	0.7	1.5
TH38	3.5	4.0	TH80	None	4.0
TH39	None	1.1	TH81	None	1.0
TH40	0.5	1.8	TH82	None	1.6
TH41	None	1.75	TH83	1.1	1.2
TH42	None	1.8			

4.3 DPL Testing

DPL testing was carried out at a number of locations across the project site. The results indicate that the overlying colluvial deposits have moderately high DPL values which range from 50mm/blow at surface to 20mm/blow near the contact with the underlying residual horizon. The moderately high surface DPL values confirm the loose to medium dense consistencies of the overlying colluvial soils as noted in most individual profiles.

DPL results in the residual horizon show improved consistencies with more consistent DPL values of between 10mm/blow and 20mm/blow confirming this horizon to be of a uniformly medium dense consistency.

DPL testing within the completely to highly weathered metamorphic rocks, generally intersected within 1.0m of depth, show values ranging between 10mm/blow in the completely to highly weathered rock horizons to 5mm/blow and refusal in the deeper less weathered rock.

In general, the amount of penetration decreases as depth increases, with no major soft spots noted in the weathered rock horizons.

DPL results must be treated with caution, particularly when comparing results recorded in the colluvial and residual layers, as cone penetration can vary with changes in moisture content. DPL tests should therefore only be used for comparative reasons and not as a finite standard. A wet profile would, for example, provide far greater penetration rates.

4.4 Existing Infrastructure

The project area appears to have benefited from the provision of a number of services over recent time. Electricity appears to be provided to much of the area, along with telephone connections, cell phone connectivity and piped potable water. Manually operated borehole pumps were also noted in certain areas. The gravel roads which provide access to most of the houses also appear to be in good condition and well-maintained. At the time of investigation, graders were re-surfacing some sections of the main gravel road that follows the northern bank of the Tugela River.

An existing network of reservoirs, pipelines and pump stations presently provide water to a large amount of homesteads. The existing reservoirs have been constructed of reinforced concrete and the inter-connecting pipes are both HDPE and PVC. Pipe markers indicate some of the network's alignment.

The existing reservoirs appear to be a number of years old; however, they still appear to be in functioning order. The full geographical extent and the supply capabilities of this existing network are unknown.



Picture 32: Manually operated borehole pump.



Picture 33: Pipe markers noted on site.



Picture 34: Telkom telephone tower.



Picture 35: Steel piping used to bridge some of the erosion gullies. The piping of the existing network appears to have become exposed in a number of locations.



Picture 36: Reservoir and Pump-Room 3-1



Picture 37: Reservoir and Pump-Room 3-2



Picture 38: Reservoir and Pump-Room 3-6



Picture 39: Reservoir and Pump-Room 3-10

5. LABORATORY TESTING

Samples of the natural in-situ soils and rock excavated in the trial holes were collected and sent for laboratory testing. Testing was carried out to ascertain what general quality could be expected of the material and if this material could be re-used for the bedding and backfill requirements for the proposed pipelines. Full material classifications were undertaken, which included a full sieve analysis, California Bearing Ratio and Atterberg Limit determination as well as hydrometer analysis. A summary of the results is included in **Tables T3** and **T4** over-page. Full laboratory report sheets, as received from the laboratory have been included as **Appendix D**.

Table T3

Sample	TH	Depth (m)	Material	LS	PI	% Clay	MDD (OMC)	GM	CBR					TRH 14	Heave Potential/ (% Swell)
									90	93	95	98	100		
MW1	26	0.7	Completely to highly weathered Amphibolite	0.0	NP	-	1828 (6.7)	1.29	4	6	8	13	20	G10	(0.0)
MW2	20	1.6	Completely to highly weathered Amphibolite	0.9	SP	-	2120 (7.4)	1.48	6	13	21	40	59	G8	(0.0)
MW3	17	0.9	Completely to highly weathered Schist	2.1	4	-	2022 (7.7)	0.91	7	11	17	29	43	G8	(0.17)
MW4	29	0.8	Clayey Silt - Colluvium	2.5	5	3	-	1.25	-	-	-	-	-	-	LOW
MW5	08	1.2	Completely to highly weathered Schist	2.2	4	-	1954 (10.5)	1.30	6	15	27	44	56	G7	(0.04)
MW6	-	-	Sample Discarded	-	-	-	-	-	-	-	-	-	-	-	-
MW7	49	2.5	Completely to Highly weathered Gneiss	4.5	9	-	1964 (12.8)	0.64	0.0	0.0	0.2	1.3	4.0	-	(0.81)
MW8	59	1.3	Clay Silt – Residual	6.4	12	-	1799 (15.7)	0.45	0.0	0.0	0.4	3.5	9.0	-	(0.00)
MW9	62	1.2	Completely to highly weathered Amphibolite	0.0	NP	-	1700 (8.2)	0.98	3	3	4	7	11	G10	(0.00)
MW10	25	0.9	Silty Sand – Residual	2.7	5	-	2024 (10.1)	0.73	3	8	17	31	42	G9	(0.14)
MW11	37	0.7-1.5	Mixed Clayey Silt and Gneiss	0.0	NP	-	2050 (9.1)	1.42	4	9	15	26	36	G9	(0.00)
MW12	72	0.9	Completely to highly weathered Amphibolite	4.6	9	-	2151 (10.8)	1.63	15	26	37	57	74	G8	(0.00)
MW13	81	0.4	Gravelly Clayey Silt – Residual	4.8	9	-	2026 (10.9)	1.66	3	10	24	36	48	G8	(0.24)
MW14	73	1.9	Completely to highly weathered Schist	5.6	11	-	1847 (11.8)	1.05	1	3	6	12	16	G10	(0.87)
MW15	68	2.1	Clayey Sand – Residual	5.1	10	-	1751 (16.1)	1.00	3	5	8	11	14	G10	(0.88)
MW16	63	1.0	Clayey Silt - Residual	7.6	14	-	1698 (16.8)	0.52	12	17	22	28	33	G8	(1.16)
MW17	50	1.8	Silty Sand – Residual	0.0	NP	0	-	1.15	-	-	-	-	-	-	LOW
MW18	51	1.5-2.2	Mixed Clayey Silt and Amphibolite	9.3	18	-	1665 (17.9)	0.41	3	4	5	9	15	G10	(0.95)

Where:

TH: Trial hole from which samples were retrieved

LS: Linear Shrinkage

MDD: Maximum Dry Density at Optimum Moisture Content

CBR: California Bearing Ratio

OMC: Optimal Moisture Content (%)

NP: Not Plastic

% Swell: Measured swell of sample during curing

PI: Plasticity Index

GM: Grading Modulus

TRH: Technical Recommendations for Highways

% Clay: Clay content

SP: Slightly Plastic

Weathered Rock	Samples MW 1,2,3,5,7,9,12,14
Soil	Samples MW 4,8,10,13,15,16,17
Mixed Sample	Samples MW 11,18

Table T4

Sample	TH	Depth (m)	Material	GM	Sieve Analysis (% Composition)				
					G	CS	MFS	FS	C & S
MW1	26	0.7	Completely to highly weathered Amphibolite	1.29	21	24	24	18	12
MW2	20	1.6	Completely to highly weathered Amphibolite	1.48	19	20	23	19	18
MW3	17	0.9	Completely to highly weathered Schist	0.91	12	21	10	23	35
MW4	29	0.8	Clayey Silt - Colluvium	1.25	11	15	30	27	17
MW5	08	1.2	Completely to highly weathered Schist	1.30	16	14	17	26	27
MW6	-	-	Sample Discarded	-					
MW7	49	2.5	Completely to Highly weathered Gneiss	0.64	8	15	16	16	45
MW8	59	1.3	Clay Silt – Residual	0.45	4	5	13	17	61
MW9	62	1.2	Completely to highly weathered Amphibolite	0.98	3	12	31	33	21
MW10	25	0.9	Silty Sand – Residual	0.73	10	15	20	17	38
MW11	37	0.7-1.5	Mixed Clayey Silt and Gneiss	1.42	14	22	26	22	17
MW12	72	0.9	Completely to highly weathered Amphibolite	1.63	10	1	4	18	67
MW13	81	0.4	Gravelly Clayey Silt – Residual	1.66	9	10	15	23	42
MW14	73	1.9	Completely to highly weathered Schist	1.05	15	15	12	12	46
MW15	68	2.1	Clayey Sand – Residual	1.00	8	9	12	20	51
MW16	63	1.0	Clayey Silt - Residual	0.52	4	4	7	13	72
MW17	50	1.8	Silty Sand – Residual	1.15	3	15	33	34	10
MW18	51	1.5-2.2	Mixed Clayey Silt and Amphibolite	0.41	8	6	8	11	67

Where:

C&S: Clay and Silt

MS: Medium Grained Sand

MFS: Medium Fine Sand

FS: Fine Sand

CS: Coarse Sand

G: Gravel

	Weathered Rock	Samples MW 1,2,3,5,7,9,12,14
	Soil	Samples MW 4,8,10,13,15,16,17
	Mixed Sample	Samples MW 11,18

6. GEOTECHNICAL ASSESSMENT

6.1 Proposed Development

Based on the clients brief and the preliminary drawings provided, it is understood that the proposed development comprises the laying of a number of new bulkwater pipelines and the construction of new reservoirs to supply potable water to rural households located within the project area.

6.2 Excavatability

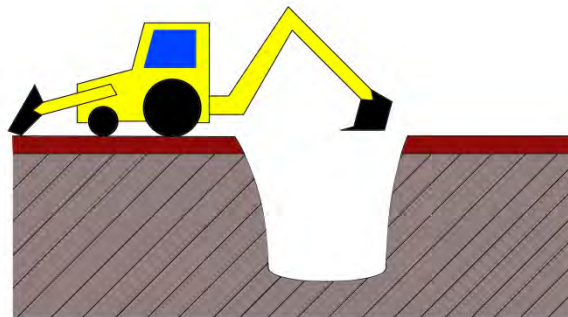
Mechanical and manual excavation methods were used for the excavation of 83 trial holes located within the project area. Mechanical excavation was carried out using a standard sized Tractor-Loader-Backhoe, while manual excavation was carried out using picks and shovels. As summarised in Table T2, the vast majority of trial hole depths were found to be in excess of 1.0m below present ground level.

The degree of excavation effort required, in order to reach target design depths of approximately 1.0m to 1.5m below natural ground level, was largely dependent on:

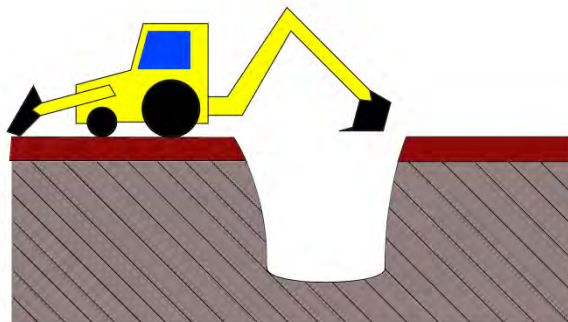
1. the presence or absence of near surface rock. Near surface rock was intersected in the majority of the trial holes. The general natural characteristics of the underlying in-situ rock comprised thinly bedded, steeply dipping, horizons of weathered metamorphic rock. In trial holes where no rock was intersected, such as in the areas underlain by deep residual soils, both manual and mechanical excavation methods were sufficient to easily and quickly obtain the target depths while excavation refusal was more often than not, reached in trial holes where rock was intersected.
2. the orientation of the joint planes of the underlying in-situ rock mass. The relative orientation of the TLB's excavation bucket to the orientation of these joint planes has a considerable effect on the excavation effort required. The scenarios depicted in the sketches overpage refer. If the excavator bucket scraps down in the same orientation of the rock layers, as shown in Scenario 1, refusal was reached far quicker, even in soft, highly to moderately, medium hard rock. If the excavator bucket scrapped across the

rock layers, as shown in Scenario 2, excavation was found to be relatively easier as the excavation teeth were able to grip the lip of an individual plane and break it along the weaker joint surfaces of the rock mass.

For the vast majority of the project area, a standard sized TLB fitted with a rock bucket should be adequate to reach the required trench depths. A considerable degree of large boulder extraction is not anticipated; however, some occasional larger hard rock fragments were intersected in some trial holes and can be expected from time to time. These did not pose a challenge with regard to excavation. The overall amount of difficult excavation is anticipated to be small; however, it will be required in some localised areas of particularly shallow rock. Here boom mounted pneumatic rock hammers, connected to a TLB or 20ton excavator should be adequate to reach the required pipe laying depths of 1.0m to 1.5m.



Scenario 1



Scenario 2

6.3 Material Quality and Re-use

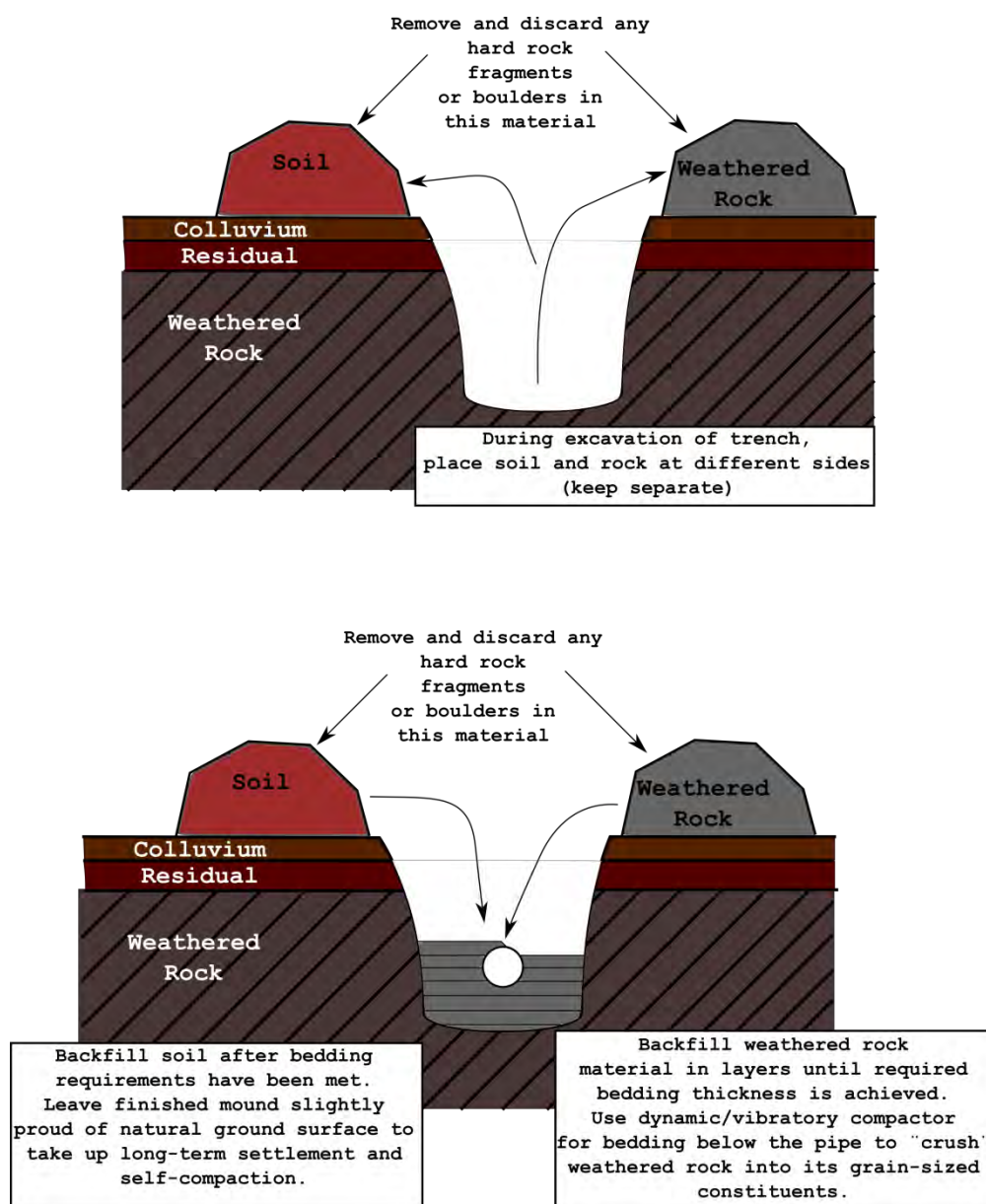
Laboratory results show the quality designation of the in-situ weathered metamorphic rocks underlying the site to generally range from moderately high quality to low quality. Quality classifications, according to TRH 14 of these weathered rock materials, have been recorded as having a G7 to G10 quality. Sample MW7 of weathered Gneiss, however, did not classify with the minimum of G10 quality. All weathered rock samples show low linear shrinkage ranging values of 0% to 5.6% with corresponding plasticity indices ranging from Non-Plastic to 11%. Mechanical sieve analysis show that when crushed and broken down to smaller grain sized constituents, these weathered rocks mostly comprise of coarse to medium grained sized particles with some silt and clay sized particles. In this crushed state, these weathered rocks appear to form medium grained, slightly clayey sands. This is further confirmed with all Grading Moduli obtained for this material having been calculated as being less than 2.

The colluvial and residual soils show low quality classifications of G8 to G10 with some samples not obtaining the minimum strength requirements for the minimum G10 classification. Plasticity values pertaining to these materials, which comprise mostly of clayey silts and sands, show low linear shrinkage values of between 0% and 7.6% and corresponding plasticity indices ranging from Non-Plastic to 14%. These colluvial and residual soils are deemed to generally have low heave potentials with negligible volumetric movement anticipated with corresponding changes in moisture content.

When the colluvial and residual soils are mixed with the weathered rock material, as represented by samples MW11 and MW18, material quality appears to drop slightly with increases in linear shrinkage and plasticity index values. Sample MW18 shows an increased plasticity index value of some 18%. This is deemed to be on the higher side, however, it is deemed to be an exception. It is felt that this value does not reflect a required change to the above mentioned material quality trend.

During trial hole excavations and the retrieval of representative material samples, the completely to highly weathered rock fabric was found to break down very easily with normal handling. The normal process of excavation, removal, stockpiling and bagging caused most of the weathered rock structure to break down into its small grain sized constituents. Considering this, along with the generally low plasticity properties of this material, it suggested that

excavated rock can be used as a source of bedding material. It is known that importing suitable river sand, with the usual G7 quality, to this area is a costly and difficult undertaking. The alternative of using reintroduced “crushed” in-situ weathered rock could provide an alternative source for this material and a substantial saving. Further to this, some of the more sandy residual soils, with TRH 14 classification of G8 to G10 could also be used for this purpose. A general methodology which could be adopted, to create the required “crushed” weathered rock, during trench excavations and pipe laying is depicted in the sketches below.



6.4 Slope Stability

The steep, hilly, and in places mountainous, terrain which characterises the Tugela River Valley coupled with the geology of steeply dipping and closely jointed metamorphic rocks makes the project area potentially a high risk site with respect to slope stability. Existing excavations for road cuttings, pipelines, borrow pits, quarries and bridges show signs of previous slope failure in places. This area is also deemed a high rainfall area and the contributing water ingress from high levels of precipitation only exacerbate slope stability concerns. An image depicting the relative steeper areas from the flatter parts of the site has been included in **Section 2. Site Description and Location**. This image has merely been provided to give the designers a graphic indication on where potential slope stability concerns may be the greatest.

To mitigate the effects of localised slope failures in the steep areas where the proposed pipelines are to pass through, it is recommended that cognisance be taken to ensure:

1. that the final pipeline alignment skirts areas which are very steep and, even though it may require lengthened sections of the network, that pipe alignments do not cross contours at right angles but be deflected to assist in lessening mobilising slope failure forces where possible.
2. Install localised slope stability measures in areas that are deemed to be particularly at risk. Measures such as small rock gabions or stockpiles of rock boulders positioned against exposed cut faces will help to greatly enhance the overall longevity of the reticulation networks integrity.
3. Minimise vegetation removal as much as possible. Vegetation provides a natural stabilising force in many instances and will assist in maintaining long term stability.



Picture 40: Slope failure in road cutting close to the project site. Upon closer inspection, the failure appears to have occurred as a result of a large wedge failure along mica covered rock joint surfaces.

6.5 Access

The general area is serviced by fairly well-maintained gravel roads which provide vehicle access to the majority of the site. Vehicle access is achievable to most rural homesteads, however, the more remote houses require a 4x4 type utility vehicle particularly in the higher, steeper ridge which dominates the northern and north western part of the site. The northern extremity of the site is the least populated section of the site and has no roads. This area is dominated by steep mountainous slopes, dense bush and steep ravines. Access to trial hole positions in this area had to be undertaken on foot.

Excavation plant will require movement in areas that are heavily vegetated. Some vegetation removal will be required to create access for excavation plant and the digging of trenches. It is, however, important that vegetation removal be kept to a minimum and that prior cognisance of all possible access routes to isolated areas be undertaken to ensure the best route is chosen which has the least impact.

6.6 Reservoir Foundations

For the construction of reservoirs the site preparation must be undertaken as follows:

- Strip and remove all surface vegetation, including the near surface colluvial horizons.
- Completely remove tree stumps and any remaining roots and organic matter.
- Scarify exposed in-situ ground horizon to 0.3m and wet to 2% of optimum moisture content (OMC). Compact to 98% MOD ASSHTO using a suitably sized mechanical soil compactor to assist in creating a uniform founding regime and compress any localised voids and softer zones.
- Cast reinforced concrete footings within 24 hours after final ground preparation has been undertaken.

It is of utmost importance that the reservoir's foundation footprint be placed wholly on natural exposed ground horizons and that it does not straddle areas of fill such as could be the case if a cut and fill platform is required. It is further suggested that reservoir sites be adequately landscaped and shaped so as to mitigate the erosive effects of stormwater run-off.

Descriptions of probable founding material and depths, as tabulated in **Table T5** below, are based on the closest trial holes to the reservoir site. It is imperative that individual sites be further investigated to obtain accurate geotechnical data pertaining to each site.

Table T5

Existing Reservoir	Trial Hole	Probable Founding Material and Depth	Foundation Recommendations
3-1	TH39	Weathered rock occurring at >1.0m depth. Caution to be taken with likely boulder horizon.	Reinforced concrete ring beam with tied – in, nominally reinforced concrete surface bed. Base of foundation trenches to be compacted throughout to 98% Mod ASSHTO density. Foundation excavations to be inspected by geotechnical engineer prior to casting of foundations.
3-2	TH60	On residual deep clay silts. No rock intersected.	
3-3	TH81	On residual deep clay silts. No rock intersected.	
3-4	TH36	At approximately 0.6m on weathered gneiss.	
3-5	TH61	At approximately 0.5m on weathered schist.	
3-6	TH65	At approximately 1.0m on weathered schist.	
3-8	Nearest is TH14 (across road, +-90m away)	At approximately 0.5m on weathered schist.	
3-9	TH19	At approximately 0.4m on weathered schist.	
3-10	Nearest is TH68 (base of steep hill, 155m away)	On residual deep clayey sands. No rock intersected.	
Un-referenced, small, existing reservoir	±28°47'25.68"S; ±31°3'2.37"E	-	
Un-referenced, small, existing reservoir)	TH57	At approximately 0.8m on weathered schist.	

(a) Differential Settlement

Major differential settlement of the residual soils and weathered rock horizons beneath reservoir structures is not envisaged, albeit, some slight elastic settlement is likely to occur. It is therefore imperative that steel reinforcing be allowed for in the design of any new reservoir structures to ensure that any localised softer zones, and localised areas of settlement, are bridged.

(b) Bearing Capacity

Allowable Bearing capacities of the underlying residual soils and weathered rocks, loaded with similarly sized reservoirs as the ones which presently exist, are anticipated to range between 100kPa to 300kPa. The actual allowable bearing capacity for a particular site will be largely dependent on the rock joint orientations or type and depth of residual soils. As mentioned previously, a site specific geotechnical investigation must be undertaken at a particular site should a new reservoir be constructed.

6.7 Problem Soils

(a) Erosive and Dispersive Soils

Large, deeply incised, erosion gullies were found to be prevalent along most streamlines within the site's boundaries. The deep residual soils that occur along the various streamline depressions seem to be highly erosive and in some places slightly dispersive. Though over-grazing by domestic cattle seems to have exacerbated the problem, the erosion is a natural and common occurrence in the metamorphic geology and steep topography of this area. Care will need to be undertaken to ensure that where a pipeline crosses these existing gullies as well as areas where future erosion can occur, that the pipes are reinforced or sleeved and adequately anchored by gabions or supports resting on underlying rock. Where the pipeline traverses directly up and down steep ground, it is imperative that baffle structures be placed along the steep sections. These baffle structures could comprise of simplistic measures such as placing piles of cobbles and boulders at regular intervals along the alignment. These structures will assist in hindering the speed and erosive power of rainwater runoff along these steeper parts.

(b) Expansive Soils

Laboratory results indicate the residual soils and weathered rock deposits have low to, at most, moderate heave potentials. Problematic expansion of the soil mass due to changes in in-situ moisture contents is not anticipated.

7. CONCLUSION

The Middledrift Bulkwater Supply SSA3 site was investigated by way of a number of site inspections, the excavation of 83 trial holes, Dynamic Cone Penetrometer Light tests, laboratory testing and inspection of existing infrastructure by geotechnical engineers of Ground Africa Consulting Geotechnical Engineers. The approximately sized 80km² site comprises hilly and mountainous terrain and is bordered by the Tugela and Nsuze rivers. The site falls within an area which is classified as a rural area.

The site was found to be underlain by near surface, highly weathered and steeply dipping metamorphic rocks. The lower riverine areas, however differ, in that they were found to be underlain by thick horizons of residual soils with underlying rock been intersected at depth. This ravine areas are presently marked by deeply incised erosion gulleys, indicating that the surface soils found within the project area are highly susceptible to erosion. Close inspection of the exposed gully faces reveal that these materials may be slightly dispersive.

It is anticipated that excavation efforts required to achieve the 1.0m to 1.5m target depths will be easily achievable with the use of standard sized Tractor-Loader Backhoes. The amount of difficult excavation is anticipated to be small, however, it will be required in localised areas of particularly shallow rock. Here boom mounted pneumatic rock hammers, connected to a TLB or 20ton excavator will be adequate.

The natural in-situ weathered rocks, owing to their general advanced degrees of weathering and thinly jointed structures, were found to be easily crushed into their respective soil sized particle constituents. It is suggested that this material could be reintroduced into at the base of excavated trenches and with sufficient scarification, compaction and quality control will suitably serve as bedding material. Available quantities may fall short of the requirements of the whole pipeline network and some sand may need to be imported to augment this in-situ source.

Some mitigation measures will need to be implemented to ensure long term slope stability in the steeper areas of the site. These areas are expected to be localised and will be best identified during construction. Allowance to undertake this work must, however, be made for during the tender stages of the project.

Where pipe alignments pass through the lower lying ravine areas, which are underlain by deep residual soils and where deeply incised erosion gullies exist, stabilization measures such as gabion construction, pipe-line reinforcement or sleeving will need to be undertaken. Evidence of damage and distress to existing pipelines in these places was evident during the site inspections.

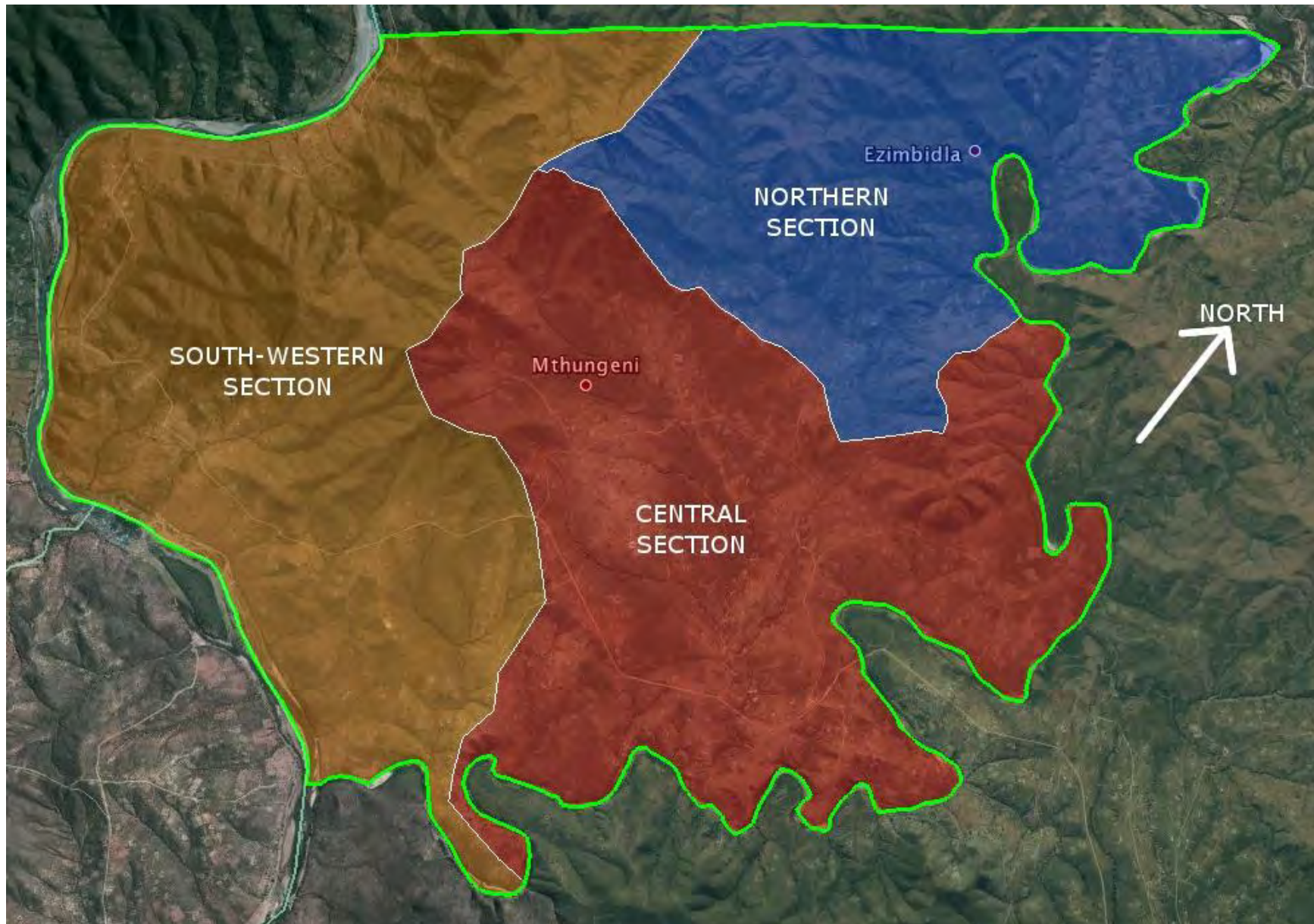
The site is deemed to be a challenging site from a geotechnical perspective. It is imperative that the concerns listed in this report are adhered to and due consideration is given to the steep topography of the area and the steeply dipping metamorphic rocks underlying the project site. It is strongly suggested that a geotechnical engineer be involved in the construction process and from time to time be asked to inspect construction in problematic steep areas, reservoir foundation trenches and the quality of the in-situ material being re-used. It is felt that this heightened control will be a considerable help to successfully ensure a quality and long lasting water supply network.

GROUND AFRICA CONSULTING ENGINEERS



Frederick Volbrecht MIEAust CPEng
Geotechnical Engineer

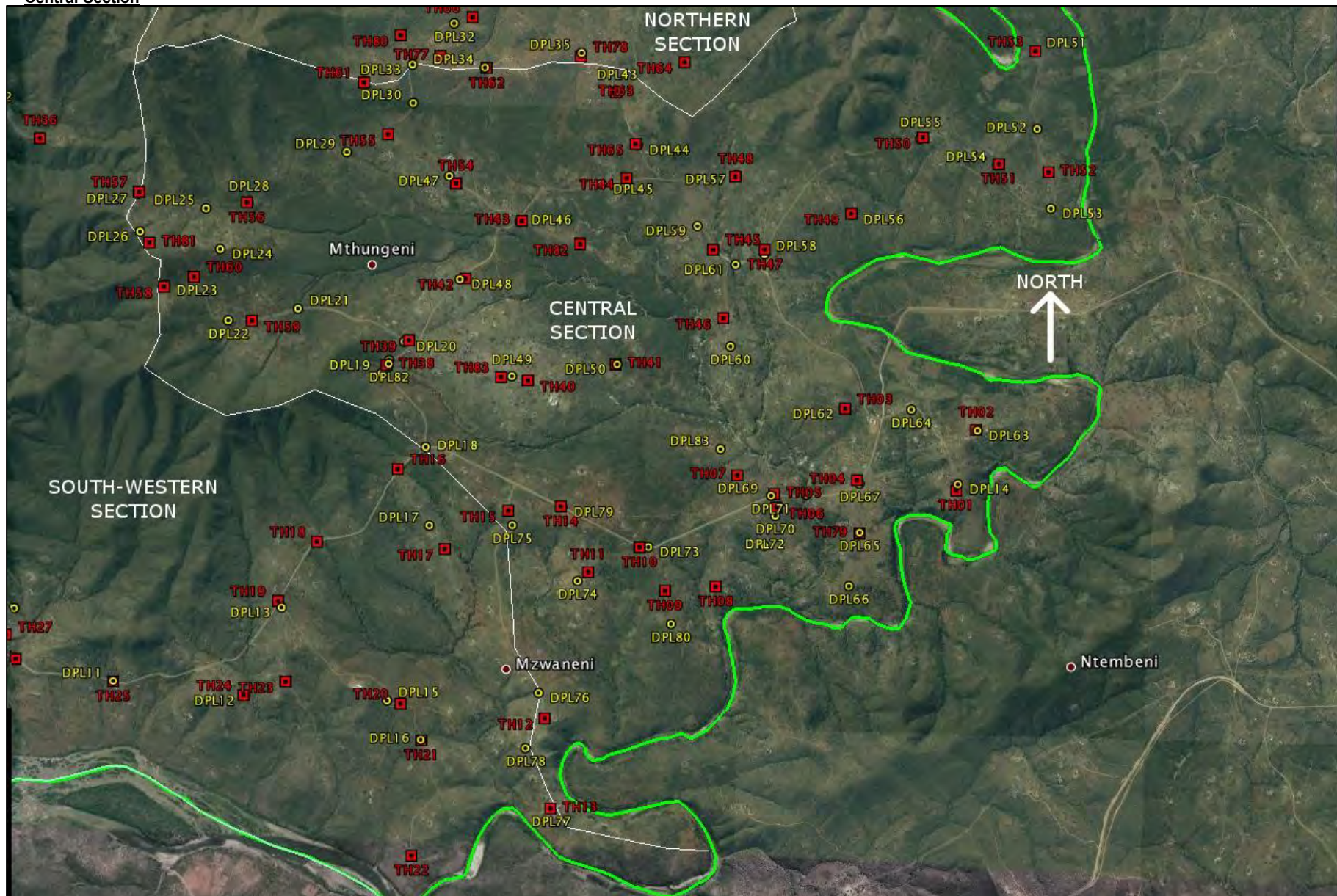
APPENDIX A
Site Section Plan and Trial Hole Positions



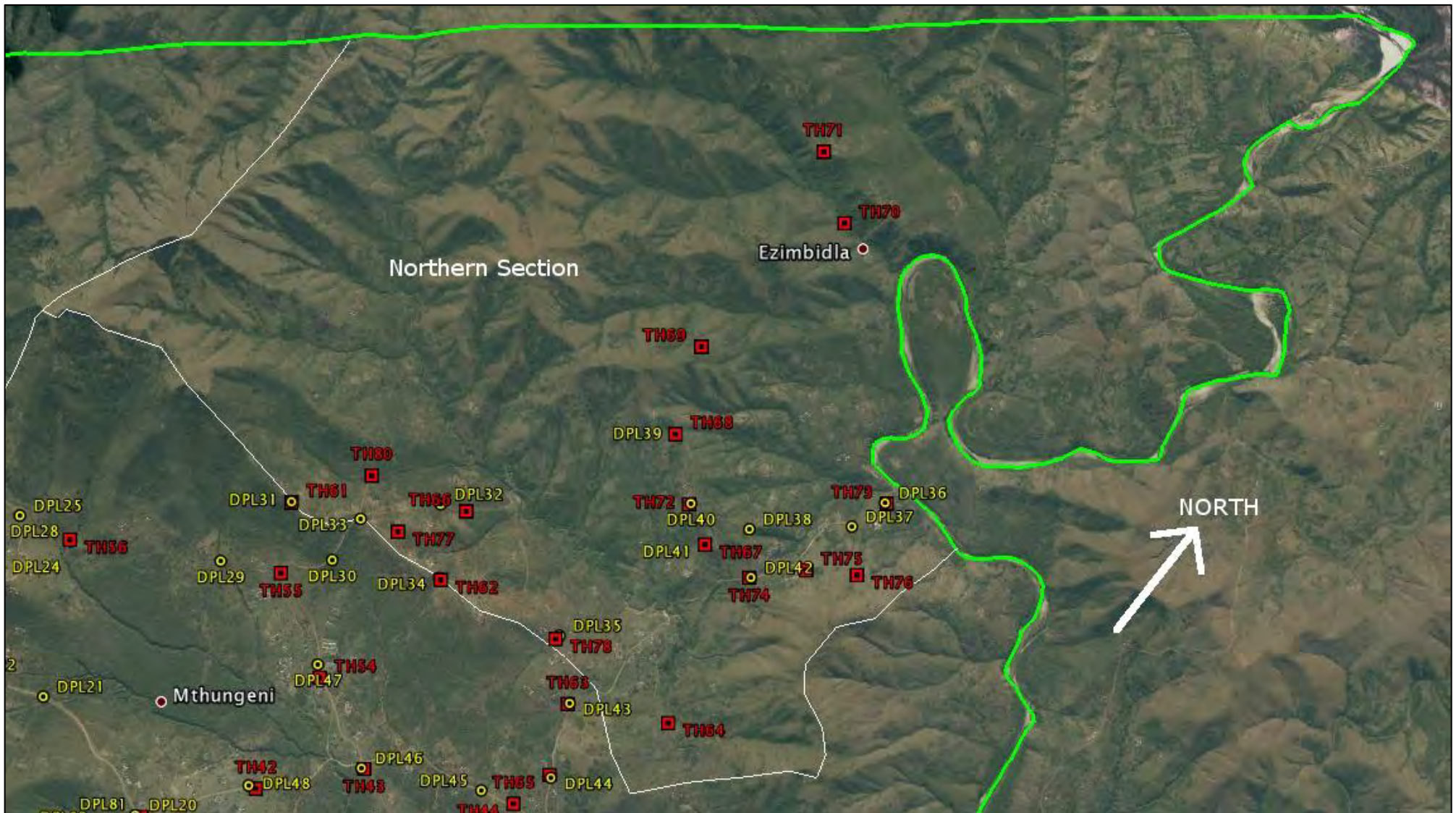
South-Western Section



Central Section



Northern Section



APPENDIX B
Individual Soil Profiles



TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH01
LATITUDE: 28°49'57.2"S
LONGITUDE: 31°04'32.9"E

Sheet 1 of 1

Depth	Description	
	<i>Present Ground Surface</i>	
0,00	CLAYEY SILT Slightly moist, reddish brown, medium dense, intact; CLAYEY SILT - Colluvium.	
0,5		
0,60	Soft rock: AMPHIBOLITE Olive beige, completely weathered, closely jointed, soft rock; AMPHIBOLITE.	
1,0		
1,20	Soft rock: AMPHIBOLITE Grey, moderately weathered, thinly laminated, closely jointed, soft rock; AMPHIBOLITE with localised harder lenses.	
1,5		
1,50	Medium hard rock: AMPHIBOLITE Olive beige, moderately weathered, closely jointed, medium hard rock; AMPHIBOLITE.	
1,60		
	End of log	

NOTES: 1: End of hole at 1.6m
2: Refusal at 1.6m
3: No groundwater encountered
4: No sample retrieved
5: Nka - Khomo Formation

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EXCAVATION METHOD: Mechanical and Manual Excavation

DATE PROFILED: 2012/09/27

PROFILED BY: MTB



TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH02
LATITUDE: 28°49'41.4"S
LONGITUDE: 31°04'38.3"E

Sheet 1 of 1

Depth	Description	
	<i>Present Ground Surface</i>	
0,00	Slightly CLAYEY SILT Slightly moist, dark brown, medium dense, intact; Slightly CLAYEY SILT - Colluvium with some large cobbles.	
0,40		
0,5	Slightly CLAYEY SANDY SILT Slightly moist, orange brown, medium dense, intact; Slightly CLAYEY SANDY SILT - Residual.	
0,70		
0,70	Soft to medium hard rock: GNEISS Grey, moderately weathered, closely jointed, soft to medium hard rock; GNEISS.	
1,0		
1,40	Medium hard rock: GNEISS Grey, moderately weathered, closely jointed, medium hard rock; GNEISS.	
1,50		
1,5	End of log	

NOTES: 1: End of hole at 1.5m
2: Refusal at 1.5m
3: No groundwater encountered
4: No sample retrieved
5: Nhg - Halambu Gneiss

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Tel: +27 35 474 7949

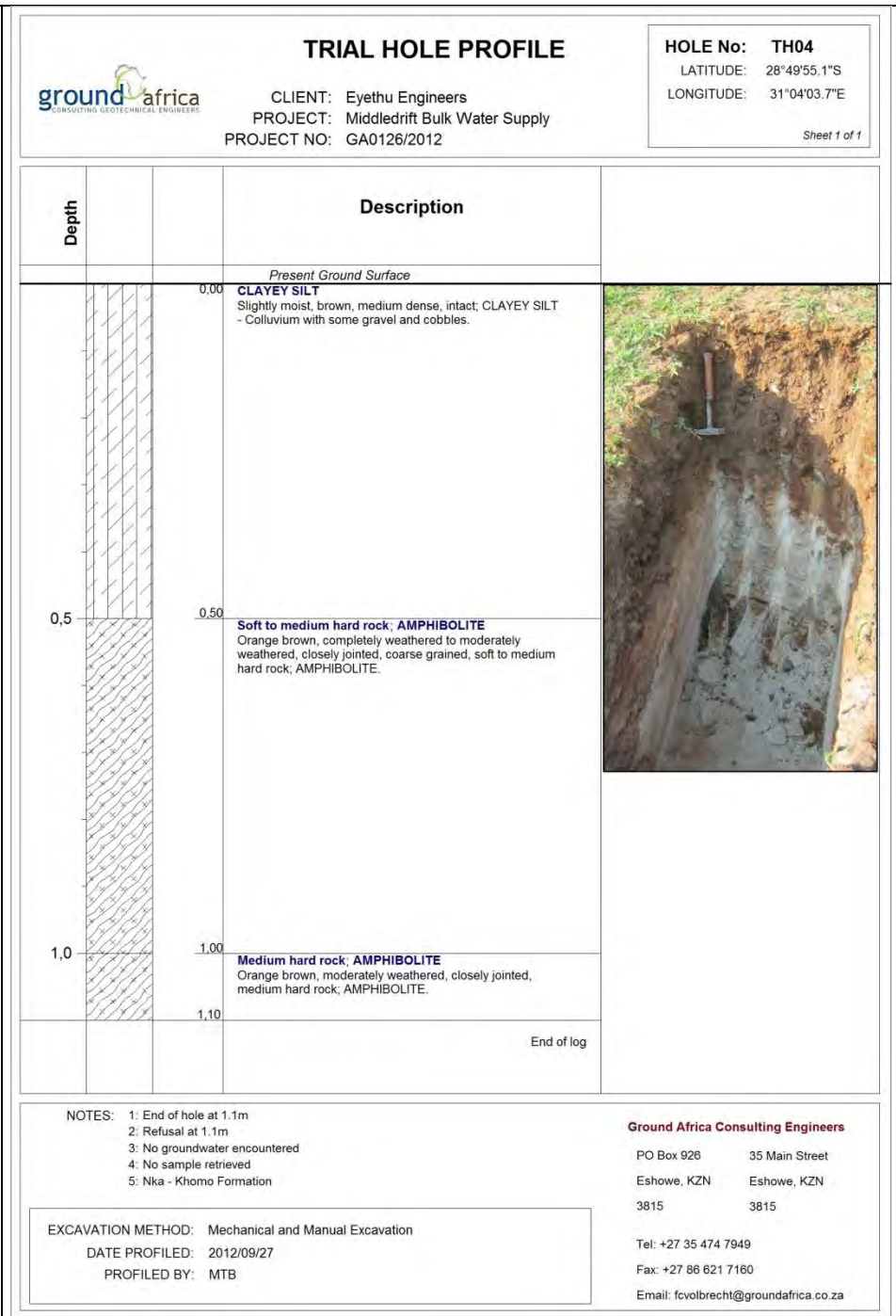
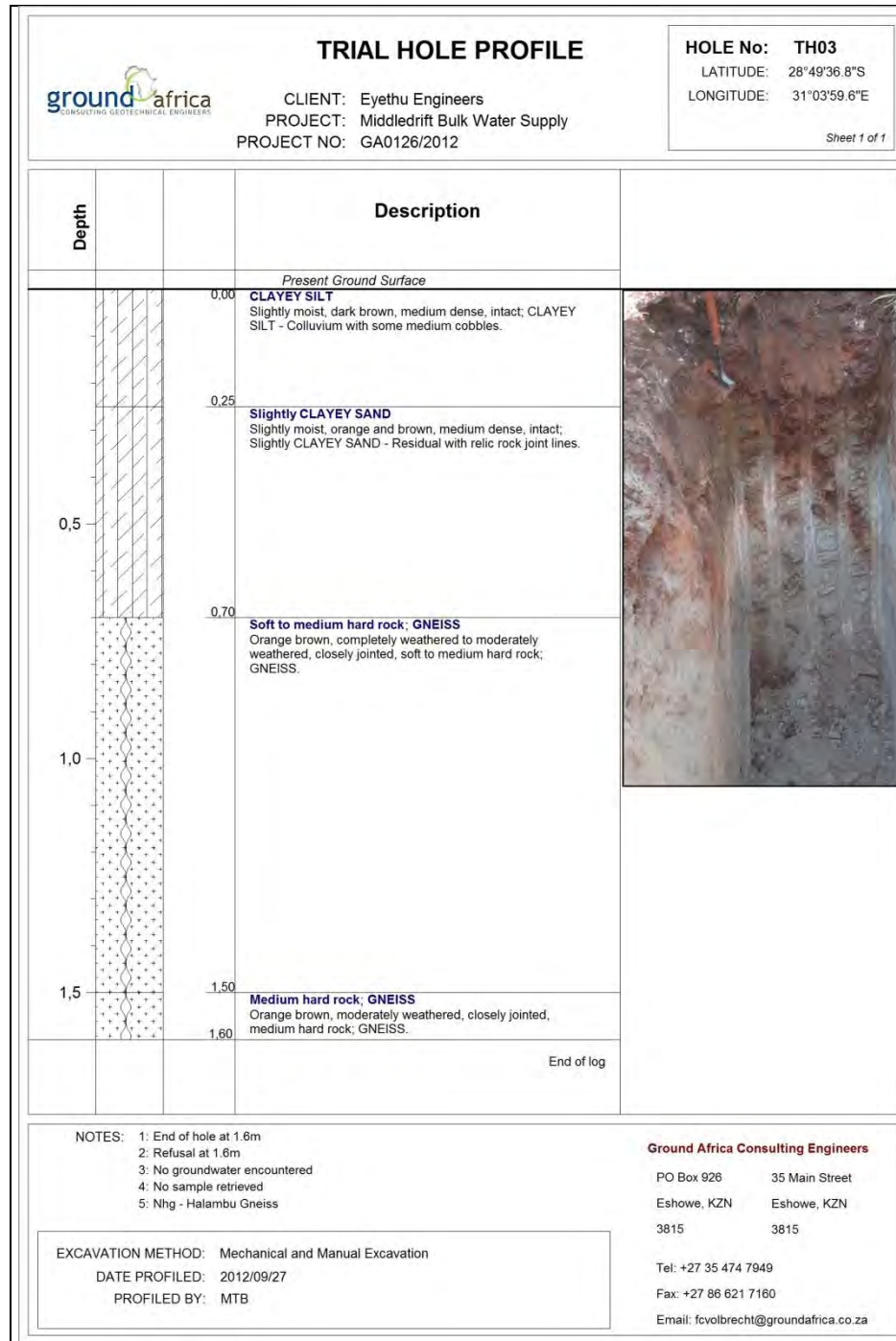
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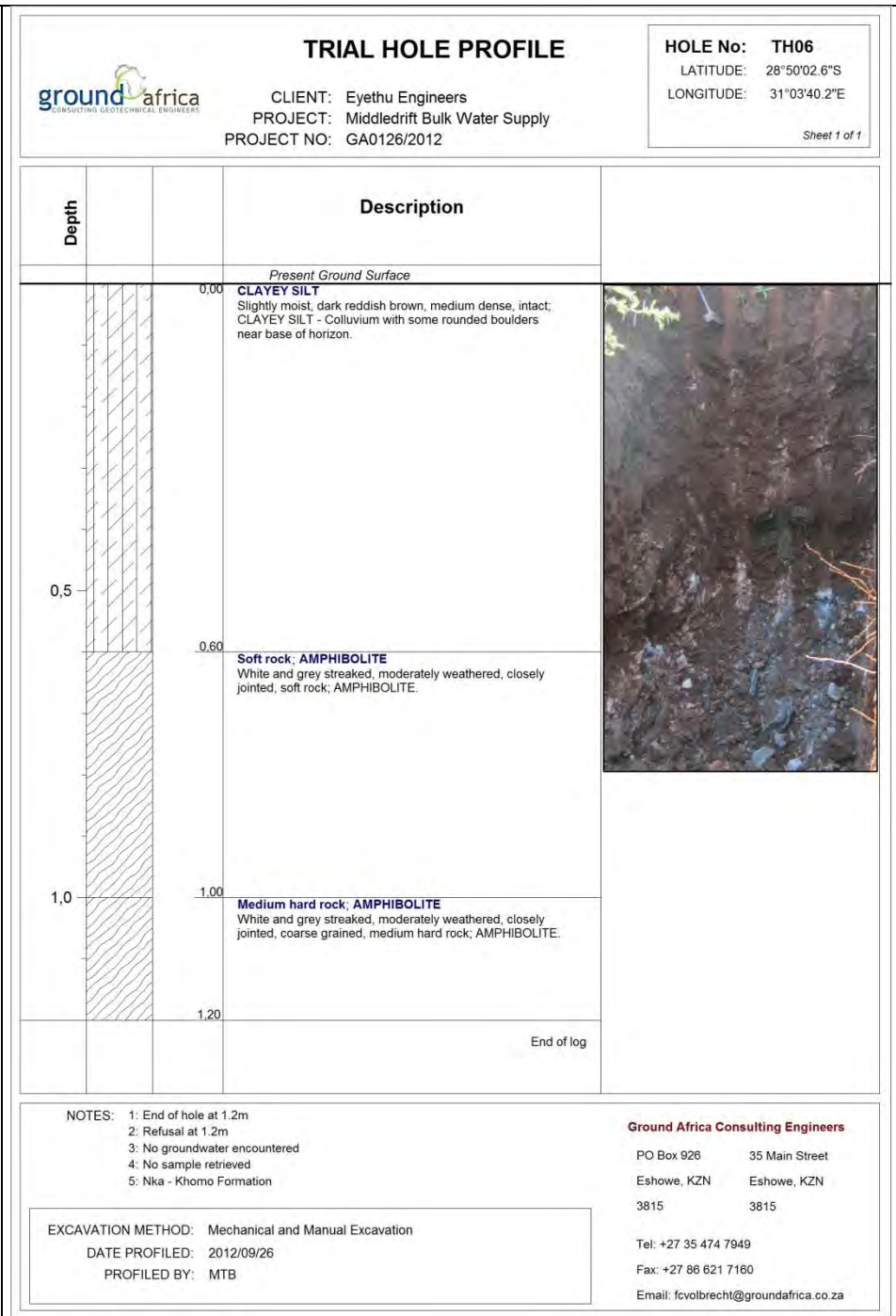
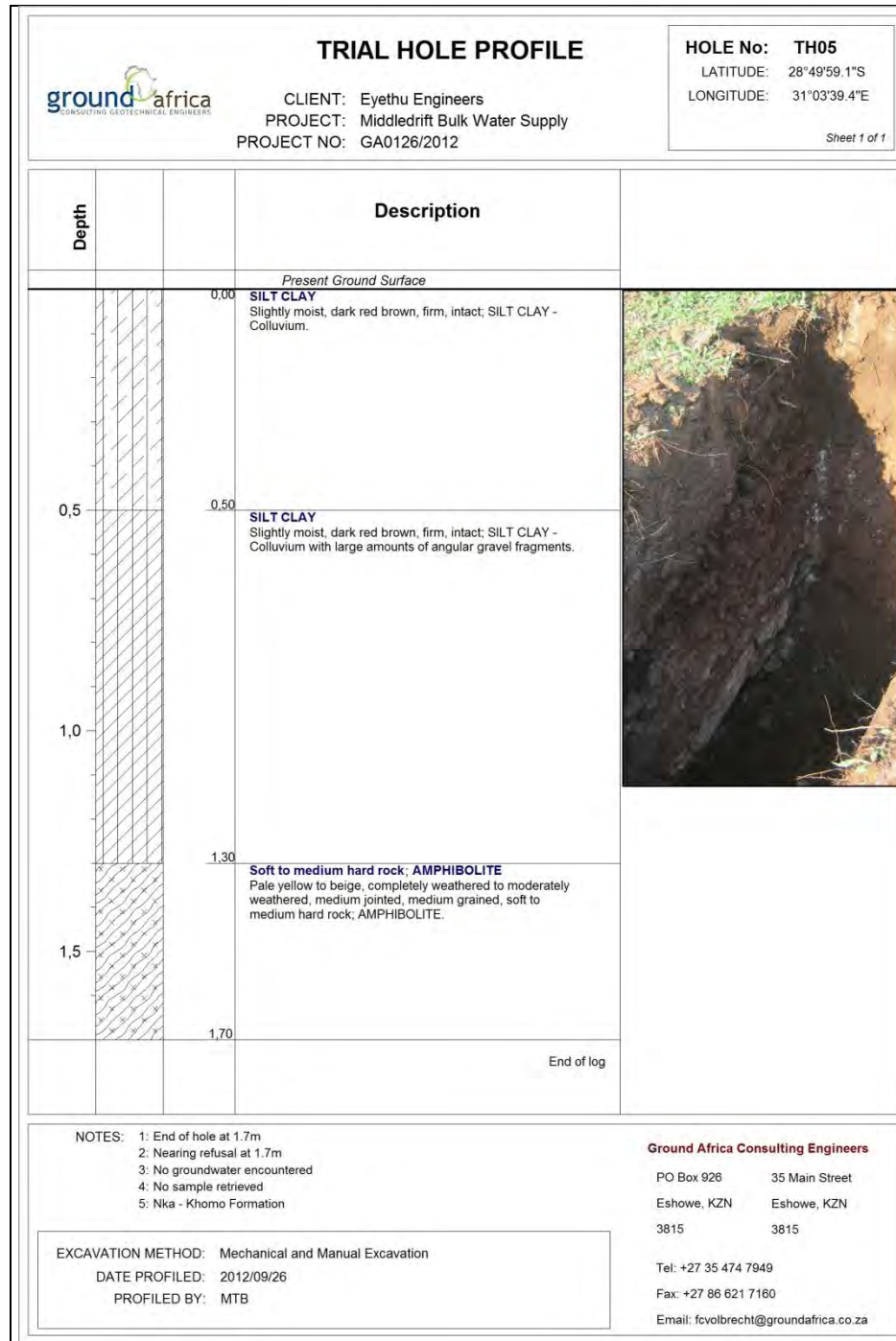
Email: fcvolbrecht@groundafrica.co.za

EXCAVATION METHOD: Mechanical and Manual Excavation

DATE PROFILED: 2012/09/27

PROFILED BY: MTB





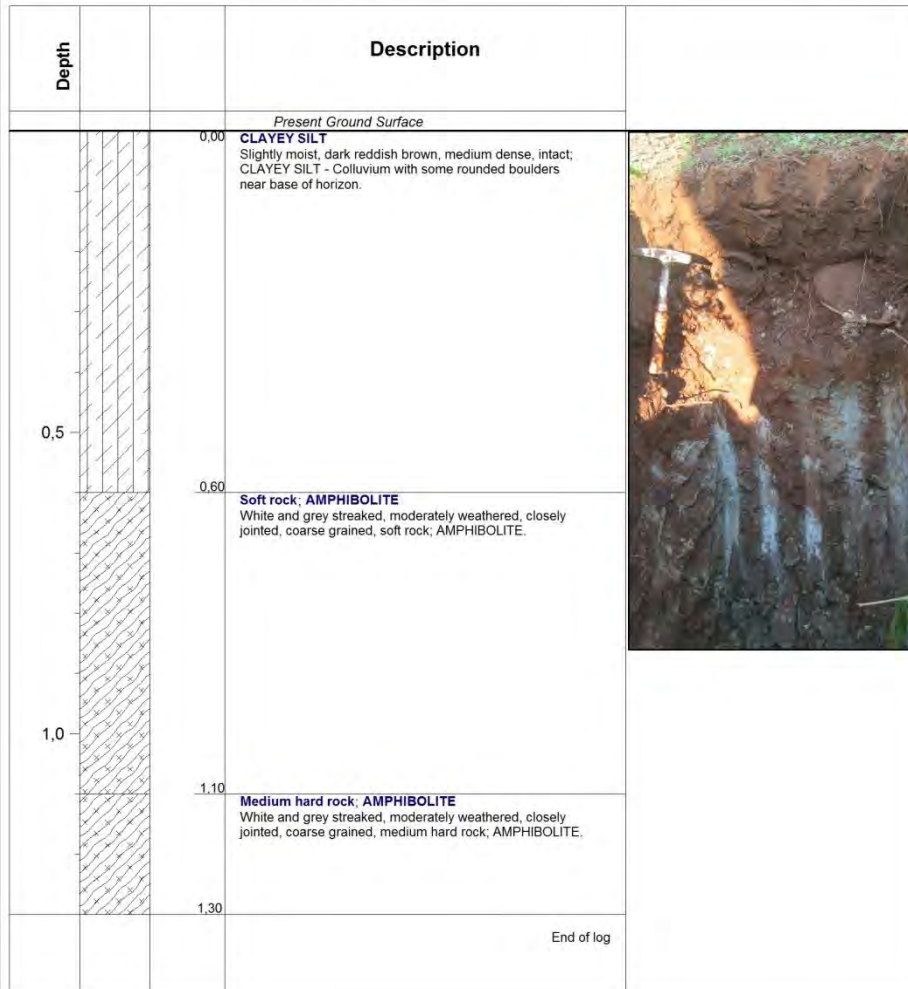


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH07
LATITUDE: 28°49'54.5"S
LONGITUDE: 31°03'28.4"E

Sheet 1 of 1



- NOTES:
- 1: End of hole at 1.3m
 - 2: Refusal at 1.3m
 - 3: No groundwater encountered
 - 4: No sample retrieved
 - 5: Nka - Khomo Formation

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EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/26
PROFILED BY: MTB

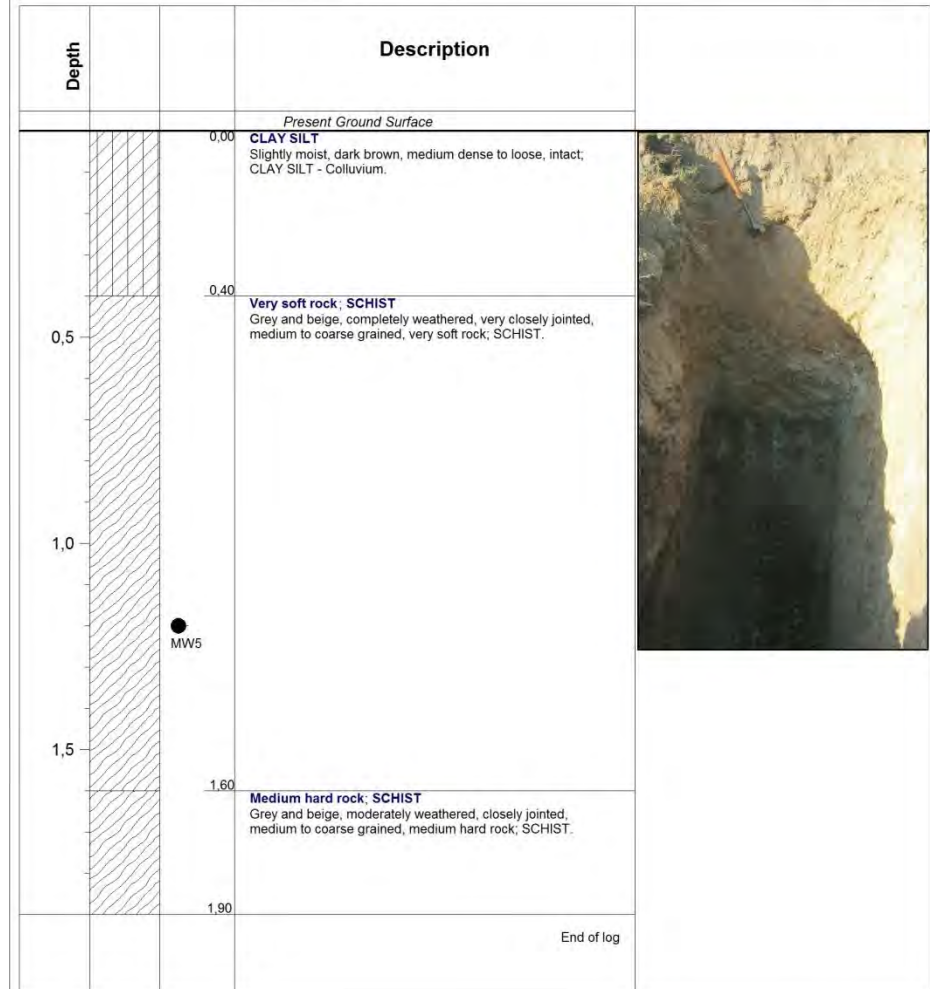


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH08
LATITUDE: 28°50'23.5"S
LONGITUDE: 31°03'22.8"E

Sheet 1 of 1



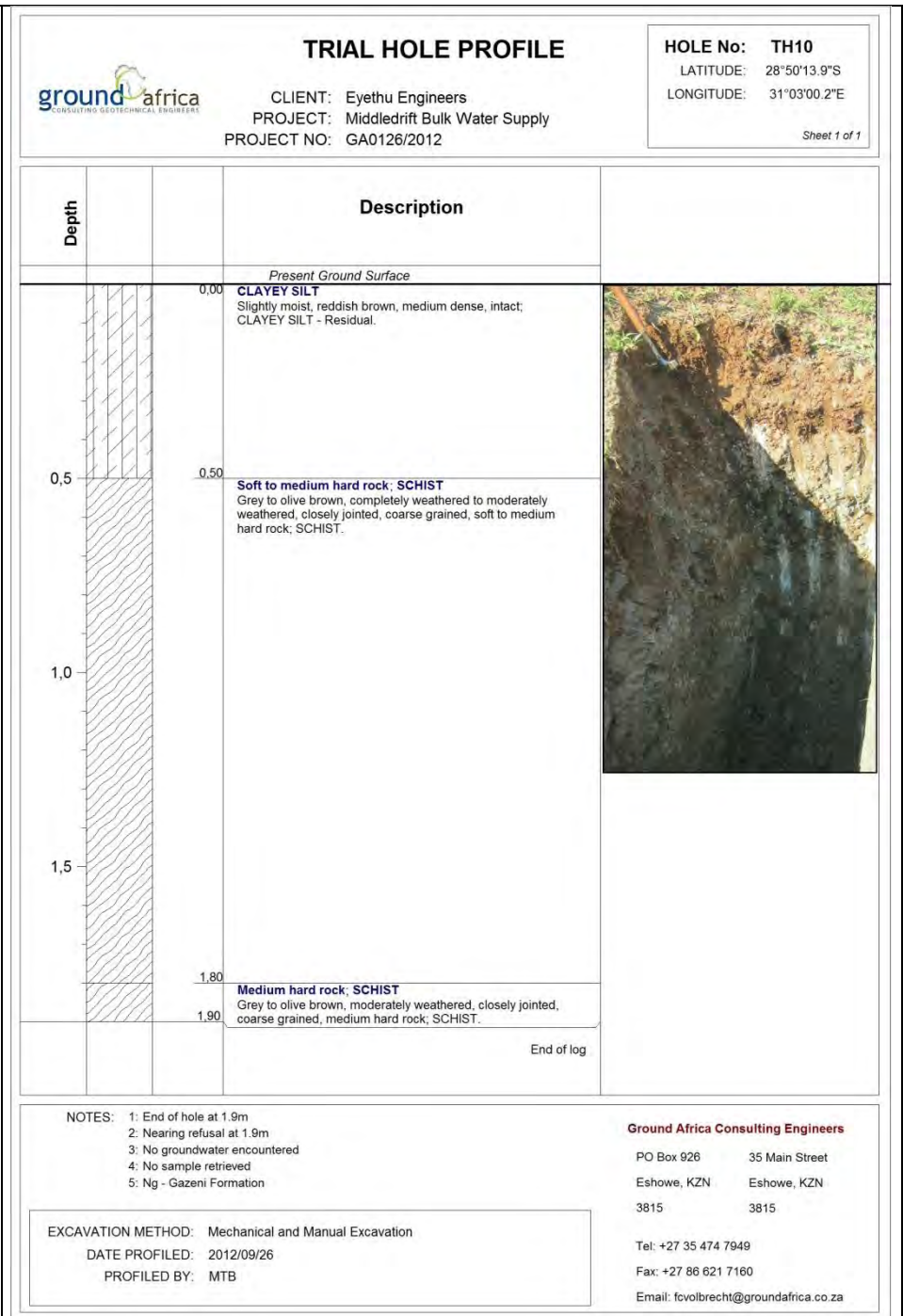
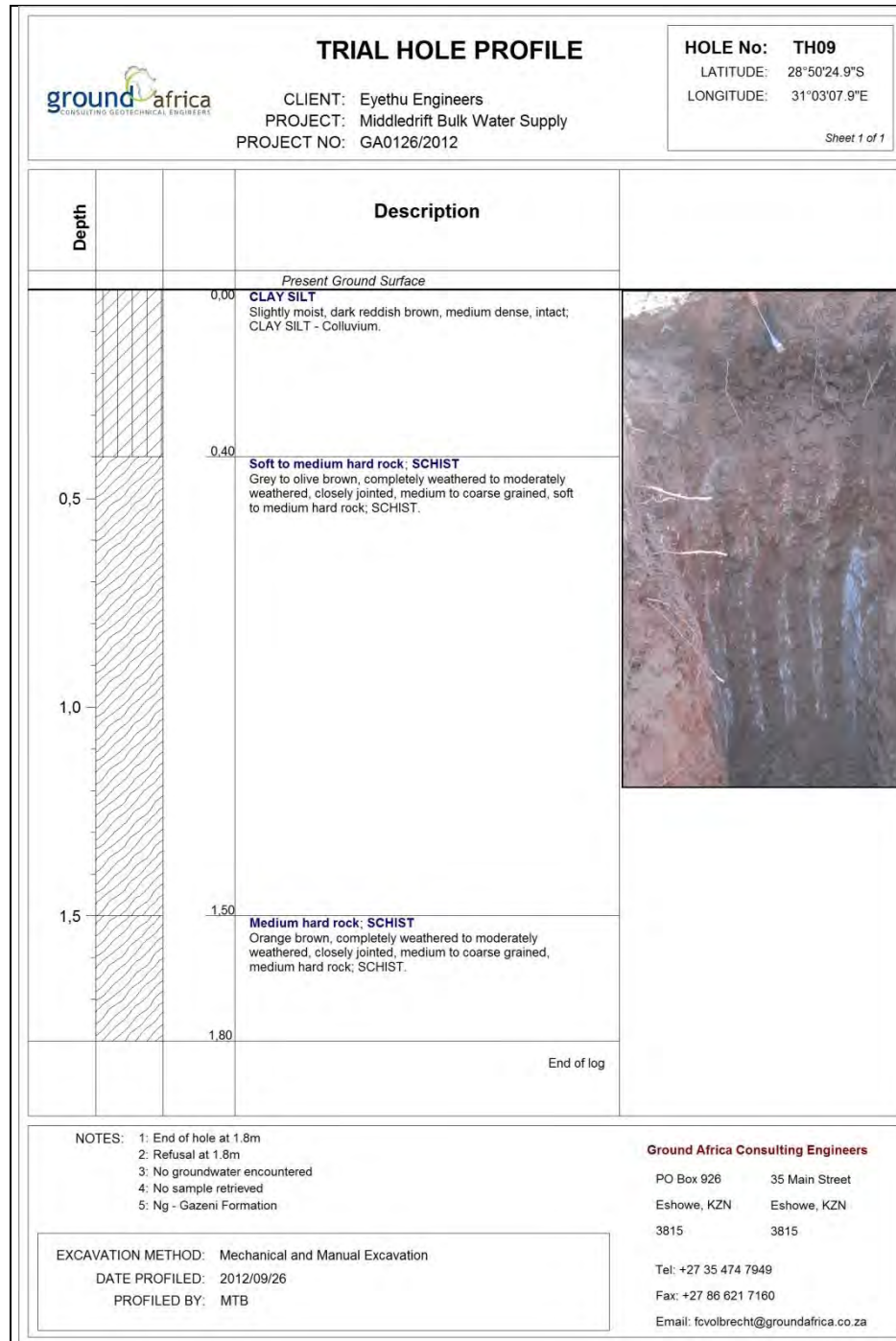
- NOTES:
- 1: End of hole at 1.9m
 - 2: Nearing refusal at 1.9m
 - 3: No groundwater encountered
 - 4: Sample MW5 retrieved from 1.2m
 - 5: Ng - Gazeni Formation

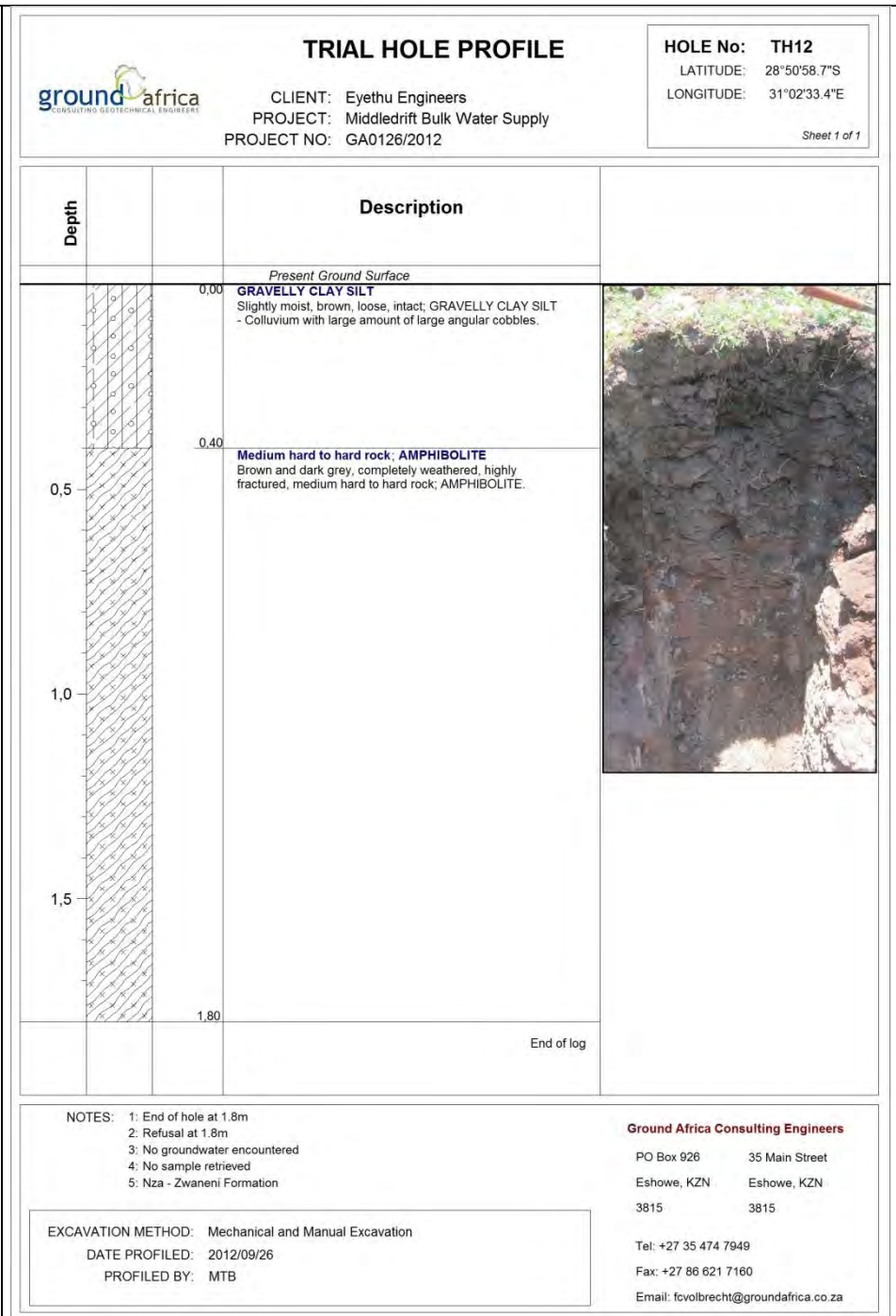
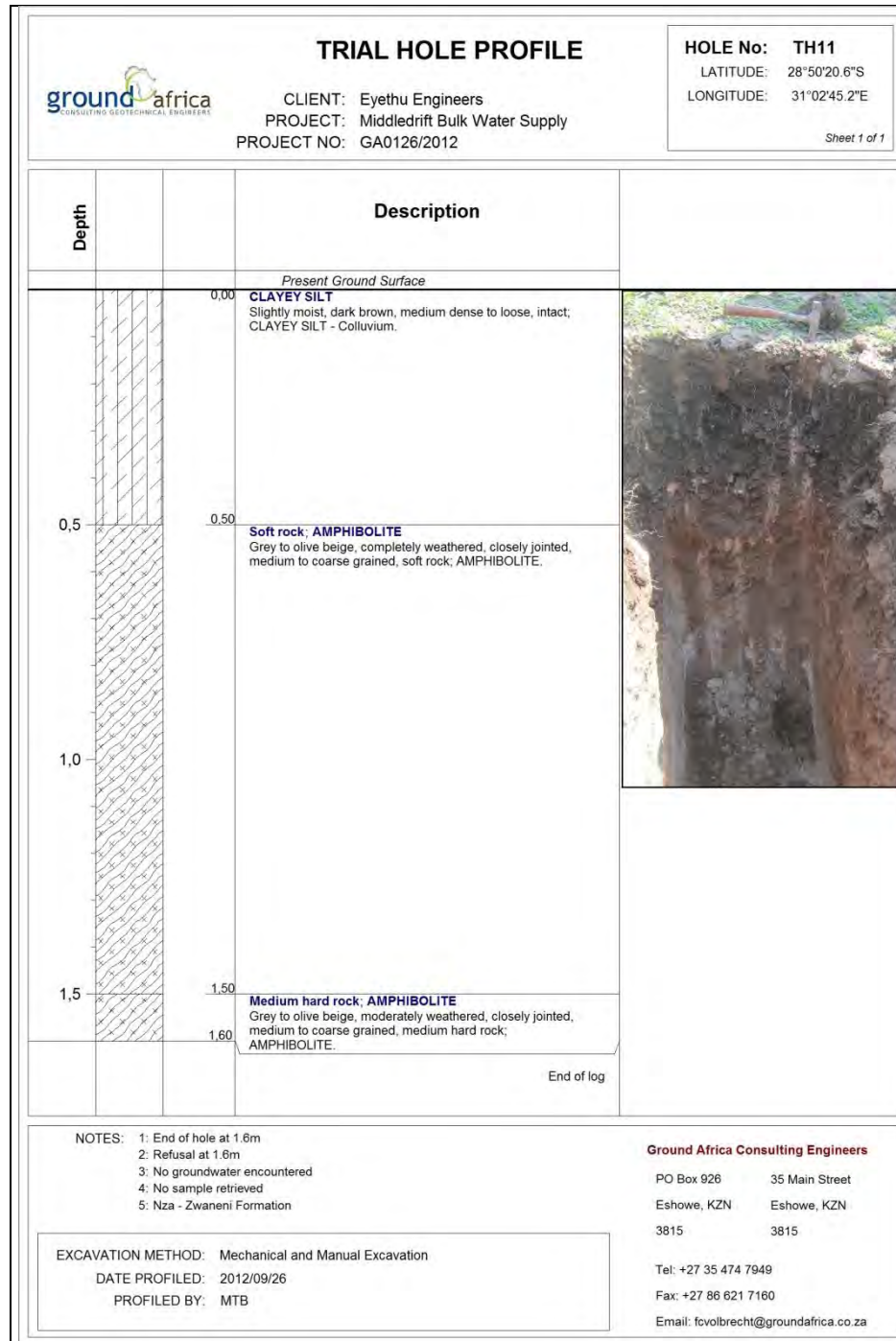
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EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/26
PROFILED BY: MTB





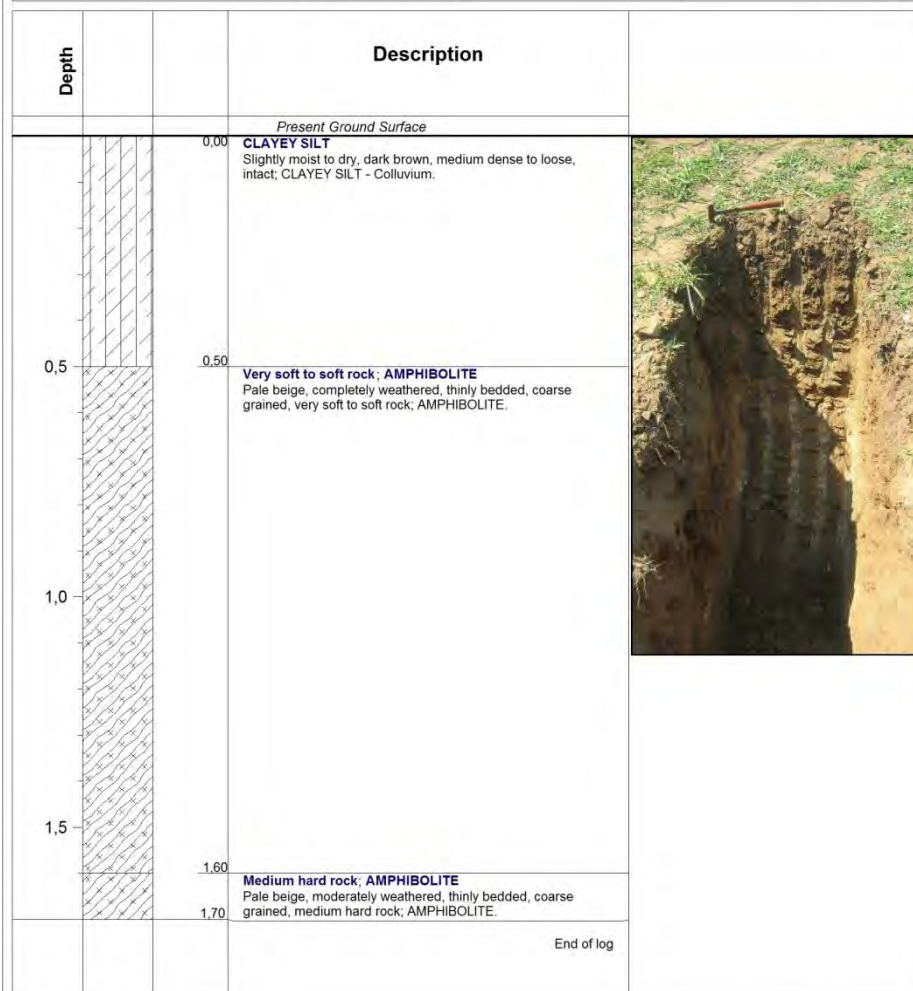


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH13
LATITUDE: 28°51'22.2"S
LONGITUDE: 31°02'35.5"E

Sheet 1 of 1



NOTES: 1: End of hole at 1.7m
2: Refusal at 1.7m
3: No groundwater encountered
4: No sample retrieved
5: Nza - Zwaneni Formation

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EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/26
PROFILED BY: MTB

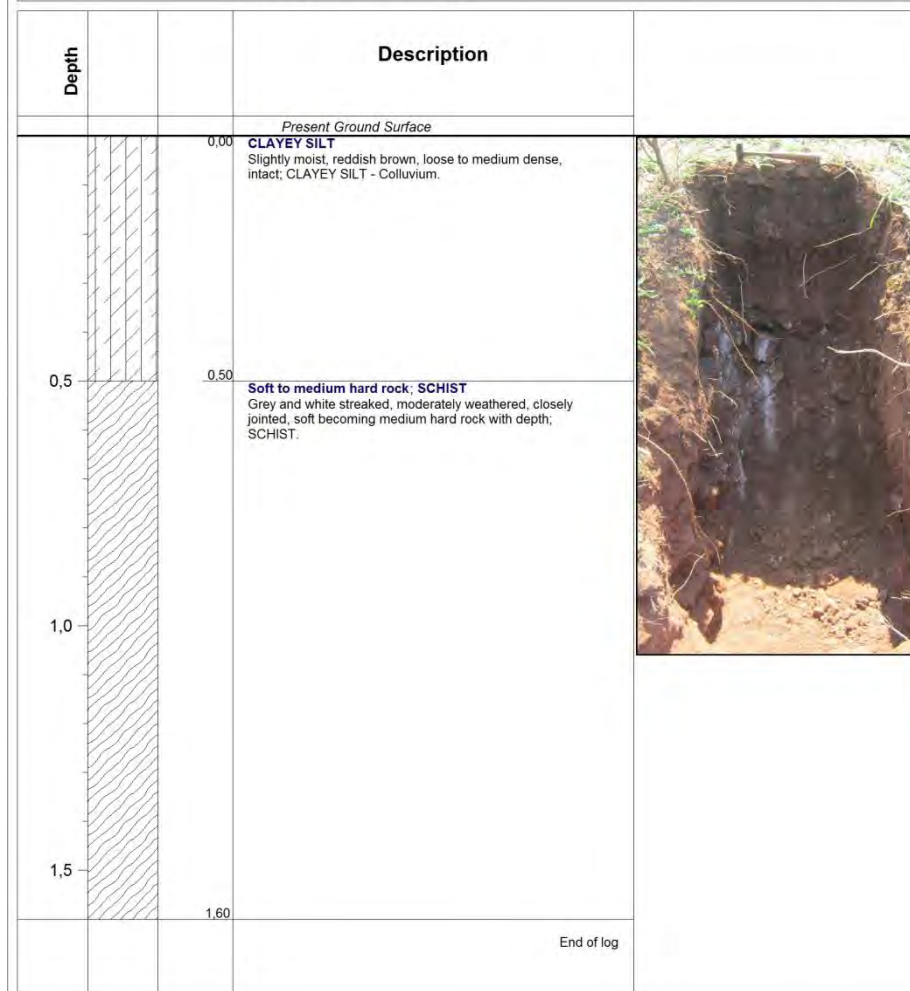


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH14
LATITUDE: 28°50'04.0"S
LONGITUDE: 31°02'36.9"E

Sheet 1 of 1



NOTES: 1: End of hole at 1.6m
2: Refusal at 1.6m
3: No groundwater encountered
4: No sample retrieved
5: Ng - Gazeni Formation

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EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/26
PROFILED BY: MTB

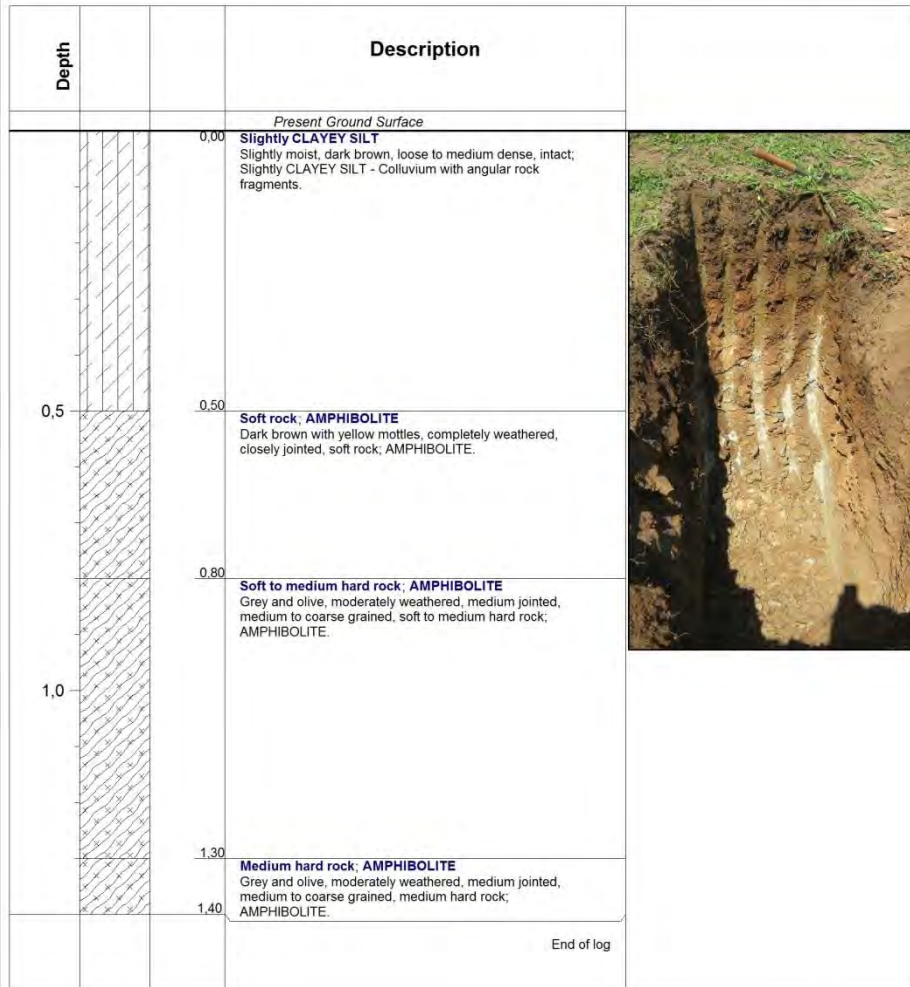


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH15
LATITUDE: 28°50'05.5"S
LONGITUDE: 31°02'21.6"E

Sheet 1 of 1



NOTES: 1: End of hole at 1.4m
2: Refusal at 1.4m
3: No groundwater encountered
4: No sample retrieved
5: Nza - Zwaneni Formation

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EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/26
PROFILED BY: MTB

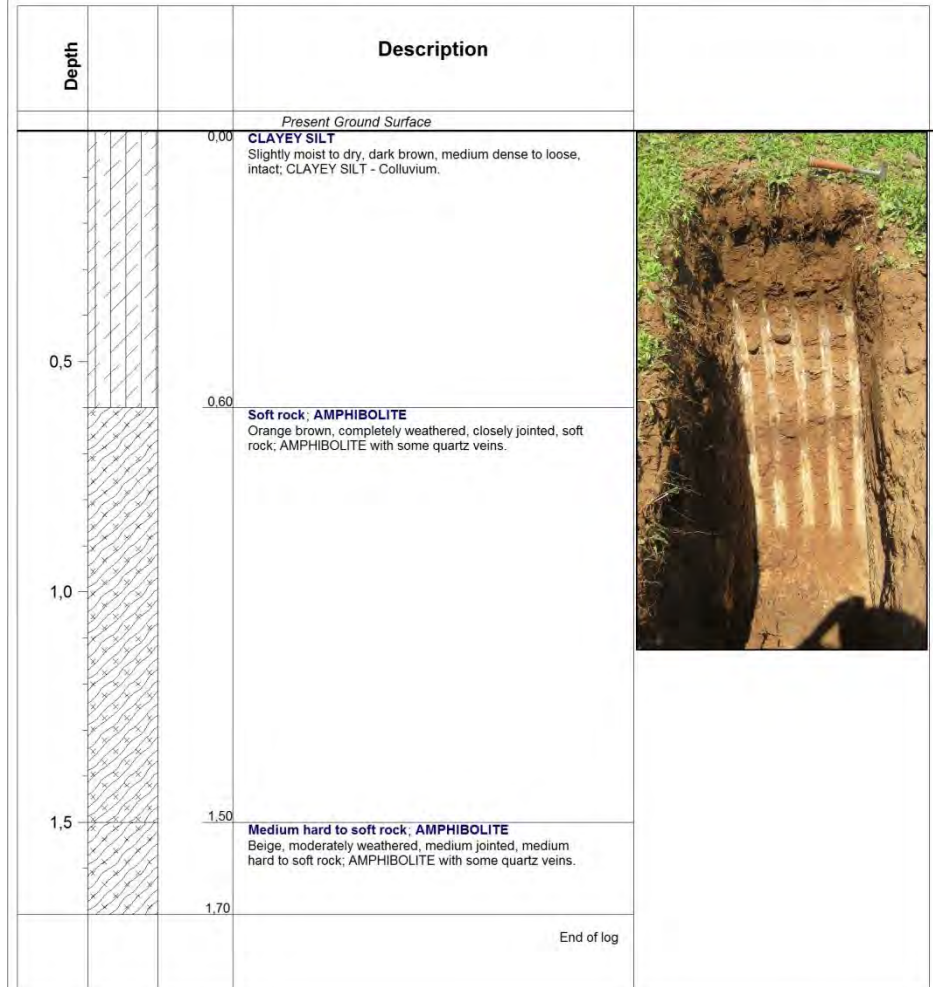


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH16
LATITUDE: 28°49'55.5"S
LONGITUDE: 31°01'49.0"E

Sheet 1 of 1



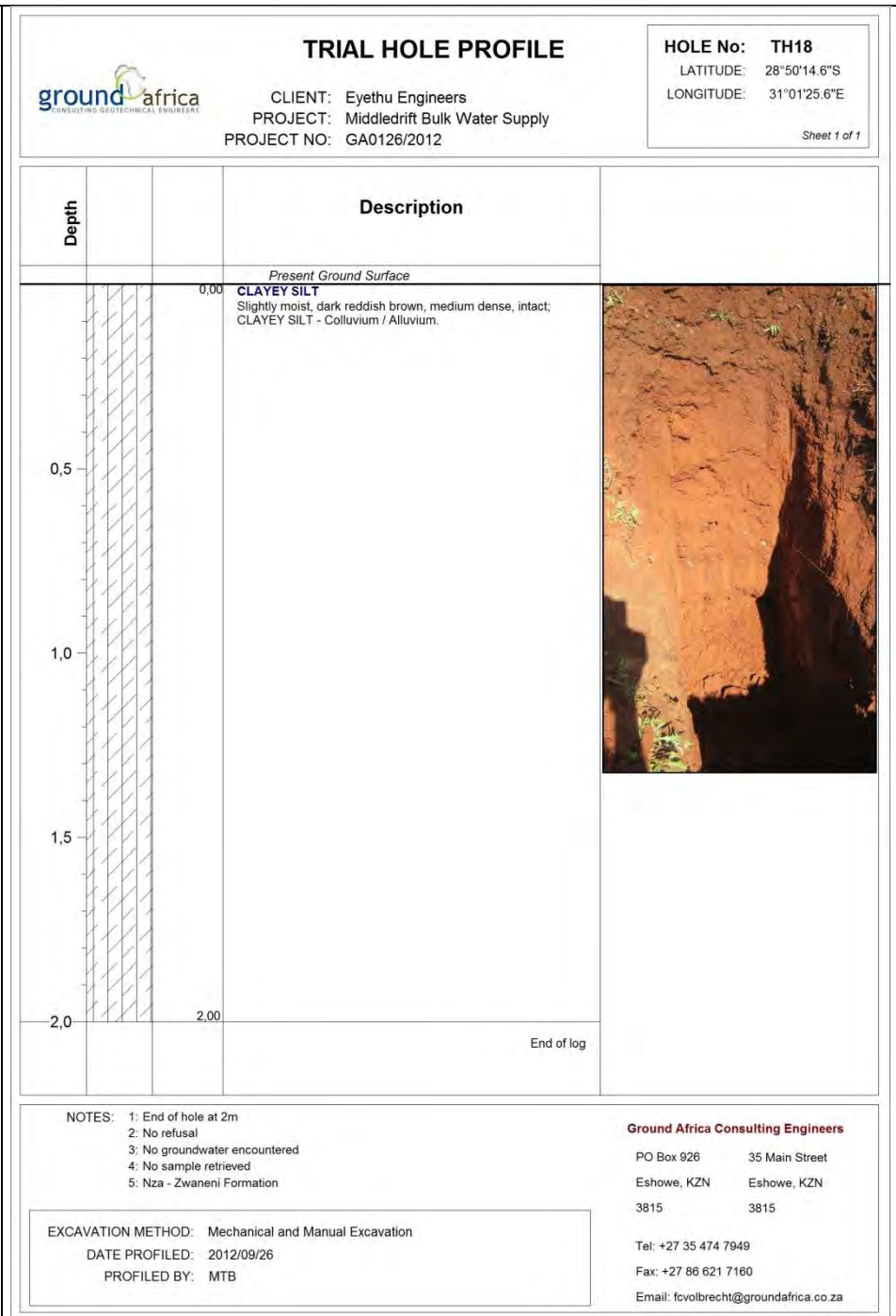
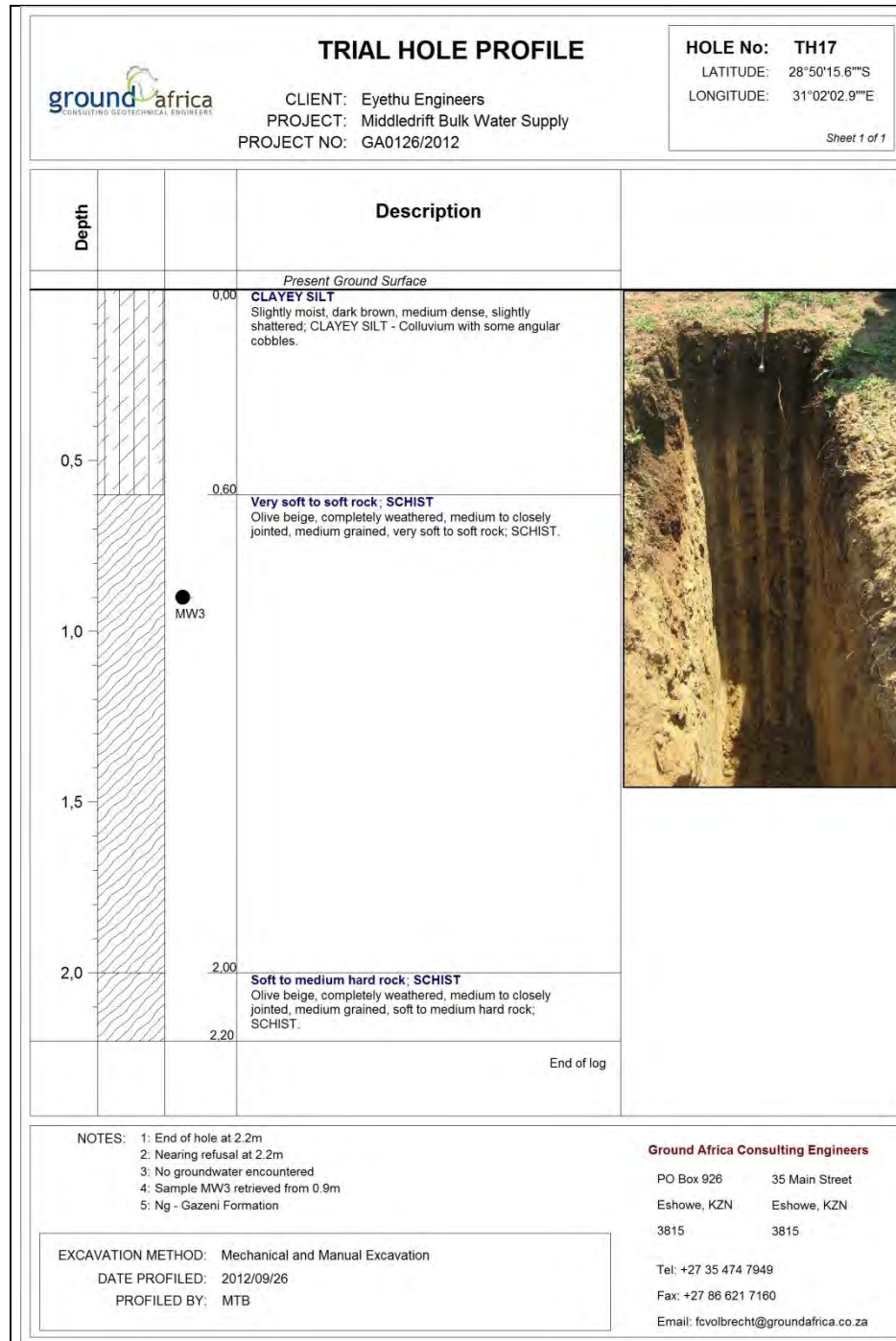
NOTES: 1: End of hole at 1.7m
2: Refusal at 1.7m
3: No groundwater encountered
4: No sample retrieved
5: Nza - Zwaneni Formation

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EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/26
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TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH19
LATITUDE: 28°50'30.1"S
LONGITUDE: 31°01'14.7"E

Sheet 1 of 1



NOTES: 1: End of hole at 0.65m
2: Refusal at 0.65m
3: No groundwater encountered
4: No sample retrieved
5: Ng - Gazeni Formation

EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/26
PROFILED BY: MTB

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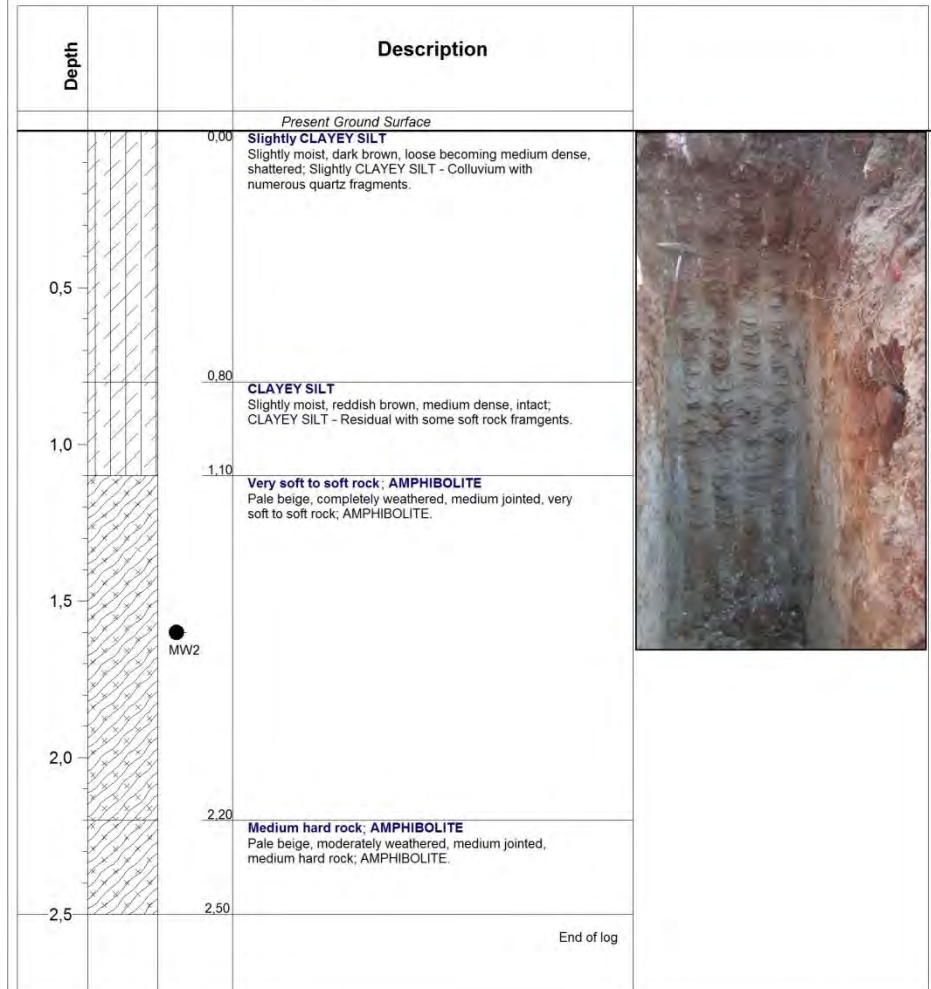


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH20
LATITUDE: 28°50'55.8"S
LONGITUDE: 31°01'50.8"E

Sheet 1 of 1



NOTES: 1: End of hole at 2.5m
2: Refusal at 2.5m
3: No groundwater encountered
4: Sample MW2 retrieved from 1.6m
5: Nza - Zwaneni Formation

EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/26
PROFILED BY: MTB

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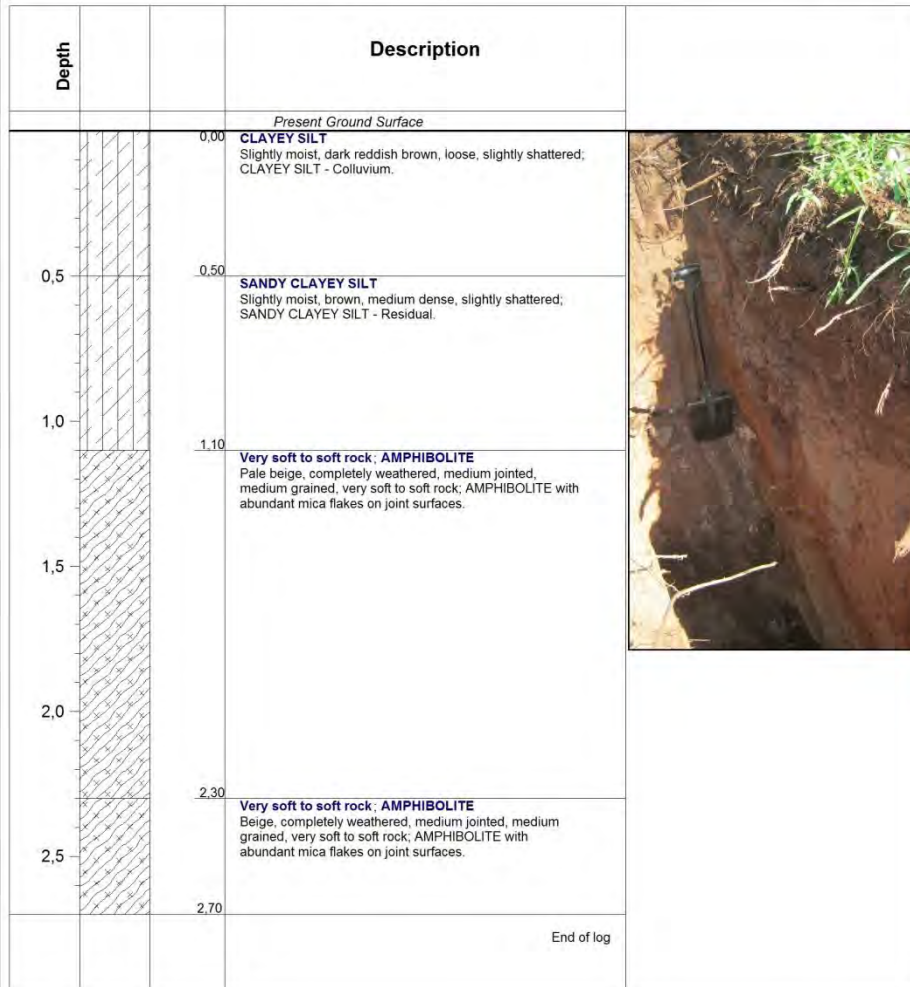


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH21
LATITUDE: 28°51'05.2"S
LONGITUDE: 31°01'57"E

Sheet 1 of 1



NOTES: 1: End of hole at 2.7m
2: Nearing refusal at 2.7m
3: No groundwater encountered
4: No sample retrieved
5: Nza - Zwaneni Formation

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Fax: +27 86 621 7160
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EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/26
PROFILED BY: MTB

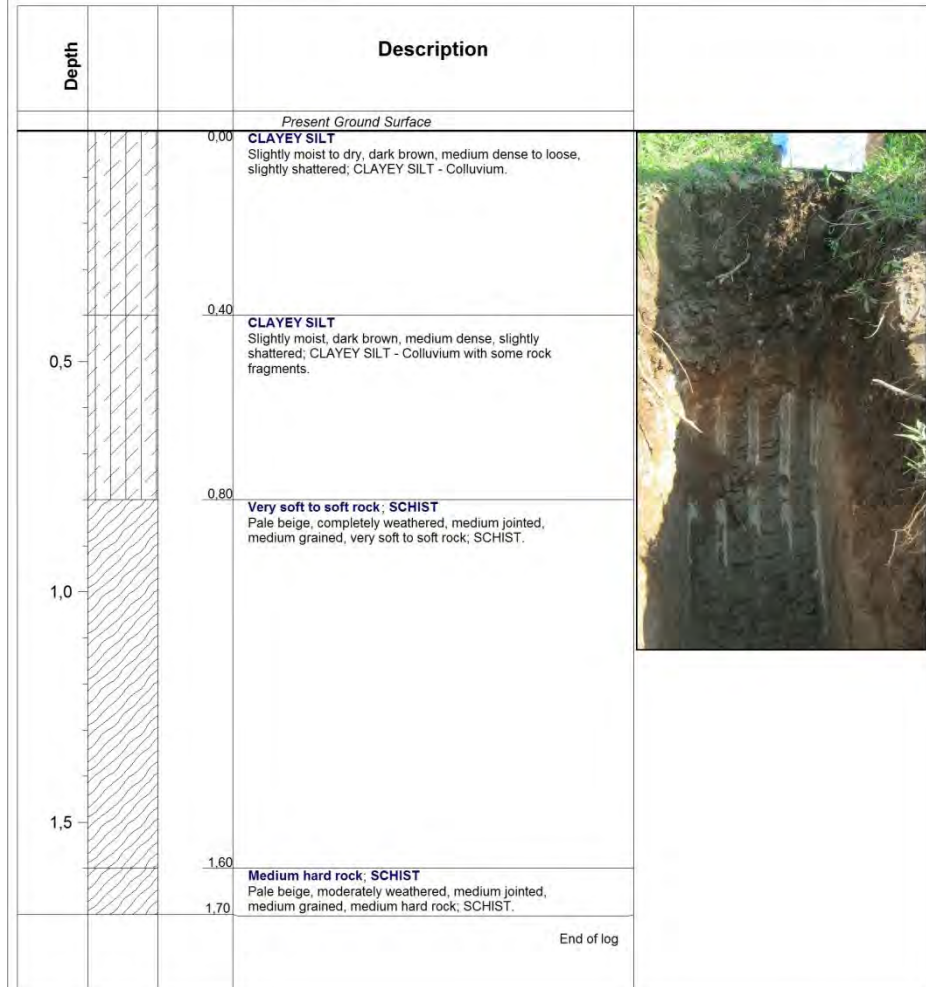


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH22
LATITUDE: 28°51'35.3"S
LONGITUDE: 31°01'54.7"E

Sheet 1 of 1



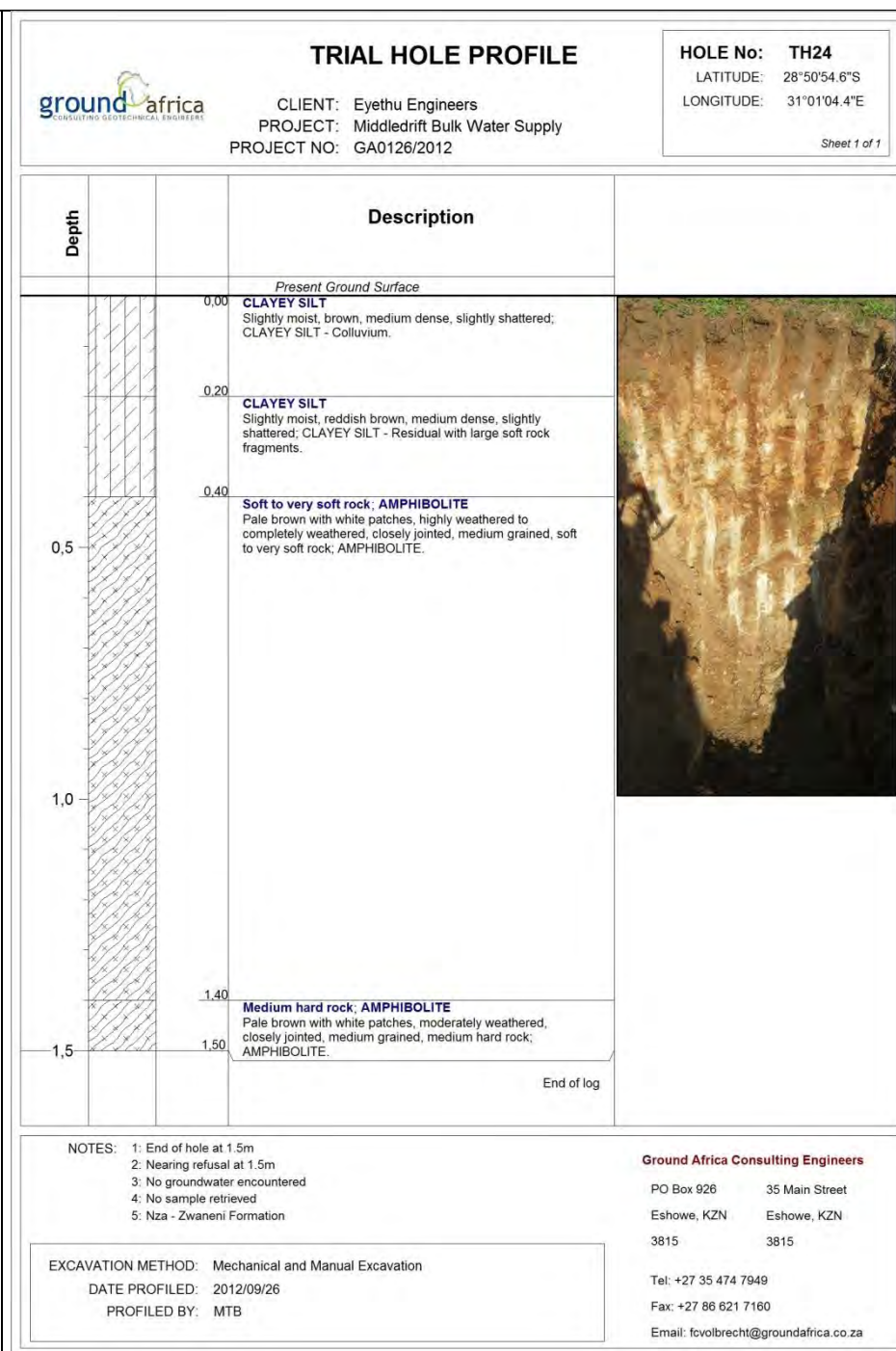
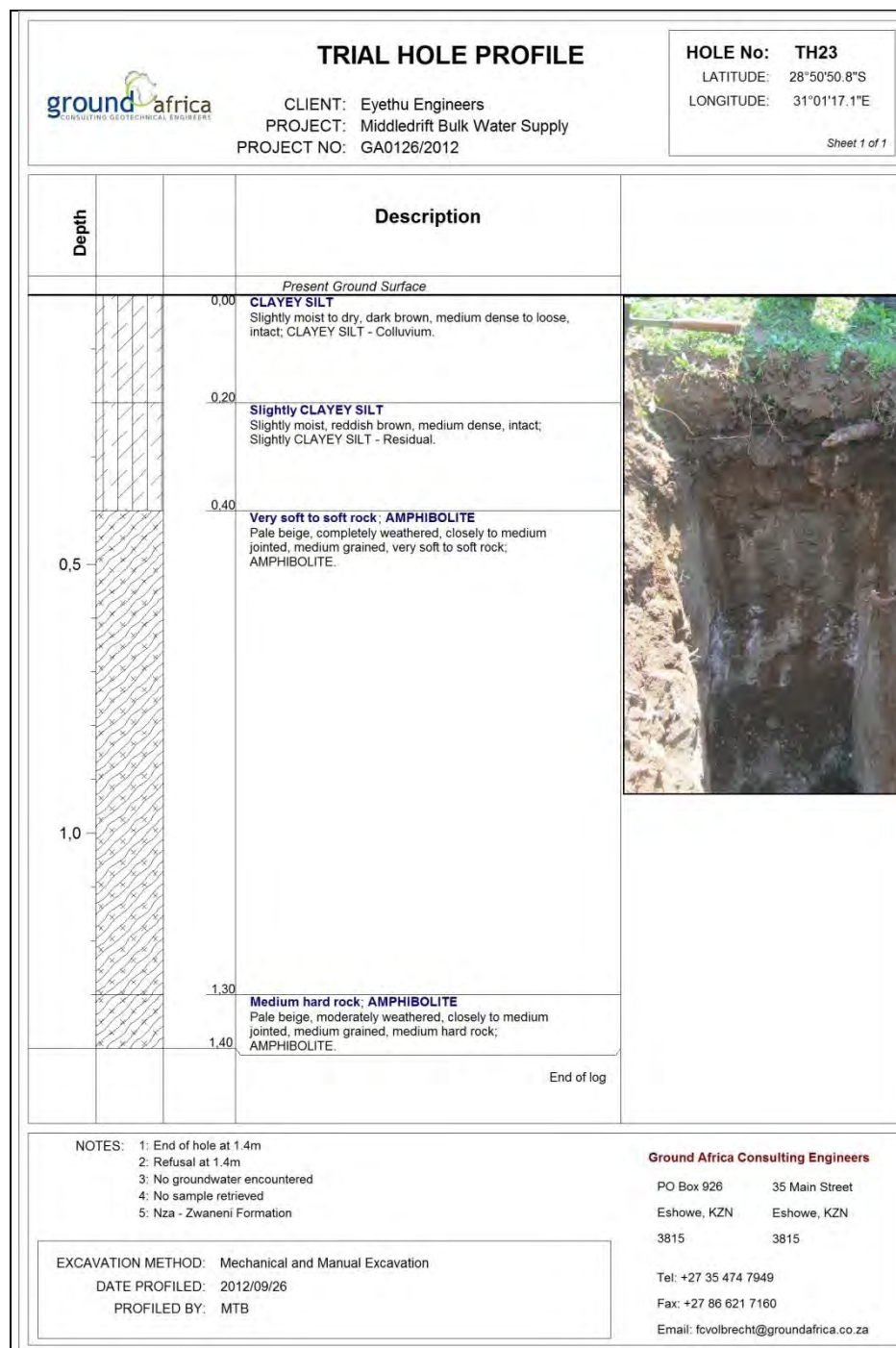
NOTES: 1: End of hole at 1.7m
2: Refusal at 1.7m
3: No groundwater encountered
4: No sample retrieved
5: Ng - Gazeni Formation

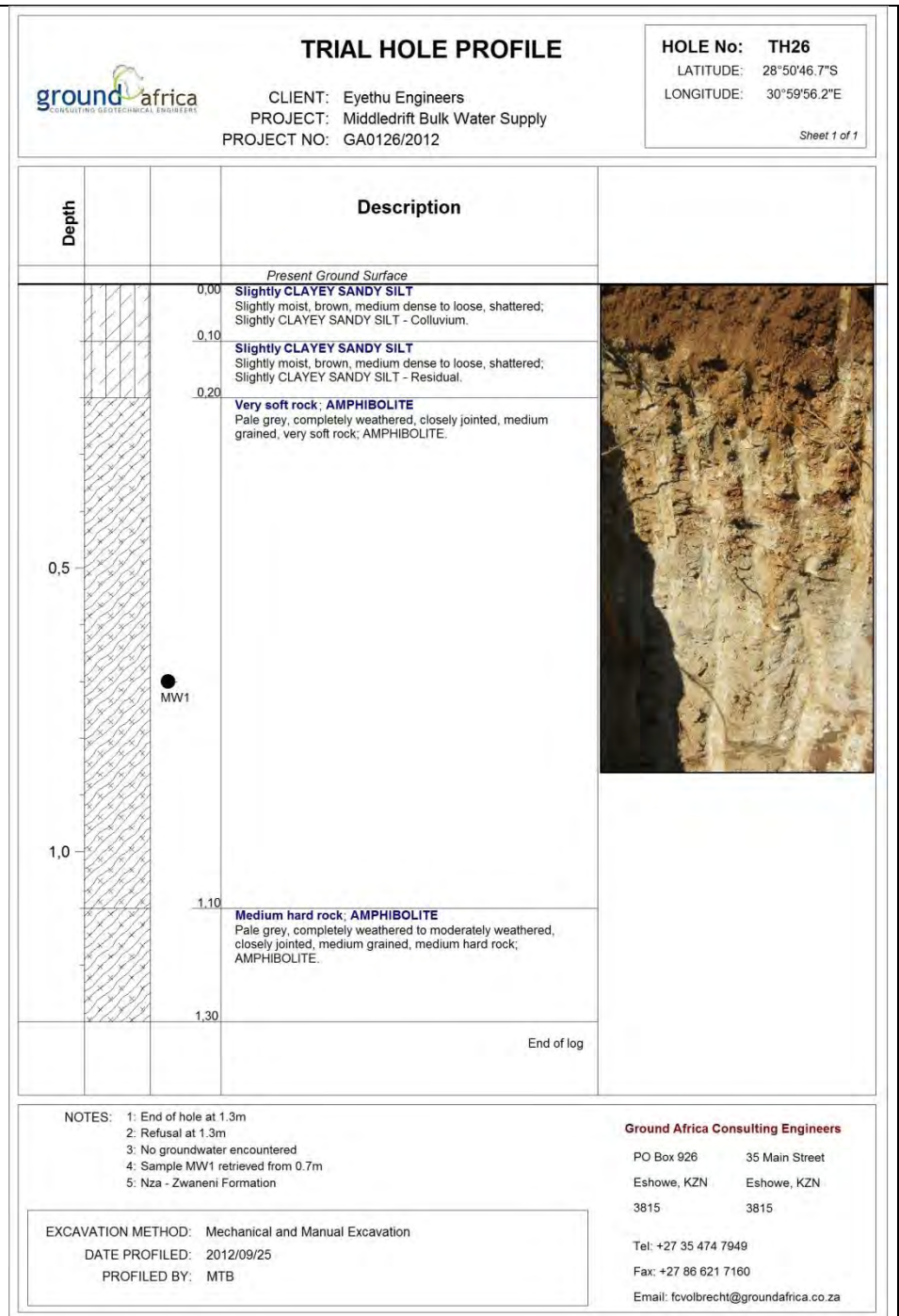
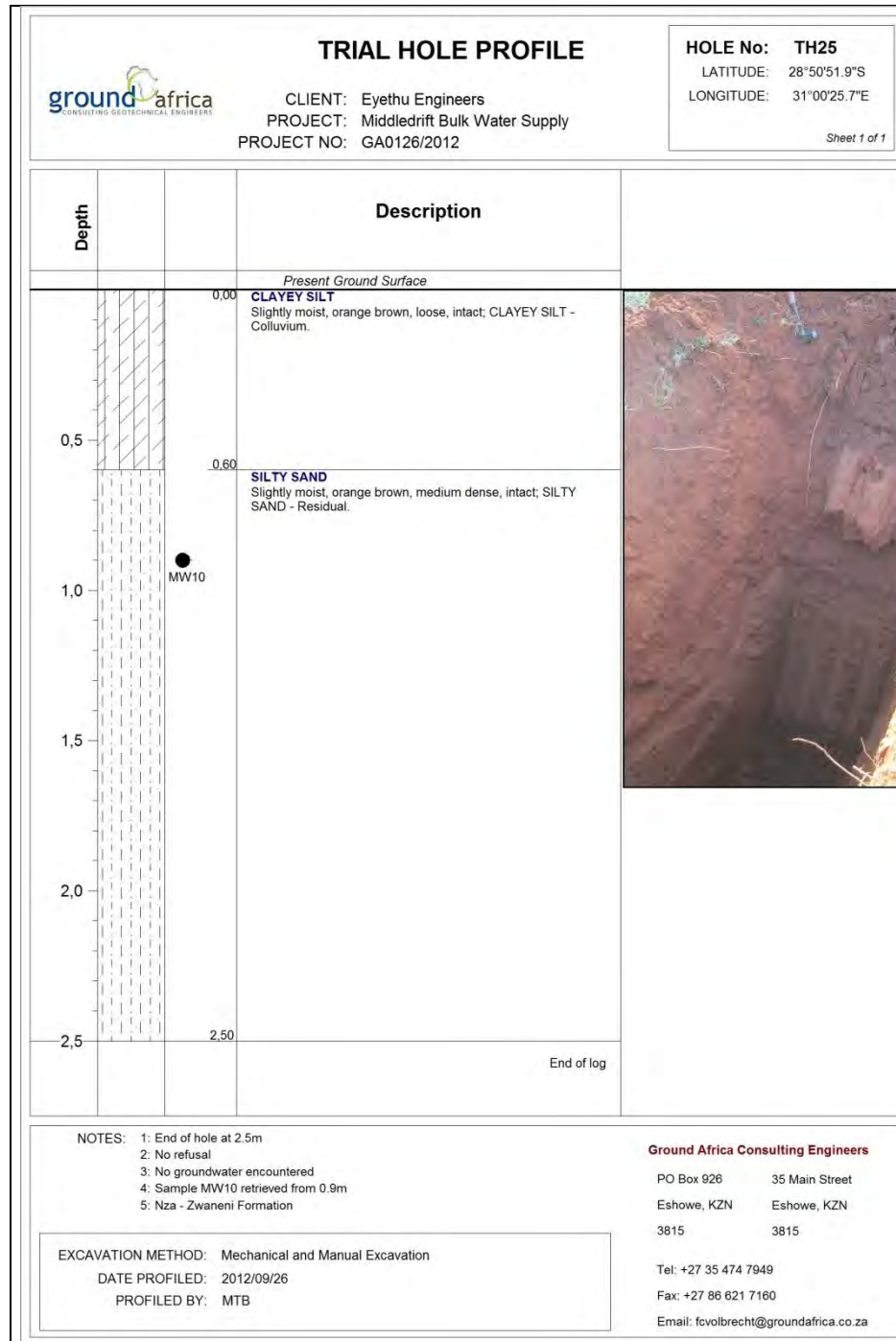
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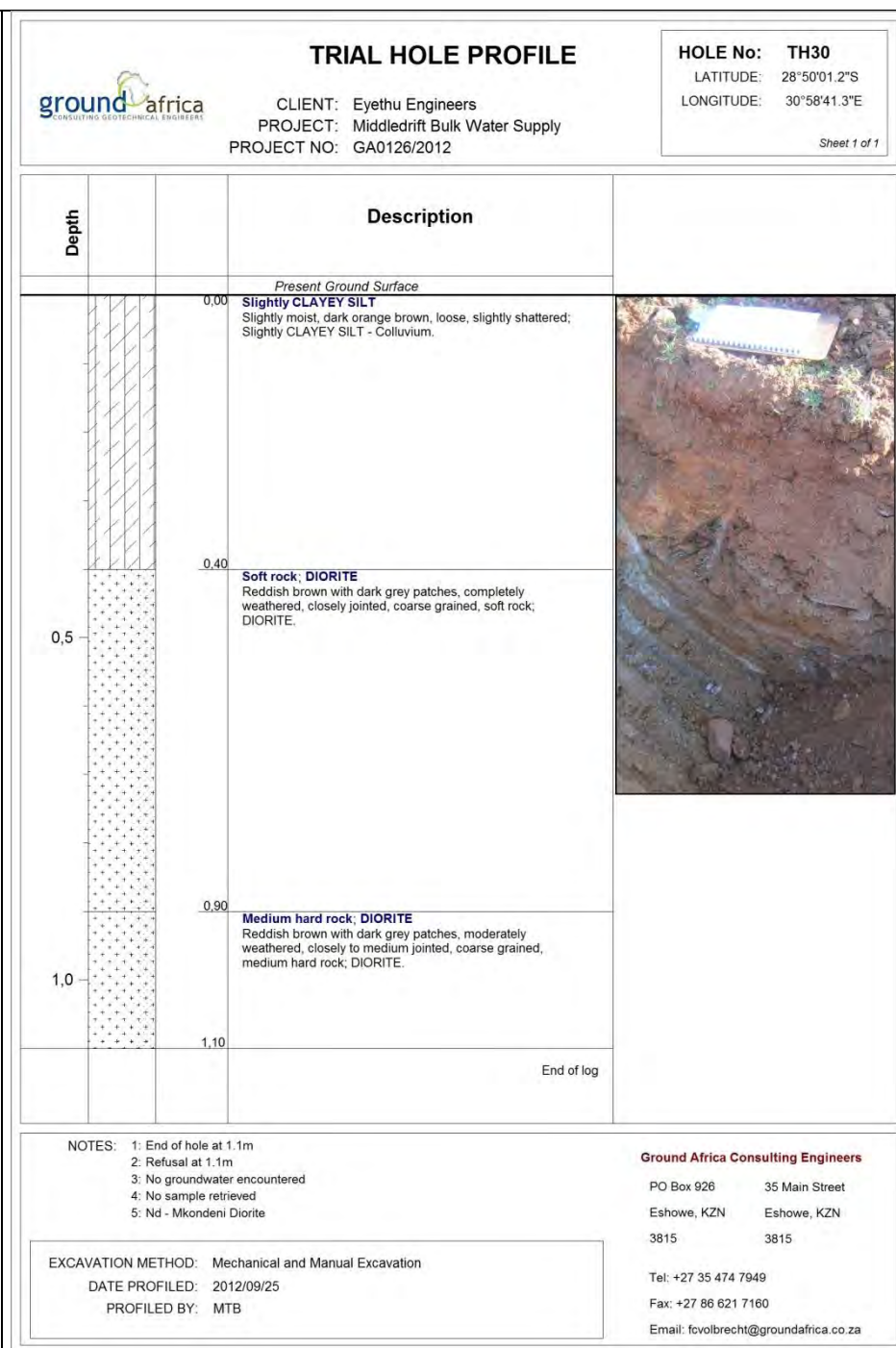
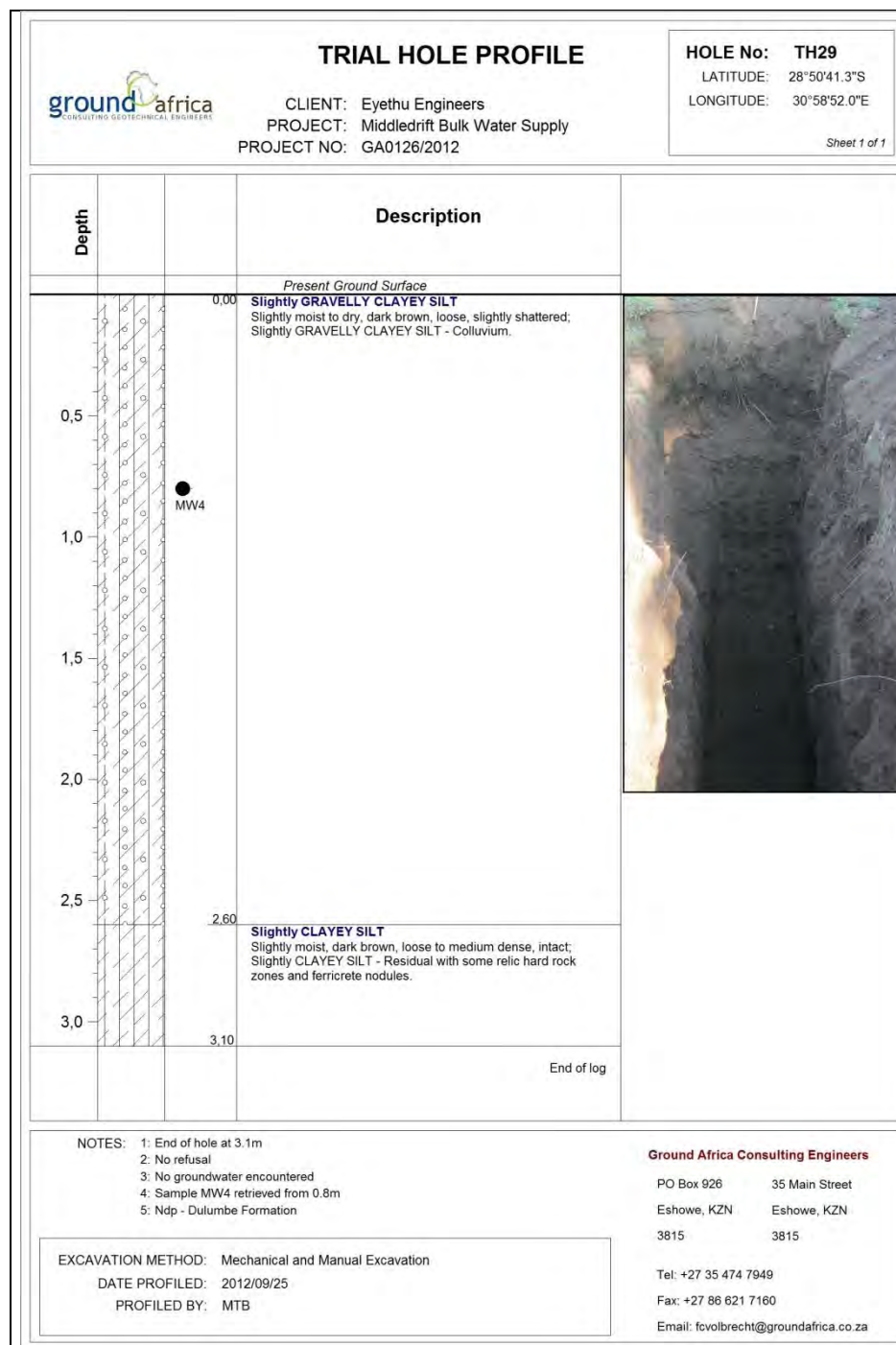
EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/26
PROFILED BY: MTB





 TRIAL HOLE PROFILE		HOLE No: TH27 LATITUDE: 28°50'41.0"S LONGITUDE: 30°59'53.4"E <i>Sheet 1 of 1</i>																								
CLIENT: Eyethu Engineers PROJECT: Middledrift Bulk Water Supply PROJECT NO: GA0126/2012																										
Depth		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;"></th> <th style="width: 10%;"></th> <th style="width: 80%;">Description</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td><i>Present Ground Surface</i></td> </tr> <tr> <td></td> <td>0,00</td> <td>CLAYEY SILT Slightly moist, reddish brown, medium dense, intact; CLAYEY SILT - Colluvium.</td> </tr> <tr> <td></td> <td>0,30</td> <td>SILTY GRAVEL Slightly moist, reddish brown, medium dense, intact; SILTY GRAVEL - Residual with abundant ferricrete nodules.</td> </tr> <tr> <td>0,5</td> <td>0,50</td> <td>Very soft rock; AMPHIBOLITE Olive brown, completely weathered, closely jointed, medium grained, very soft rock; AMPHIBOLITE.</td> </tr> <tr> <td>1,0</td> <td></td> <td></td> </tr> <tr> <td></td> <td>1,40</td> <td>Medium hard to hard rock; QUARTZITE Pale grey, moderately weathered, medium to widely jointed, medium hard to hard rock; QUARTZITE.</td> </tr> <tr> <td>1,5</td> <td>1,50</td> <td>End of log</td> </tr> </tbody> </table>			Description			<i>Present Ground Surface</i>		0,00	CLAYEY SILT Slightly moist, reddish brown, medium dense, intact; CLAYEY SILT - Colluvium.		0,30	SILTY GRAVEL Slightly moist, reddish brown, medium dense, intact; SILTY GRAVEL - Residual with abundant ferricrete nodules.	0,5	0,50	Very soft rock; AMPHIBOLITE Olive brown, completely weathered, closely jointed, medium grained, very soft rock; AMPHIBOLITE.	1,0				1,40	Medium hard to hard rock; QUARTZITE Pale grey, moderately weathered, medium to widely jointed, medium hard to hard rock; QUARTZITE.	1,5	1,50	End of log
		Description																								
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EXCAVATION METHOD: Mechanical and Manual Excavation DATE PROFILED: 2012/09/25 PROFILED BY: MTB																										

 TRIAL HOLE PROFILE		HOLE No: TH28 LATITUDE: 28°50'36.2"S LONGITUDE: 30°59'29.6"E <i>Sheet 1 of 1</i>																											
CLIENT: Eyethu Engineers PROJECT: Middledrift Bulk Water Supply PROJECT NO: GA0126/2012																													
Depth		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;"></th> <th style="width: 10%;"></th> <th style="width: 80%;">Description</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td><i>Present Ground Surface</i></td> </tr> <tr> <td></td> <td>0,00</td> <td>CLAYEY SAND Slightly moist, pale brown with white speckles, loose, slightly shattered; CLAYEY SAND - Colluvium.</td> </tr> <tr> <td></td> <td>0,30</td> <td>CLAYEY SAND Slightly moist, brown, loose to medium dense, slightly shattered; CLAYEY SAND - Residual.</td> </tr> <tr> <td>0,5</td> <td>0,60</td> <td>Soft rock; AMPHIBOLITE Brown and white mottles, completely weathered, medium jointed, medium grained, soft rock; AMPHIBOLITE.</td> </tr> <tr> <td>1,0</td> <td></td> <td></td> </tr> <tr> <td></td> <td>1,5</td> <td></td> </tr> <tr> <td>2,0</td> <td></td> <td></td> </tr> <tr> <td>2,5</td> <td>2,50</td> <td>End of log</td> </tr> </tbody> </table>			Description			<i>Present Ground Surface</i>		0,00	CLAYEY SAND Slightly moist, pale brown with white speckles, loose, slightly shattered; CLAYEY SAND - Colluvium.		0,30	CLAYEY SAND Slightly moist, brown, loose to medium dense, slightly shattered; CLAYEY SAND - Residual.	0,5	0,60	Soft rock; AMPHIBOLITE Brown and white mottles, completely weathered, medium jointed, medium grained, soft rock; AMPHIBOLITE.	1,0				1,5		2,0			2,5	2,50	End of log
		Description																											
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2,0																													
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NOTES: 1: End of hole at 2.5m 2: Nearing refusal at 2.5m 3: No groundwater encountered 4: No sample retrieved 5: Nza - Zwaneni Formation Ground Africa Consulting Engineers PO Box 926 35 Main Street Eshowe, KZN Eshowe, KZN 3815 3815 Tel: +27 35 474 7949 Fax: +27 86 621 7160 Email: fcvolbrecht@groundafrica.co.za																													
EXCAVATION METHOD: Mechanical and Manual Excavation DATE PROFILED: 2012/09/25 PROFILED BY: MTB																													



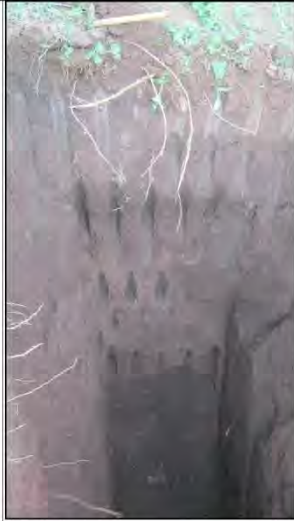


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH31
LATITUDE: 28°49'41.4"S
LONGITUDE: 30°58'22.3"E

Sheet 1 of 1

Depth	Description	
	Present Ground Surface	
0,00	CLAYEY SILT Slightly moist, reddish brown, loose becoming medium dense, shattered; CLAYEY SILT - Colluvium with isolated gravel fragments.	
0,5		
1,0		
1,5		
2,0		
2,10		
	End of log	

NOTES: 1: End of hole at 2.1m
2: No refusal
3: No groundwater encountered
4: No sample retrieved
5: Nw - Wosi Formation

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EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/25
PROFILED BY: MTB



TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH32
LATITUDE: 28°49'26.2"S
LONGITUDE: 30°58'42.6"E

Sheet 1 of 1

Depth	Description	
	Present Ground Surface	
0,00	CLAYEY SILT Dry, brown, medium dense, slightly shattered; CLAYEY SILT - Colluvium.	
0,5		
0,80	SILTY GRAVEL Slightly moist, greyish white, medium dense, SILTY GRAVEL - Pebble Marker.	
1,00	CLAY SILT Dry to slightly moist, brown, medium dense, intact; CLAY SILT - Residual.	
1,5		
2,0		
2,5		
2,70		
	End of log	

NOTES: 1: End of hole at 2.7m
2: No refusal
3: No groundwater encountered
4: No sample retrieved
5: Ndp - Dulumbe Formation / Nw - Wosi Formation

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EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/10/01
PROFILED BY: MTB

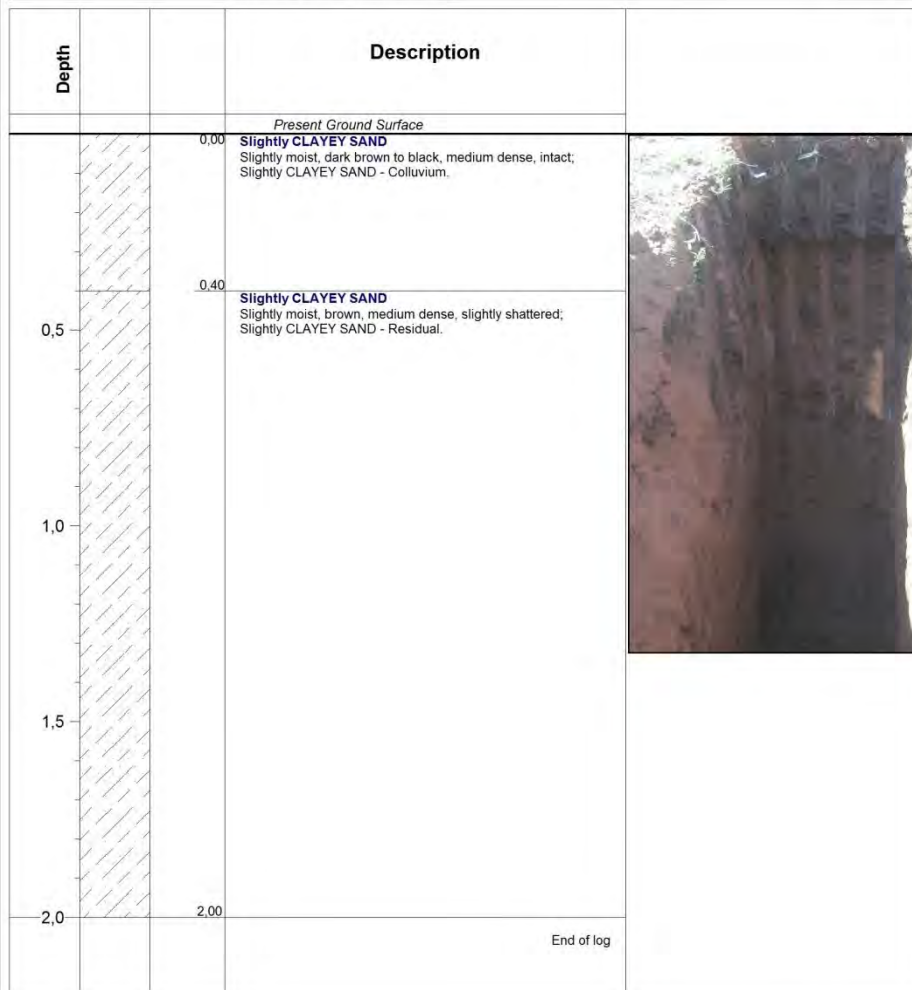


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH33
LATITUDE: 28°49'08.1"S
LONGITUDE: 30°59'21.2"E

Sheet 1 of 1



NOTES: 1: End of hole at 2m
2: No refusal
3: No groundwater encountered
4: No sample retrieved
5: Ndp - Dulumbe Formation

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EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/10/01
PROFILED BY: MTB

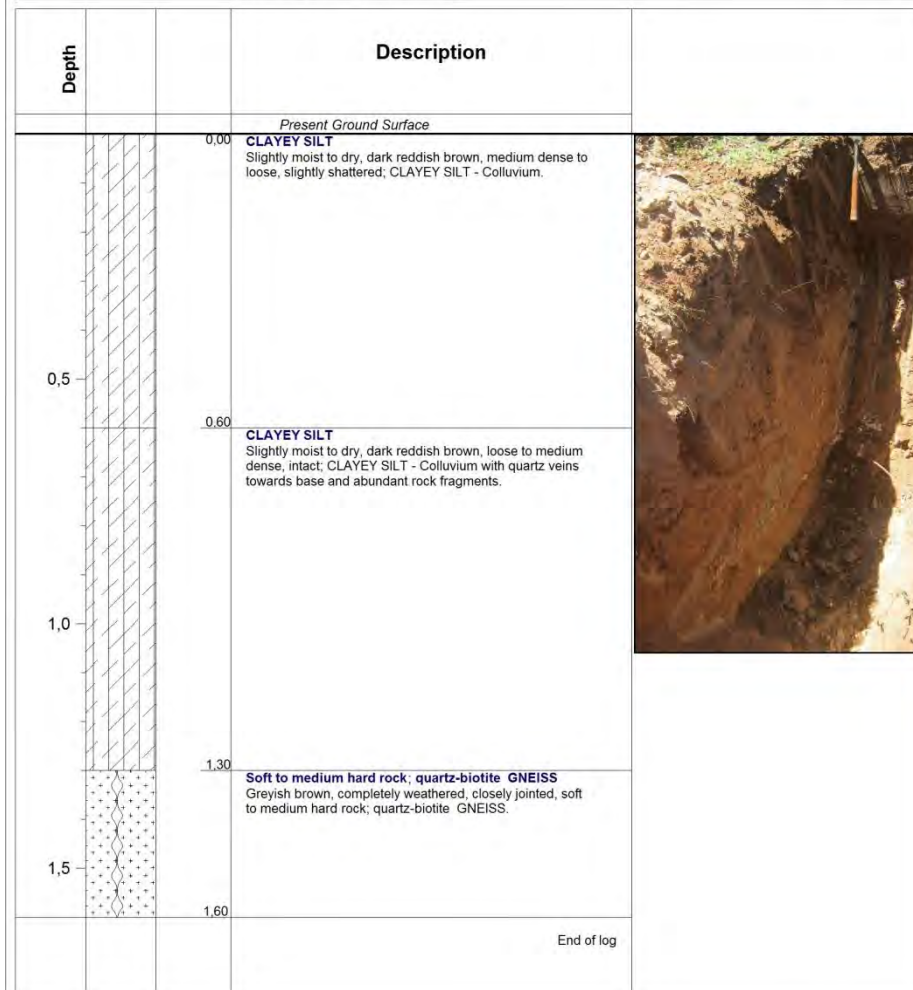


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH34
LATITUDE: 28°49'12.0"S
LONGITUDE: 30°59'26.4"E

Sheet 1 of 1



NOTES: 1: End of hole at 1.6m
2: Nearing refusal at 1.6m
3: No groundwater encountered
4: No sample retrieved
5: Ndp - Dulumbe Formation

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EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/10/01
PROFILED BY: MTB

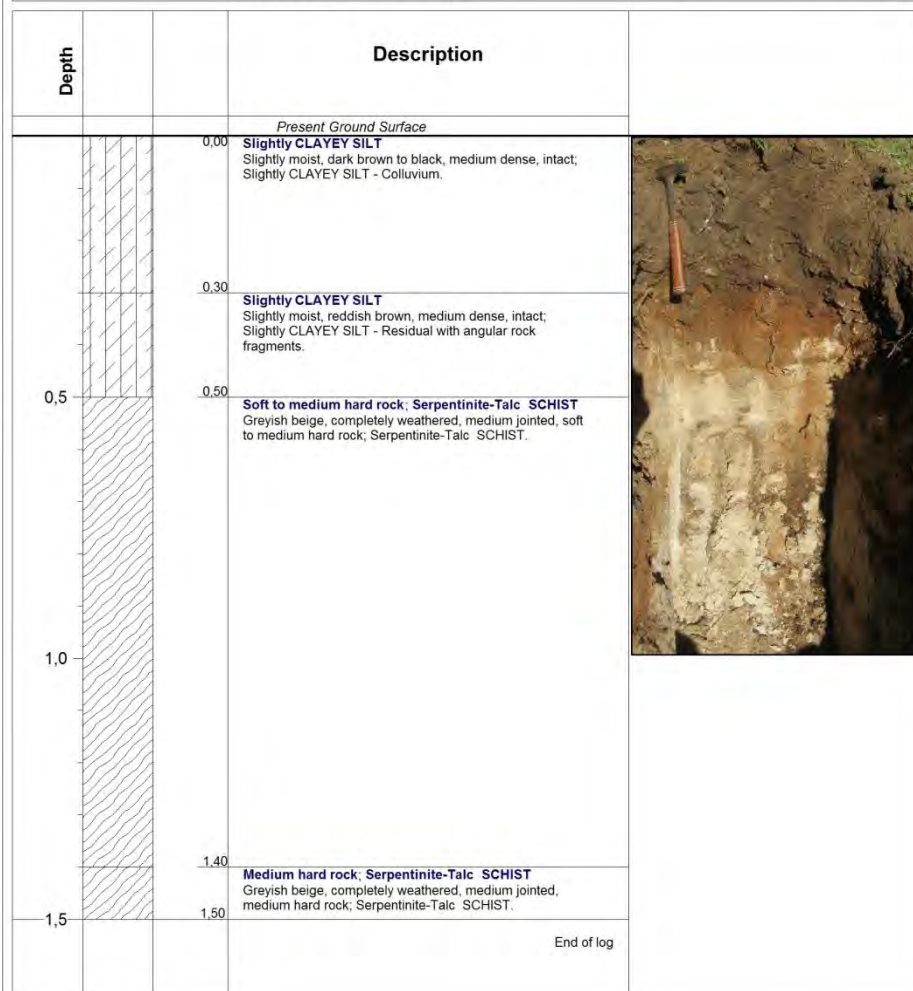


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH35
LATITUDE: 28°48'43.0"S
LONGITUDE: 30°59'25.1"E

Sheet 1 of 1



NOTES: 1: End of hole at 1.5m
2: Refusal at 1.5m
3: No groundwater encountered
4: No sample retrieved
5: Nss - Serpentine-talc Schist, Sithilo Complex

EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/10/01
PROFILED BY: MTB

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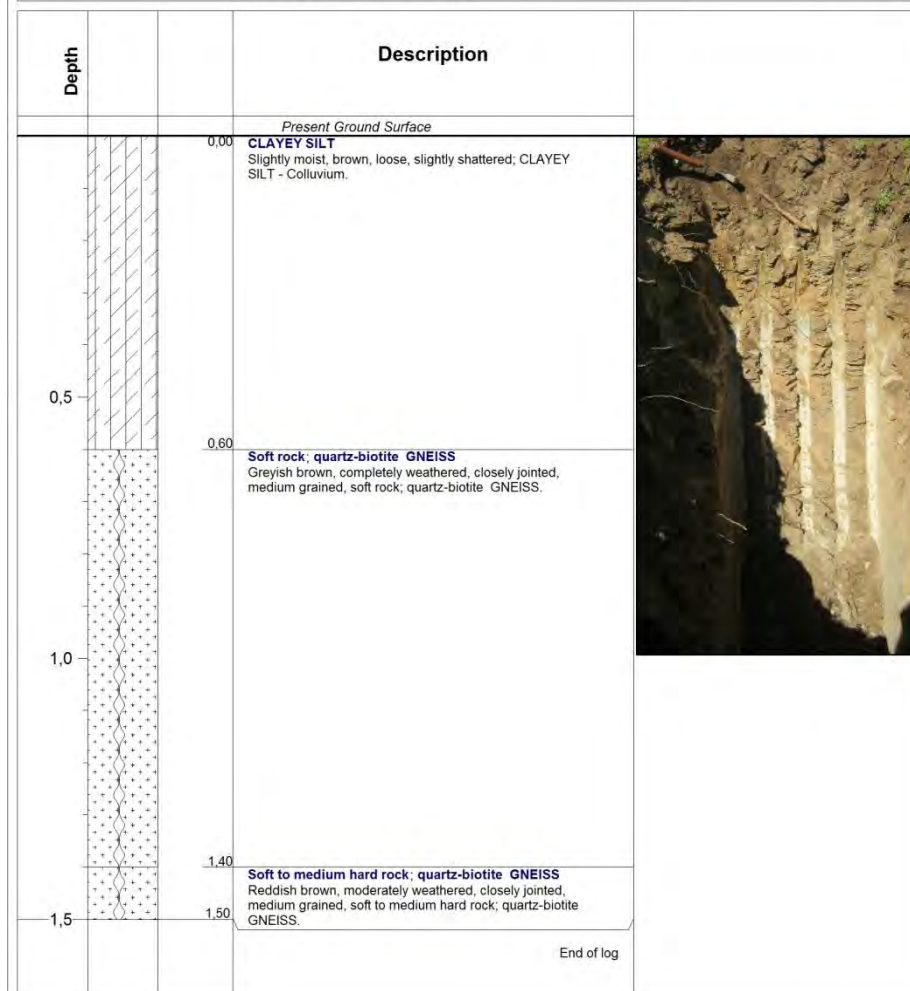


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH36
LATITUDE: 28°48'32.9"S
LONGITUDE: 31°00'02.2"E

Sheet 1 of 1



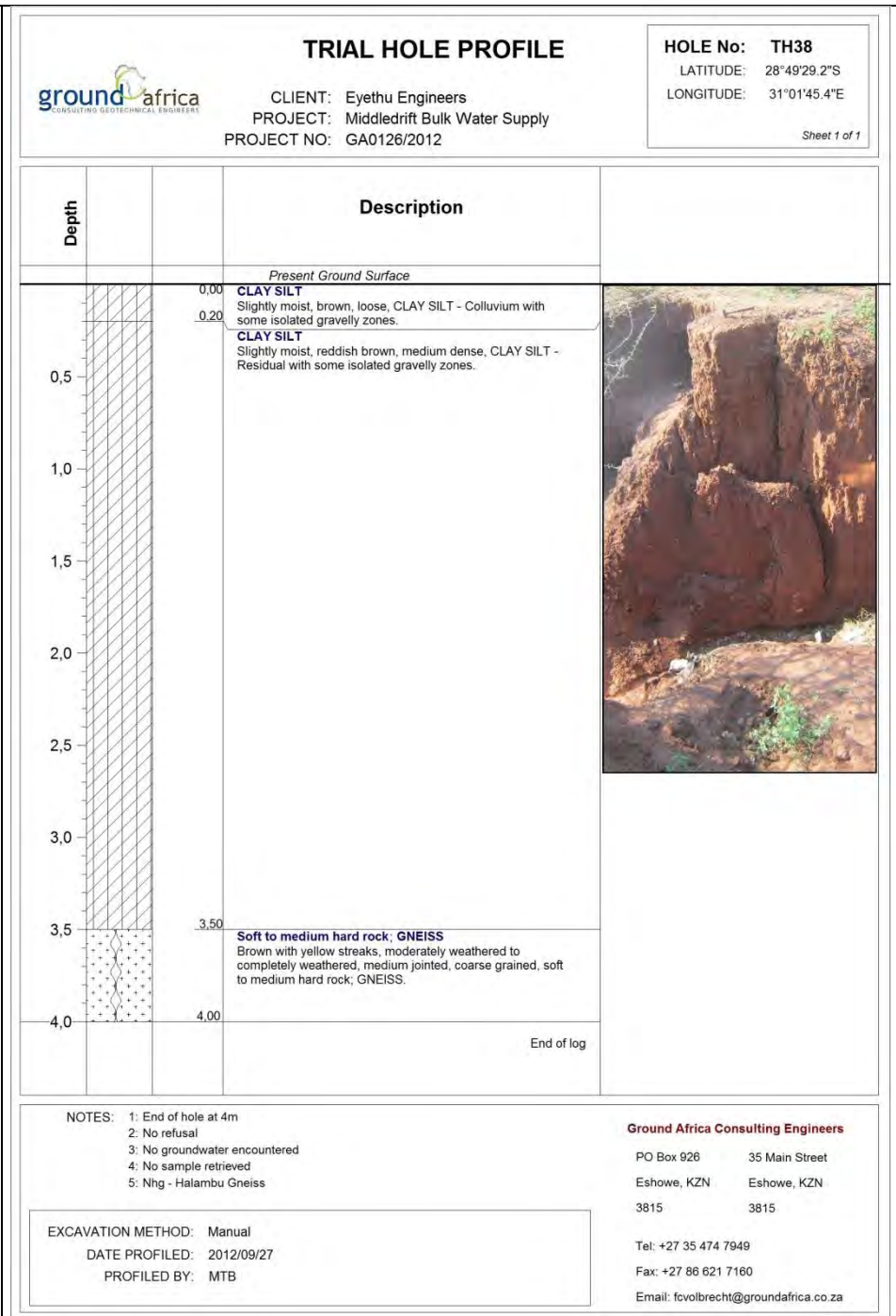
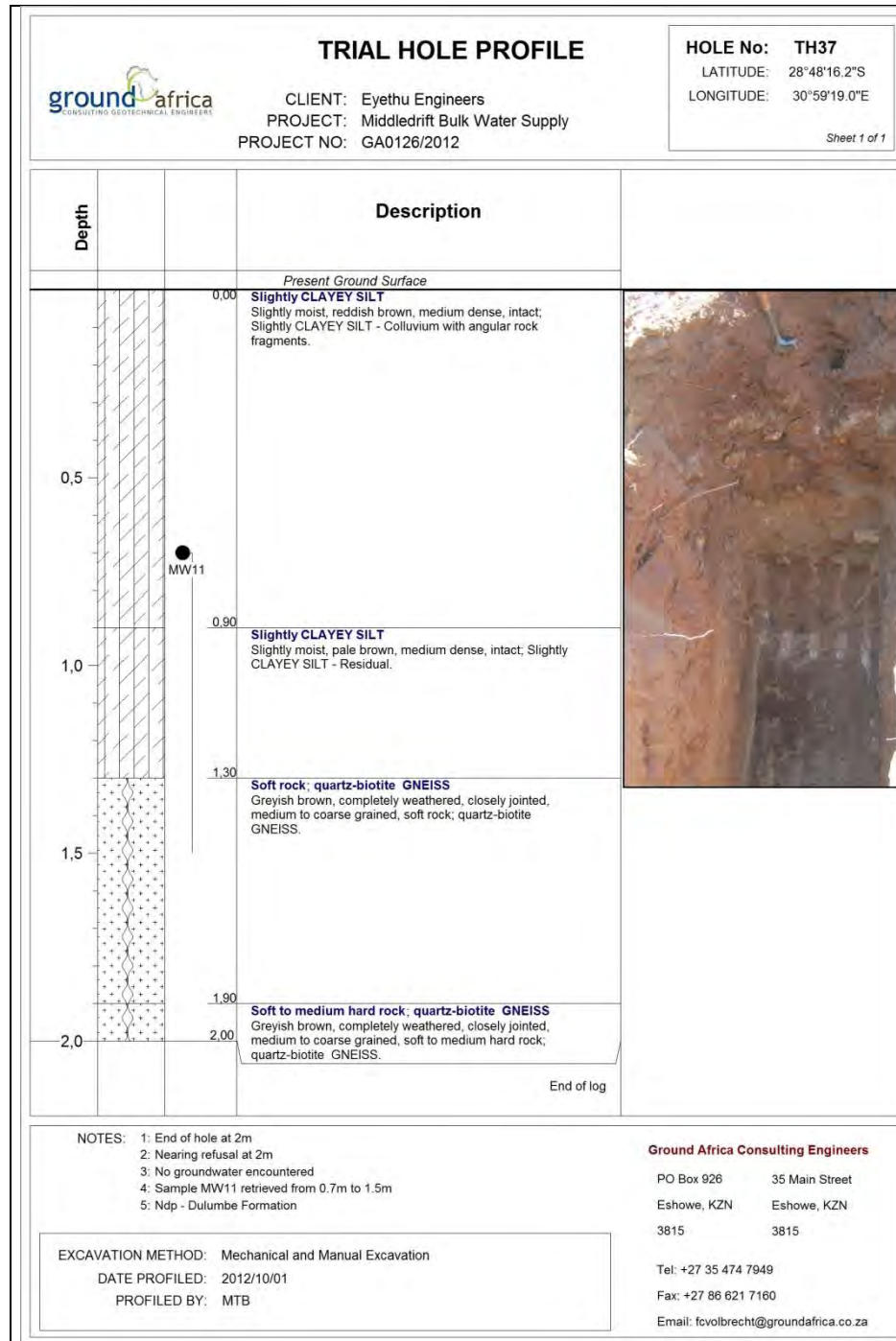
NOTES: 1: End of hole at 1.5m
2: Refusal at 1.5m
3: No groundwater encountered
4: No sample retrieved
5: Ndp - Dulumbe Formation

EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/10/01
PROFILED BY: MTB

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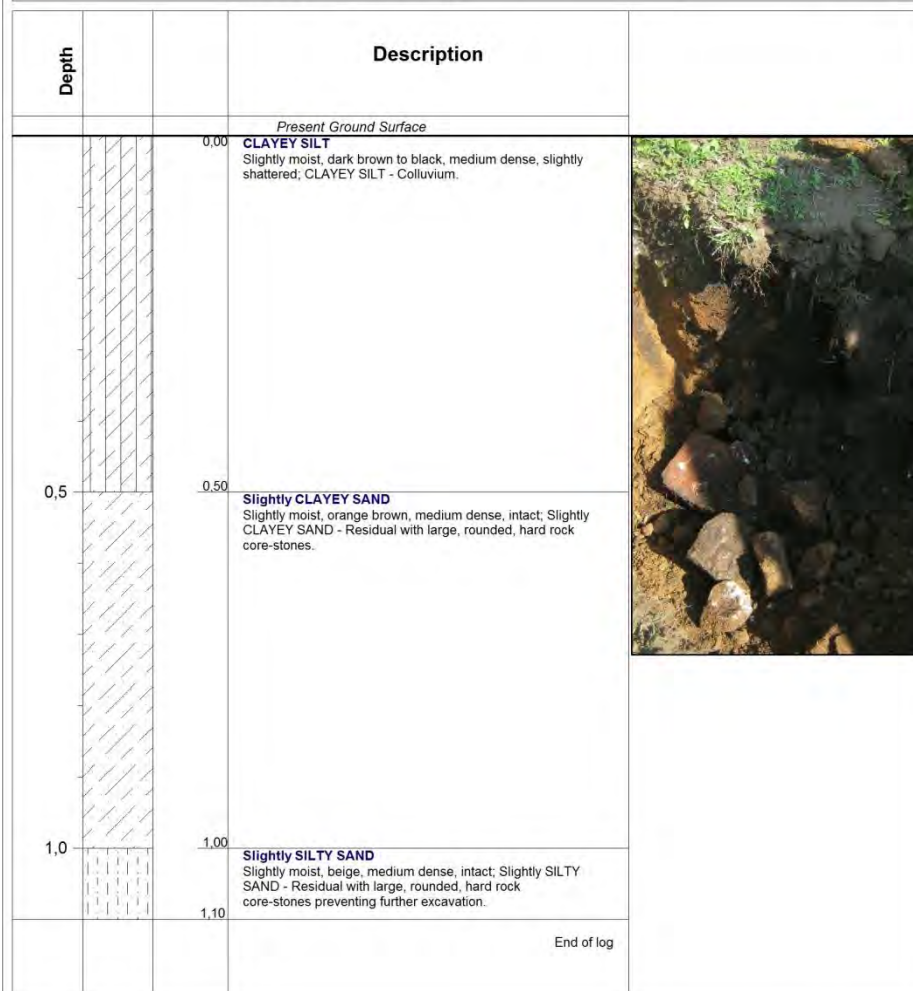


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH39
LATITUDE: 28°49'22.7"S
LONGITUDE: 31°01'51.7"E

Sheet 1 of 1



NOTES: 1: End of hole at 1.1m
2: Refusal at 1.1m
3: No groundwater encountered
4: No sample retrieved
5: Nhg - Halamvu Gneiss

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EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/27
PROFILED BY: MTB

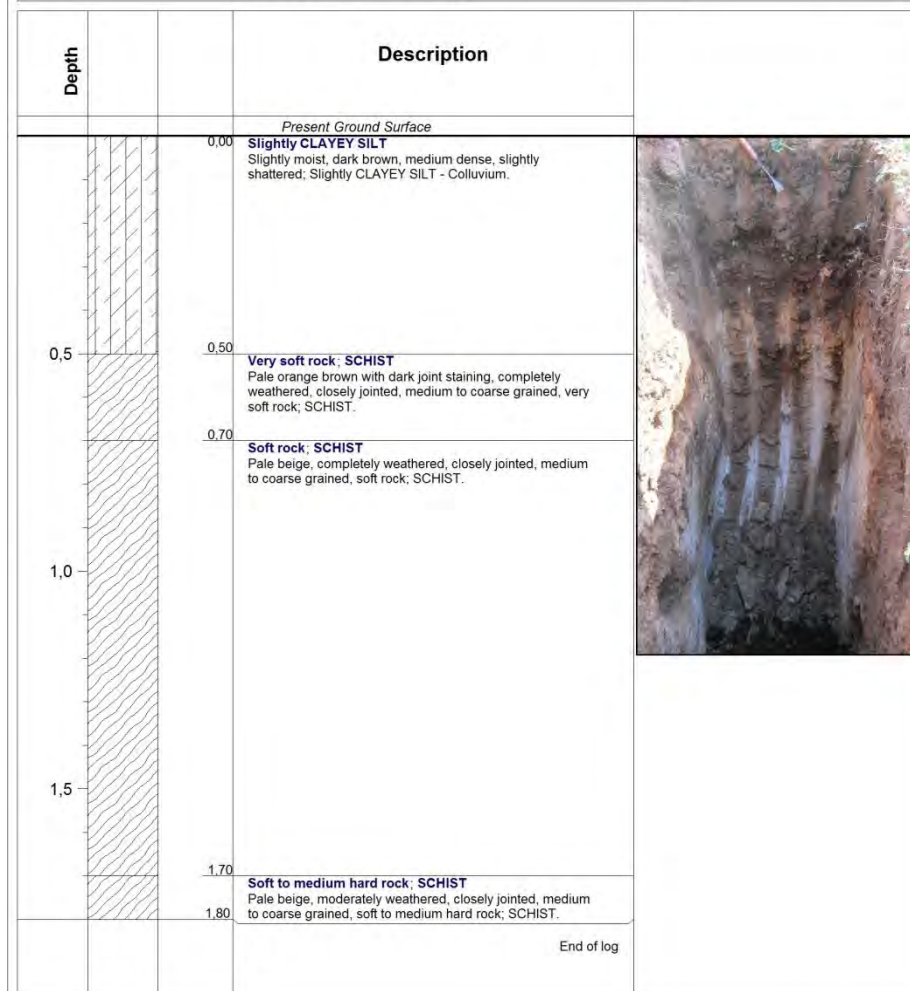


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH40
LATITUDE: 28°49'31.8"S
LONGITUDE: 31°02'26.3"E

Sheet 1 of 1



NOTES: 1: End of hole at 1.8m
2: Nearing refusal at 1.8m
3: No groundwater encountered
4: No sample retrieved
5: Ntu - Tuma Formation
6: Numerous graves near by

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EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/27
PROFILED BY: MTB



TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH41
LATITUDE: 28°49'26.9"S
LONGITUDE: 31°02'51.8"E

Sheet 1 of 1

Depth	Description	
	<i>Present Ground Surface</i>	
0.00	CLAYEY SILT Slightly moist, dark brown to black, medium dense, slightly shattered; CLAYEY SILT - Colluvium.	
0.5		
0.60	Slightly GRAVELLY CLAYEY SILT Slightly moist, brown, dense, shattered; Slightly GRAVELLY CLAYEY SILT - Residual.	
1.0		
1.00	NODULAR CALCARETE Slightly moist, brown with white speckles, dense, intact; NODULAR CALCARETE - Pedogenic.	
1.5		
1.75		
	End of log	

NOTES: 1: End of hole at 1.75m
2: Refusal at 1.75m
3: No groundwater encountered
4: No sample retrieved
5: Nhg - Halambu Gneiss

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EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/27
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TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH42
LATITUDE: 28°49'06.1"S
LONGITUDE: 31°02'07.3"E

Sheet 1 of 1

Depth	Description	
	<i>Present Ground Surface</i>	
0.00	CLAYEY SILT Slightly moist, dark brown to black, medium dense, intact; CLAYEY SILT - Colluvium.	
0.5		
0.50	Slightly GRAVELLY CLAYEY SILT Slightly moist, reddish brown, medium dense becoming dense with depth, slightly shattered; Slightly GRAVELLY CLAYEY SILT - Residual with some gravel.	
1.0		
1.5		
1.80		
	End of log	

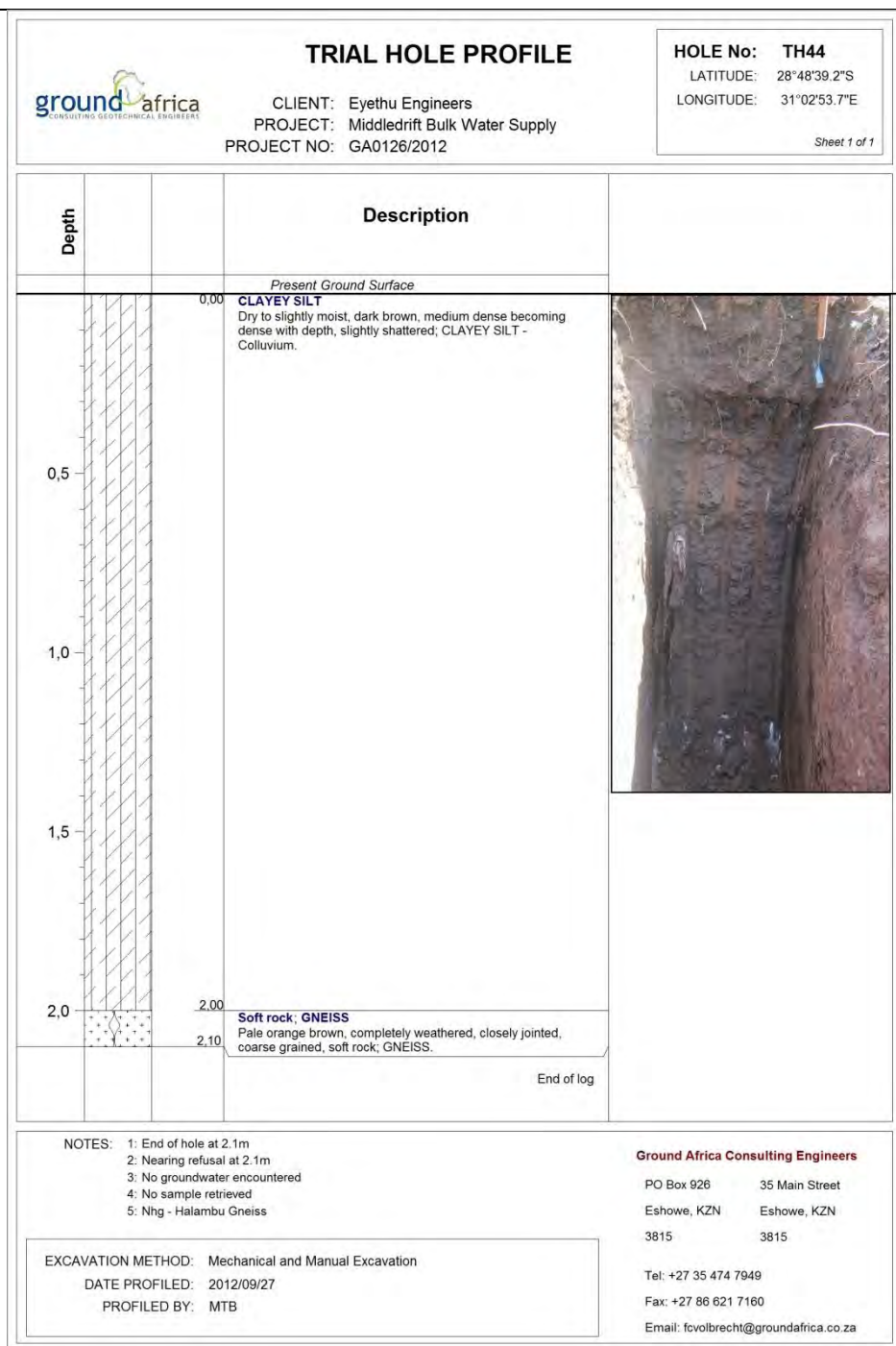
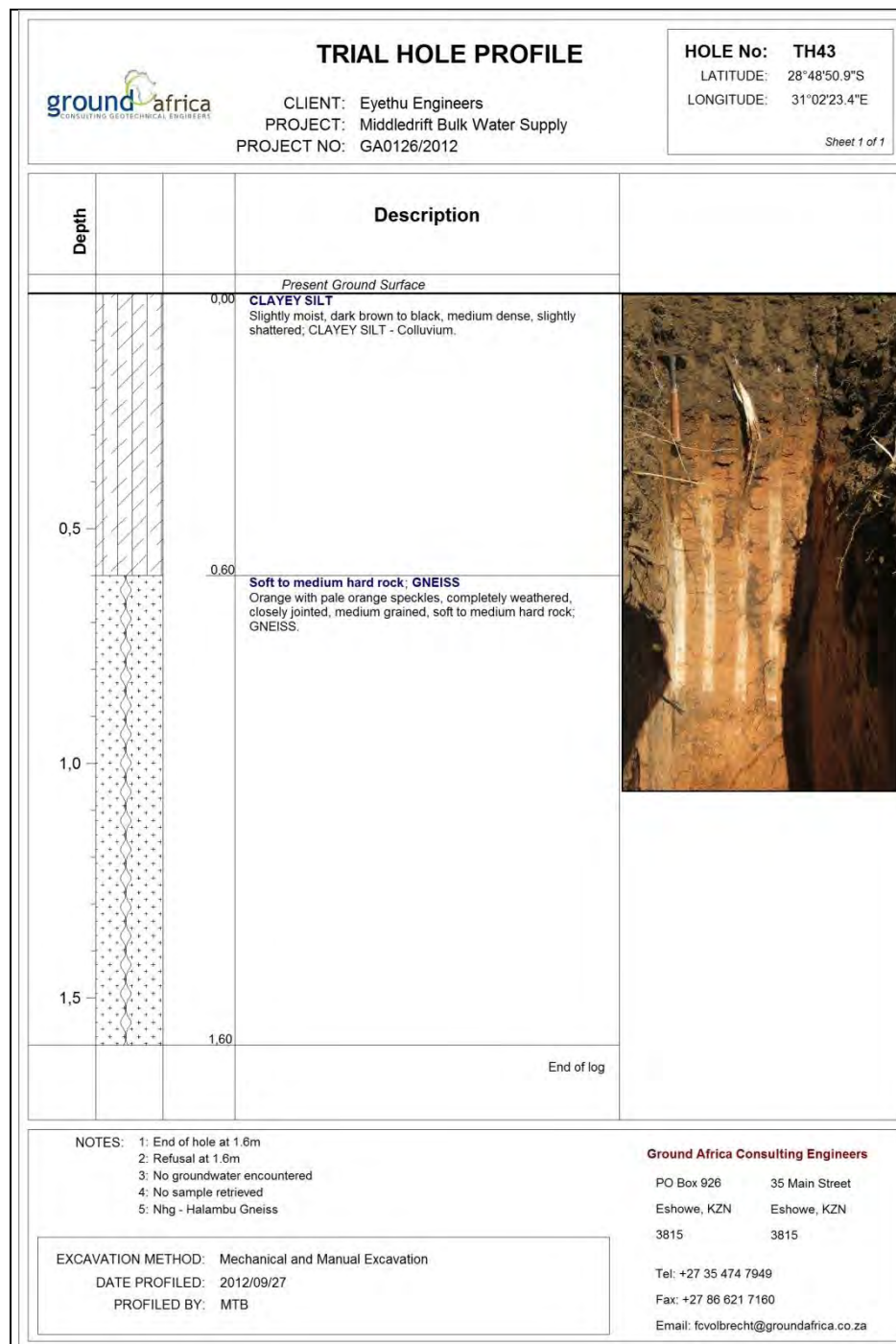
NOTES: 1: End of hole at 1.8m
2: Slow excavation at 1.8m
3: No groundwater encountered
4: No sample retrieved
5: Nhg - Halambu Gneiss

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EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/27
PROFILED BY: MTB



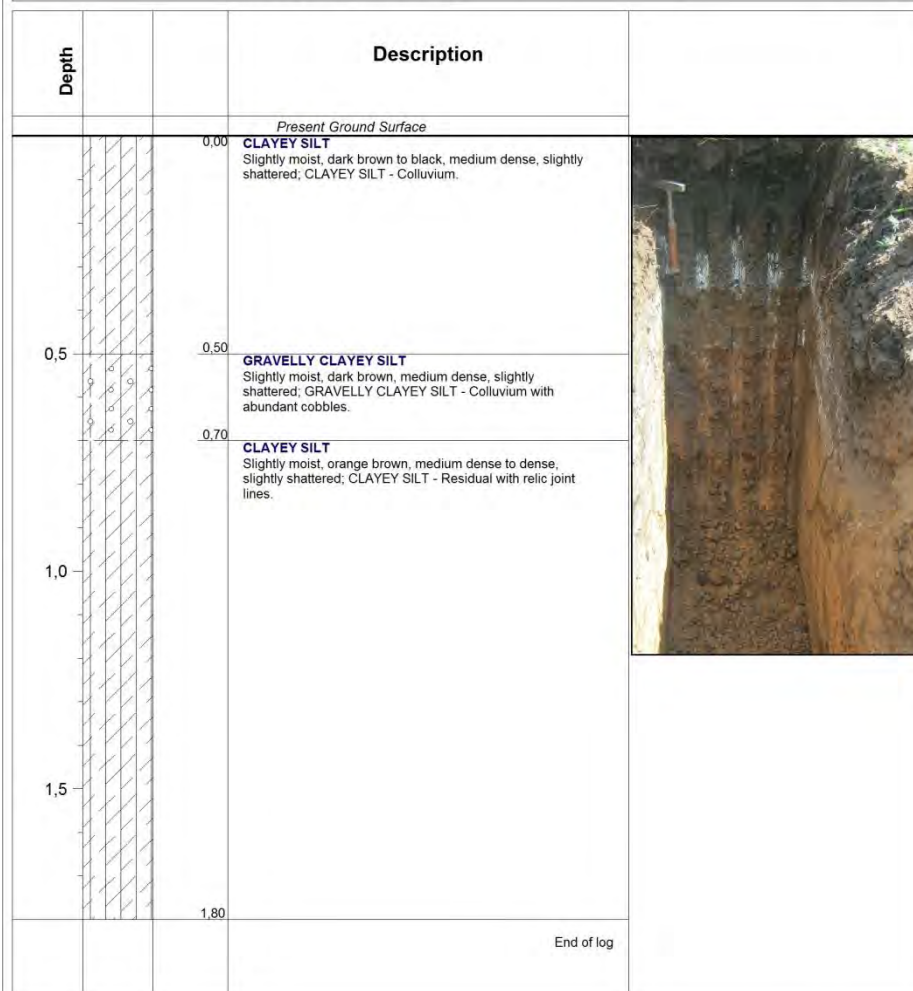


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH45
LATITUDE: 28°48'56.7"S
LONGITUDE: 31°03'19.6"E

Sheet 1 of 1



NOTES: 1: End of hole at 1.8m
2: No refusal
3: No groundwater encountered
4: No sample retrieved
5: Nhg - Halambu Gneiss

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EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/27
PROFILED BY: MTB

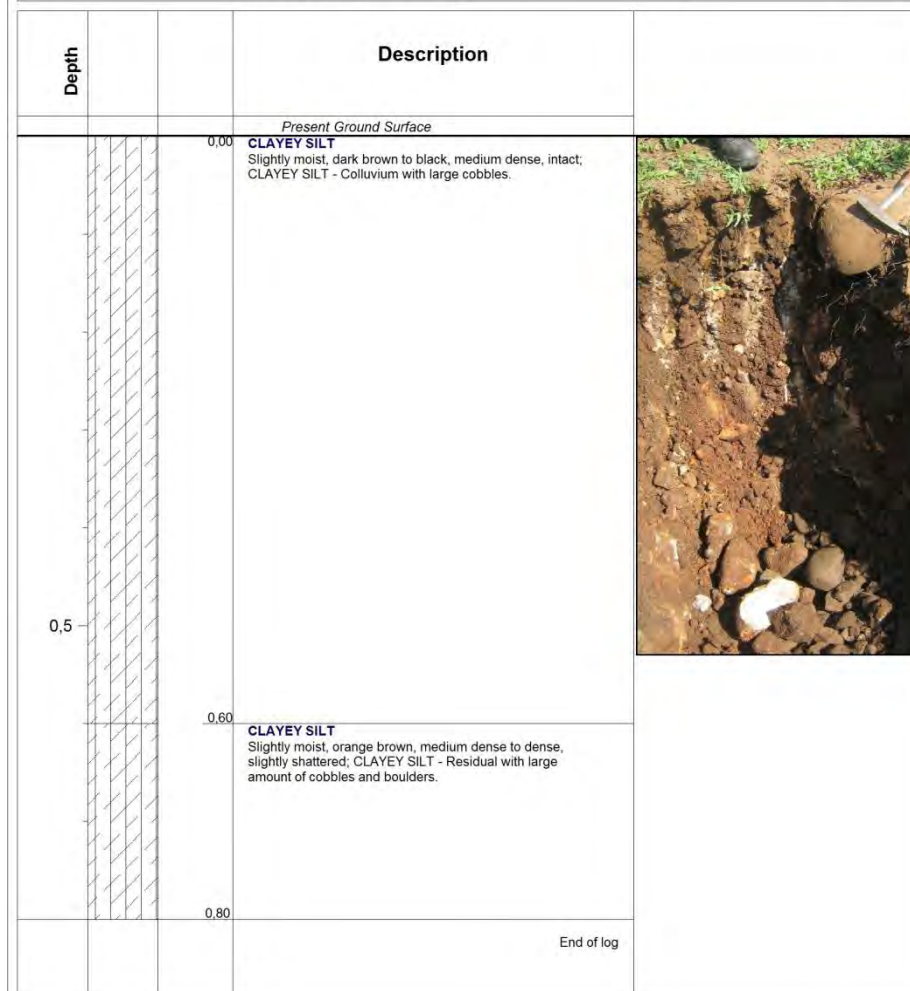


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH46
LATITUDE: 28°49'14.2"S
LONGITUDE: 31°03'23.1"E

Sheet 1 of 1



NOTES: 1: End of hole at 0.8m
2: Refusal at 0.8m
3: No groundwater encountered
4: No sample retrieved
5: Nhg - Halambu Gneiss

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EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/27
PROFILED BY: MTB

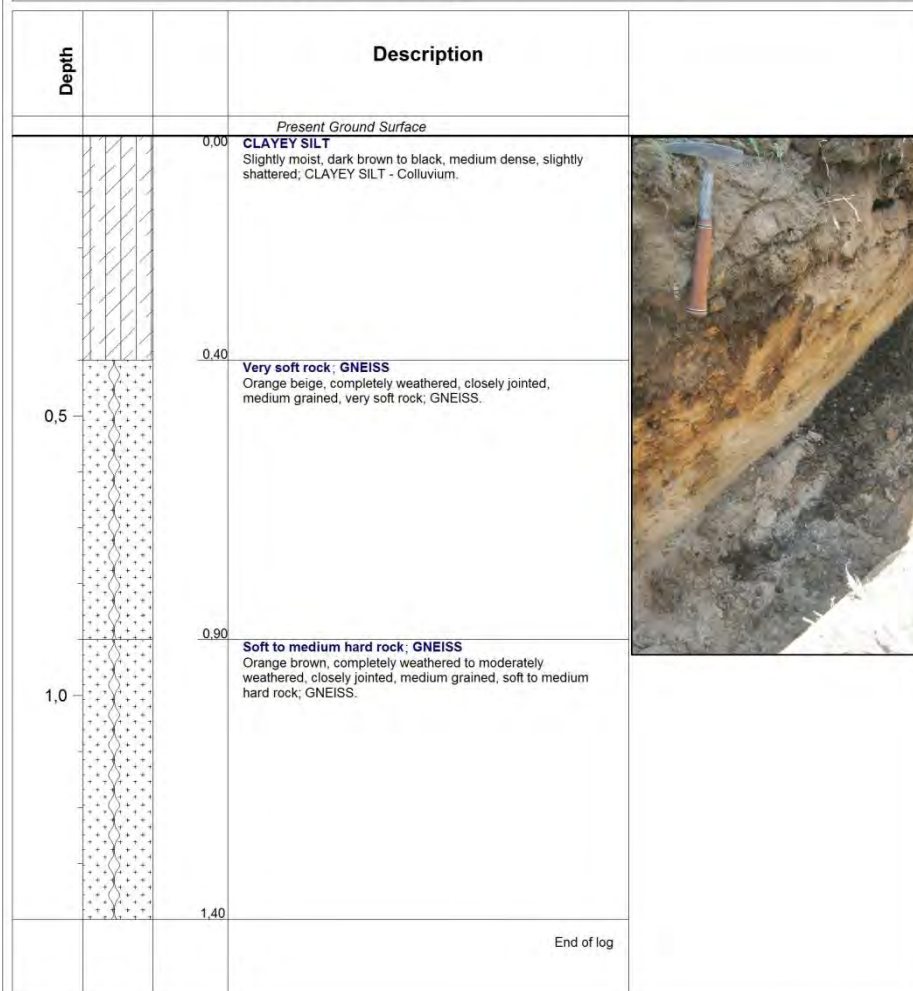


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH47
LATITUDE: 28°48'57.56"S
LONGITUDE: 31°3'34.55"E

Sheet 1 of 1



NOTES: 1: End of hole at 1.4m
2: Nearing refusal at 1.4m
3: No groundwater encountered
4: No sample retrieved
5: Nhg - Halambu Gneiss

EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/27
PROFILED BY: MTB

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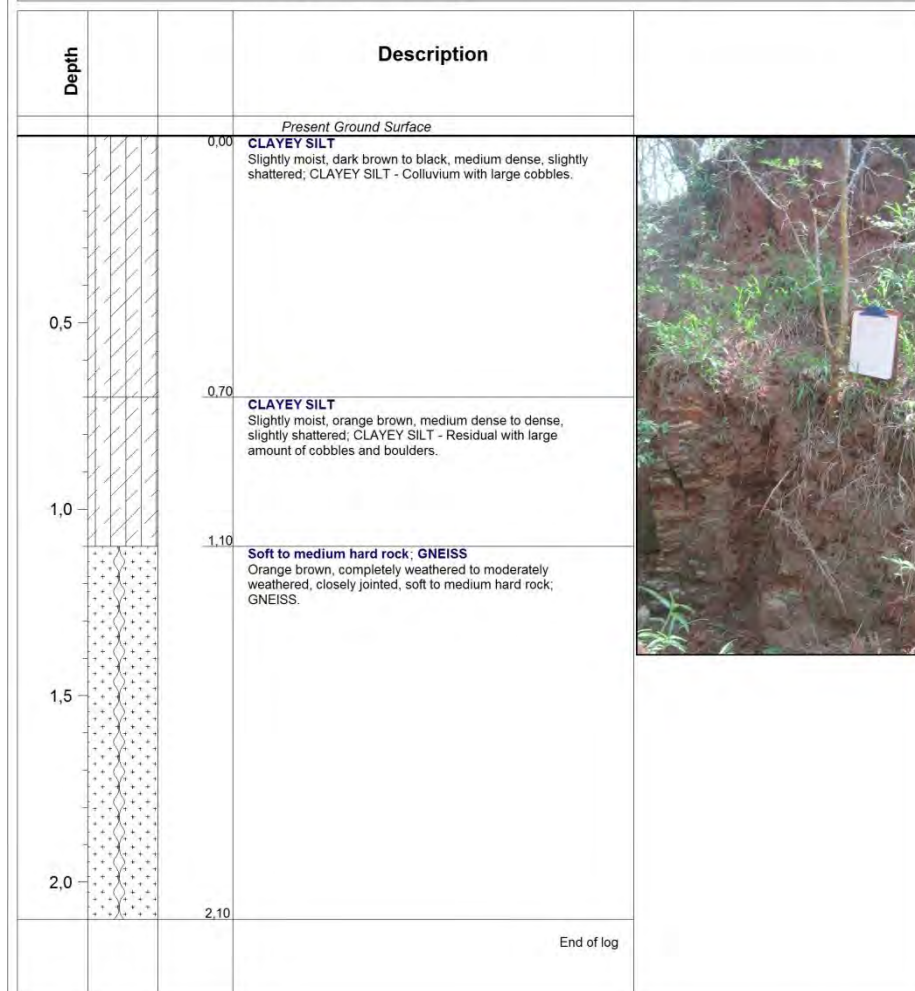


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH48
LATITUDE: 28°48'38.1"S
LONGITUDE: 31°03'25.6"E

Sheet 1 of 1



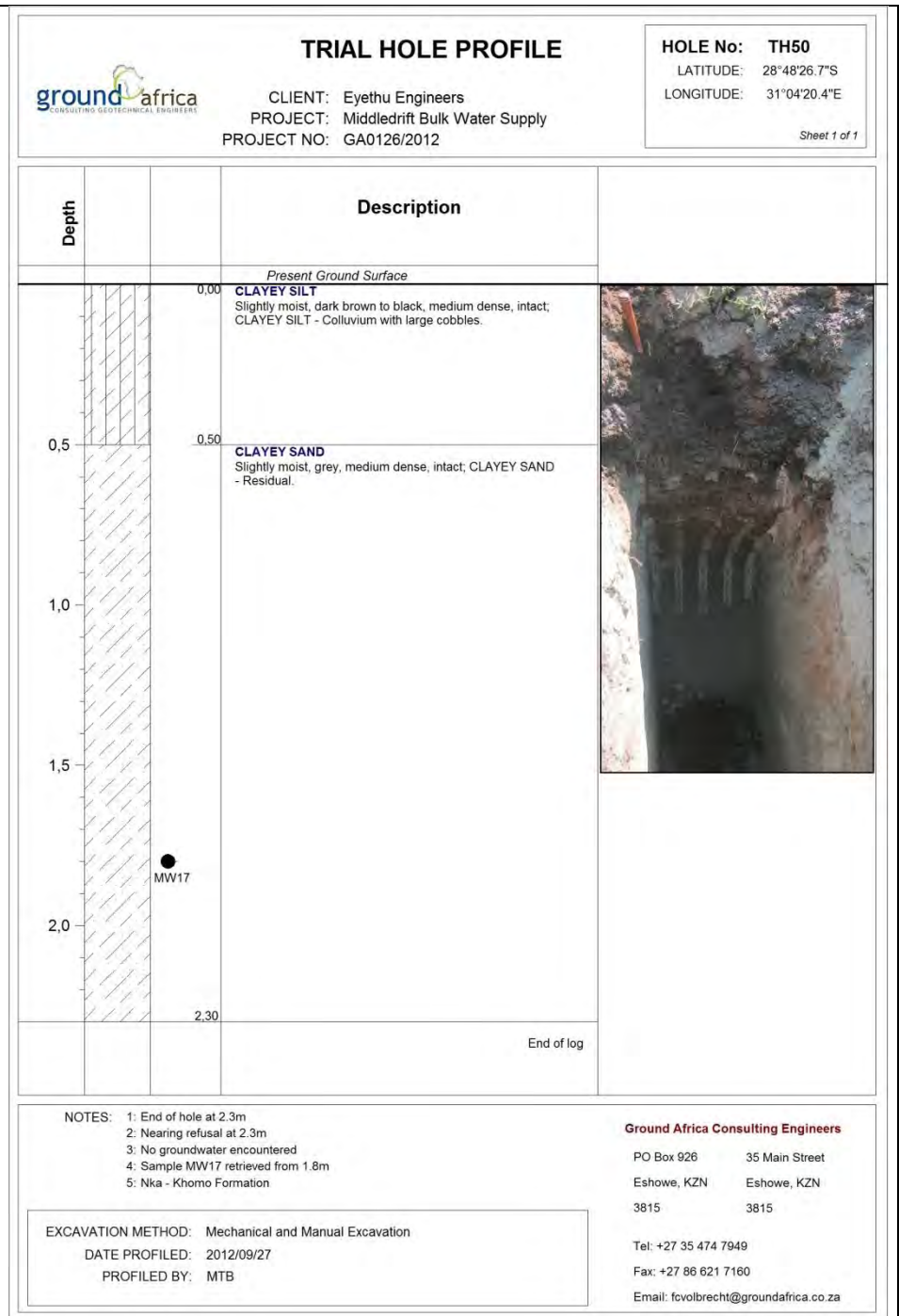
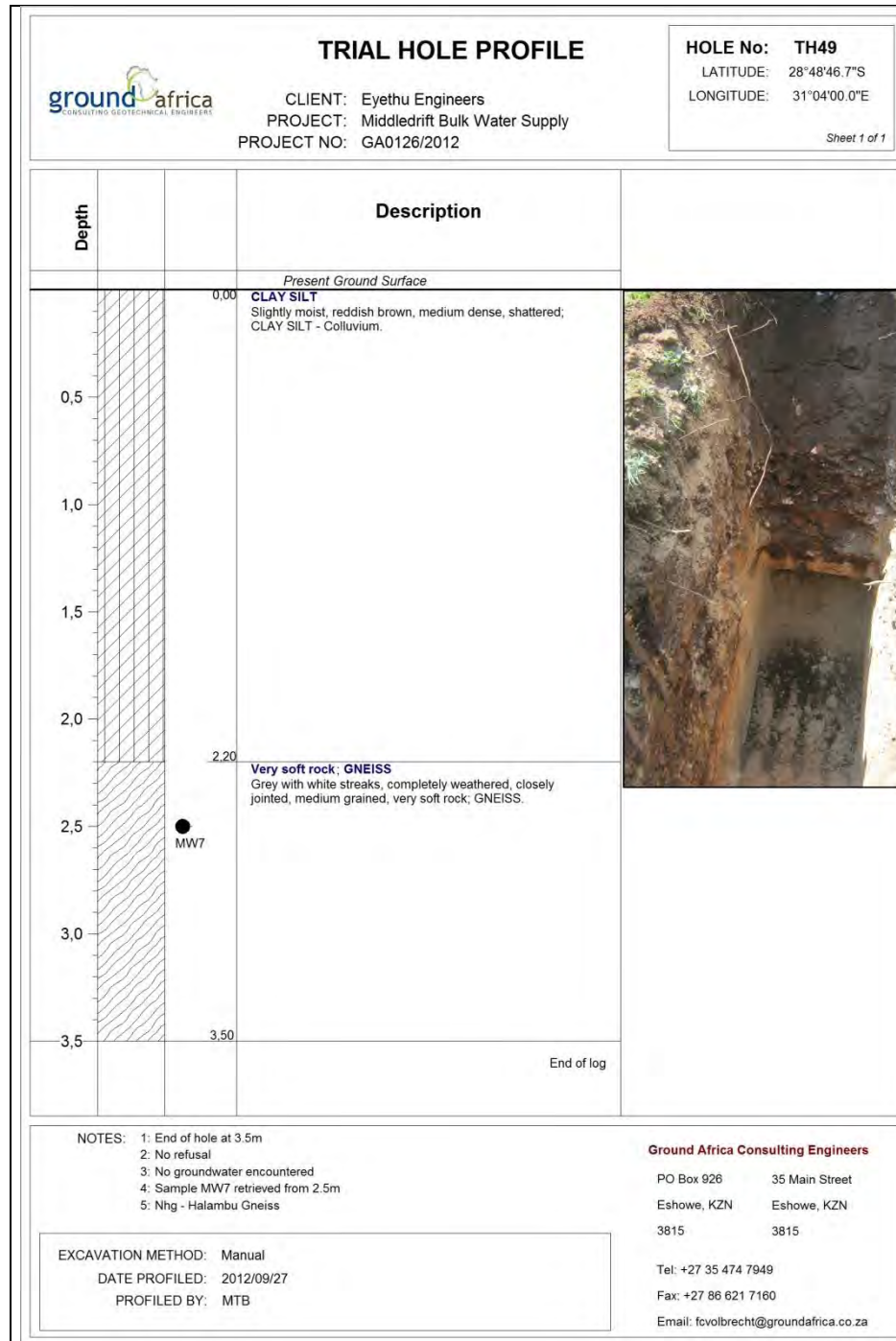
NOTES: 1: End of hole at 2.1m
2: Refusal at 2.1m
3: No groundwater encountered
4: No sample retrieved
5: Nhg - Halambu Gneiss

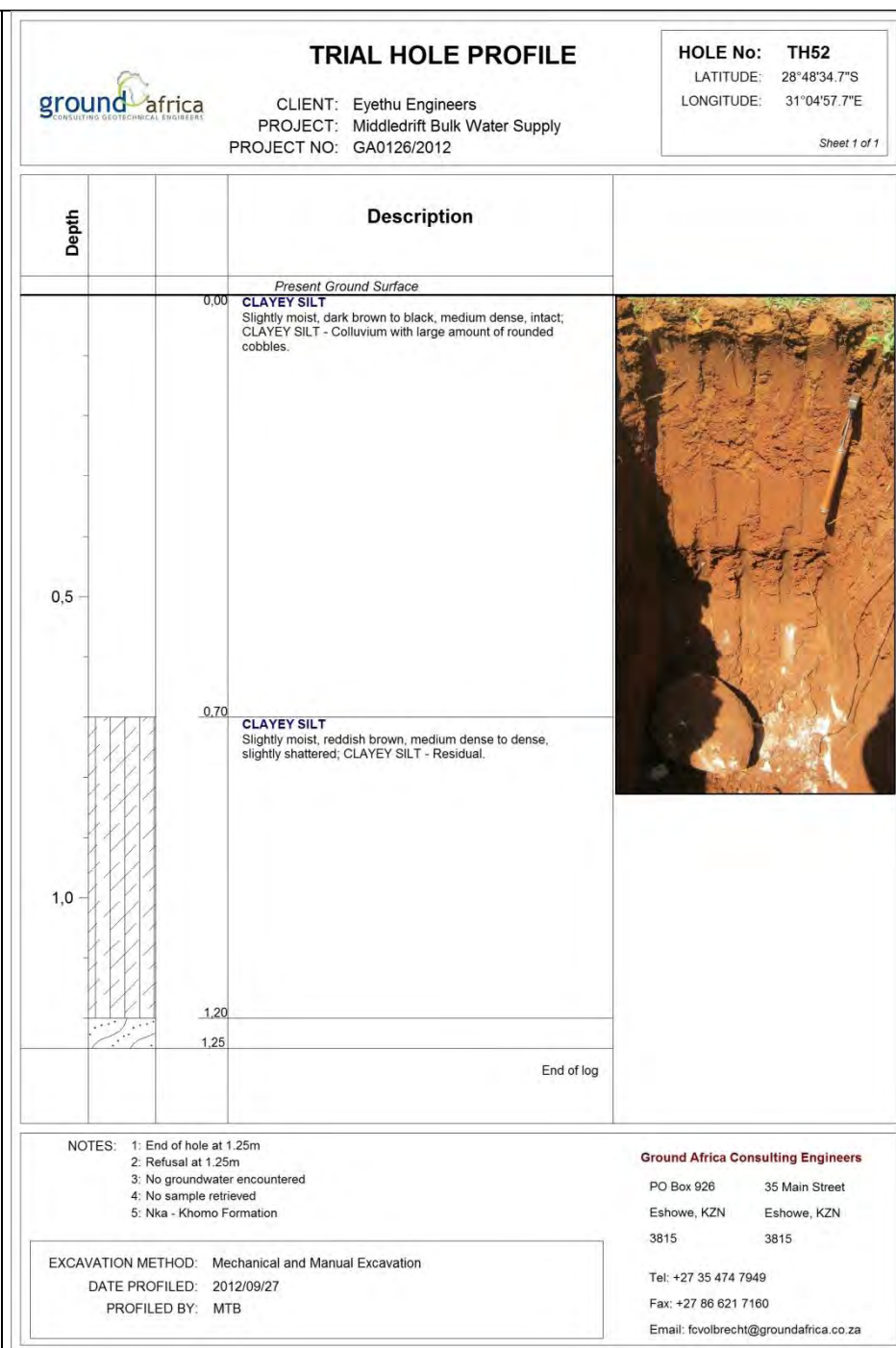
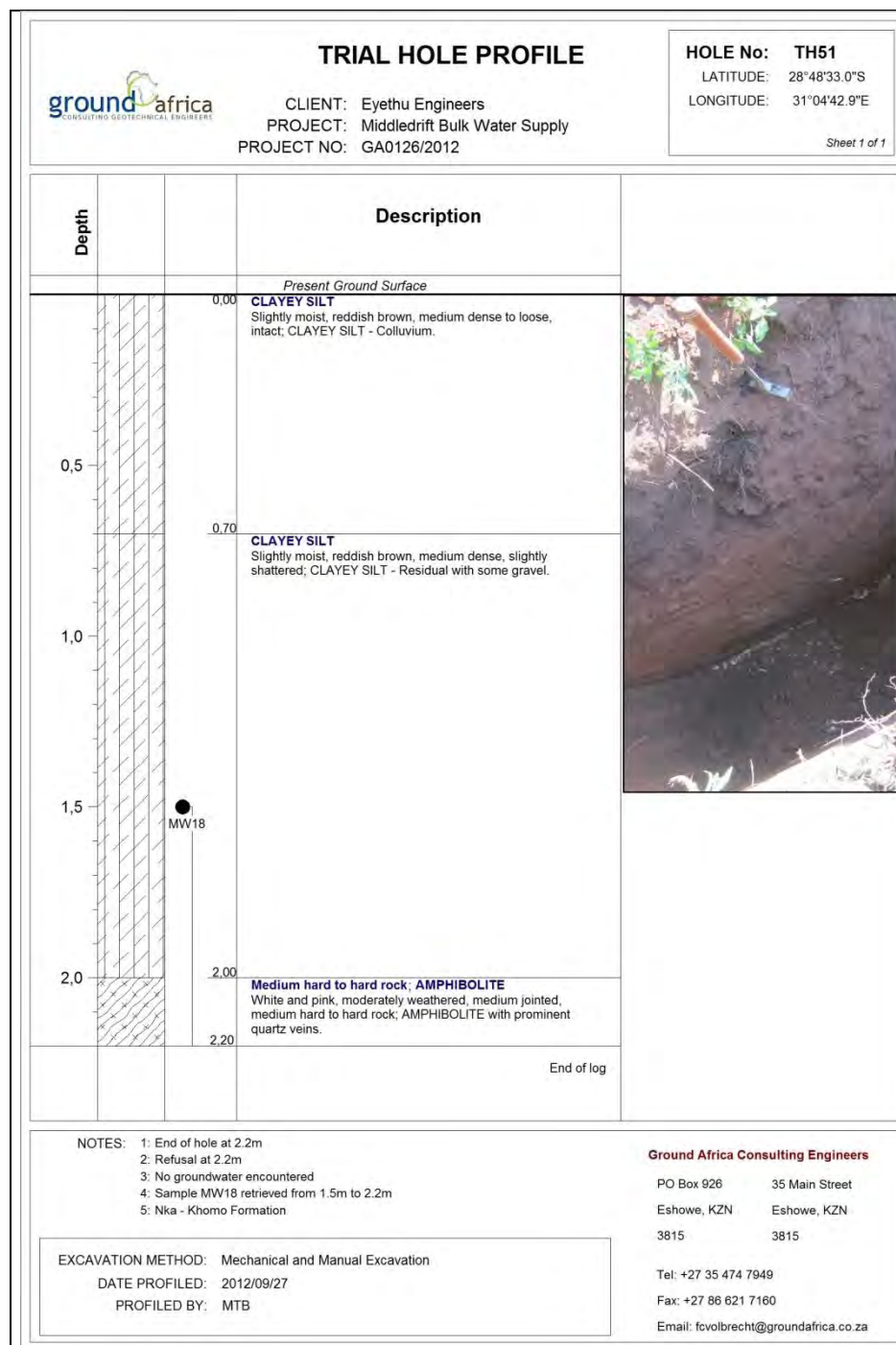
EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/27
PROFILED BY: MTB

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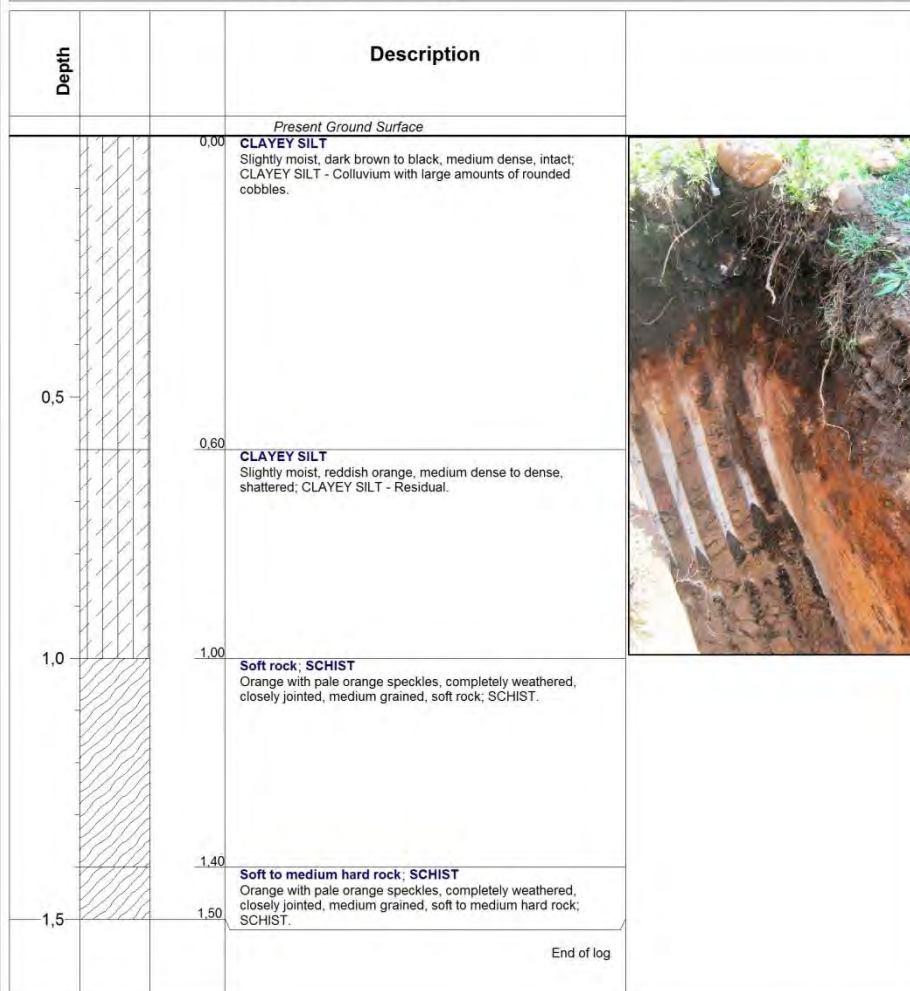


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH53
LATITUDE: 28°48'03.6"S
LONGITUDE: 31°04'52.9"E

Sheet 1 of 1



NOTES: 1: End of hole at 1.5m
2: Refusal at 1.5m
3: No groundwater encountered
4: No sample retrieved
5: Ntu - Tuma Formation

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EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/27
PROFILED BY: MTB

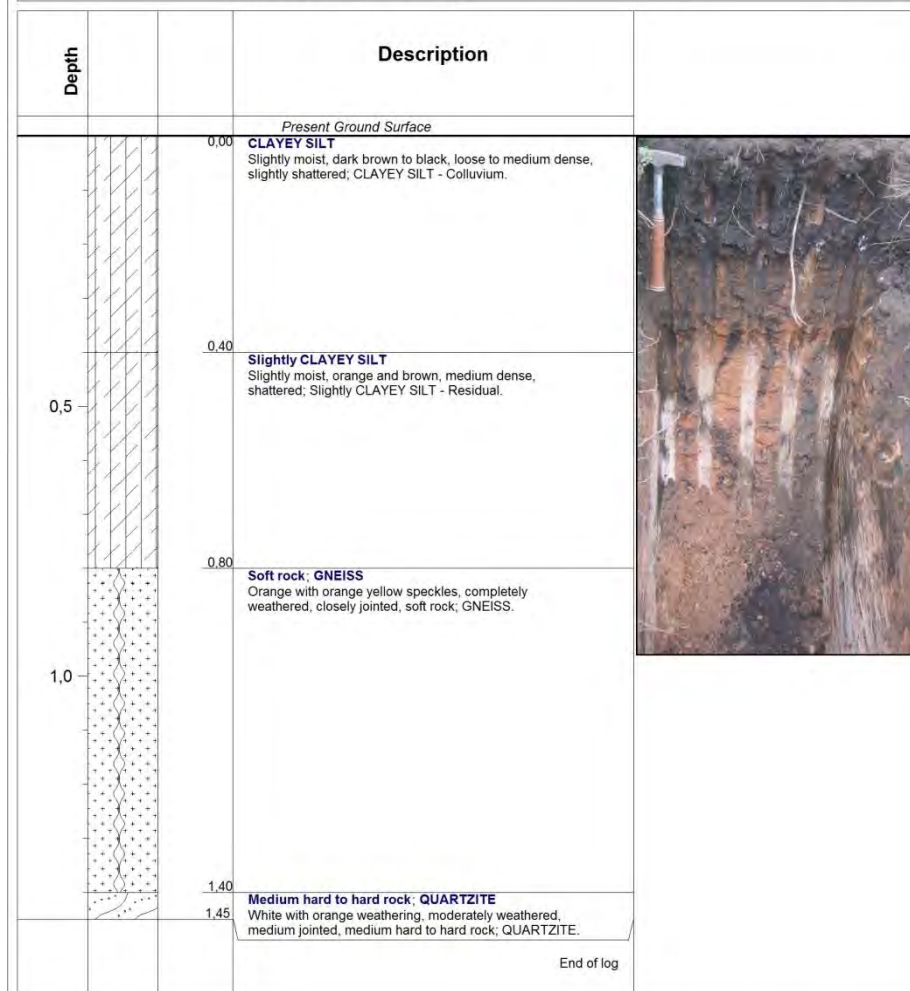


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH54
LATITUDE: 28°48'41.9"S
LONGITUDE: 31°02'04.1"E

Sheet 1 of 1



NOTES: 1: End of hole at 1.45m
2: Refusal at 1.45m
3: No groundwater encountered
4: No sample retrieved
5: Nhlg - Hlammbu Gneiss

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EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/28
PROFILED BY: MTB



TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH55
LATITUDE: 28°48'30.1"S
LONGITUDE: 31°01'44.4"E

Sheet 1 of 1

Depth	Description	
	Present Ground Surface	
0.00	Very Slightly CLAYEY SILT Slightly moist, dark brown, medium dense, intact; Very Slightly CLAYEY SILT - Colluvium.	
0.40	CLAY SILT Dry to slightly moist, red brown, medium dense, slightly shattered; CLAY SILT - Residual.	
1.70	Scattered CLAYEY SILT Slightly moist, orange brown, medium dense, slightly shattered; Scattered CLAYEY SILT - Residual with some ferricrete nodules.	
2.50	End of log	

NOTES: 1: End of hole at 2.5m
2: No refusal
3: No groundwater encountered
4: No sample retrieved
5: Nza - Zwaneni Formation

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EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/28
PROFILED BY: MTB



TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH56
LATITUDE: 28°48'48.6"S
LONGITUDE: 31°01'04.5"E

Sheet 1 of 1

Depth	Description	
	Present Ground Surface	
0.00	CLAY SILT Dry to slightly moist, red brown, medium dense, slightly shattered; CLAY SILT - Residual.	
0.5		
1.0		
1.5		
2.0		
2.5		
2.70	End of log	

NOTES: 1: End of hole at 2.7m
2: No refusal
3: No groundwater encountered
4: No sample retrieved
5: Nza - Zwaneni Formation

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EXCAVATION METHOD: Manual
DATE PROFILED: 2012/09/28
PROFILED BY: MTB

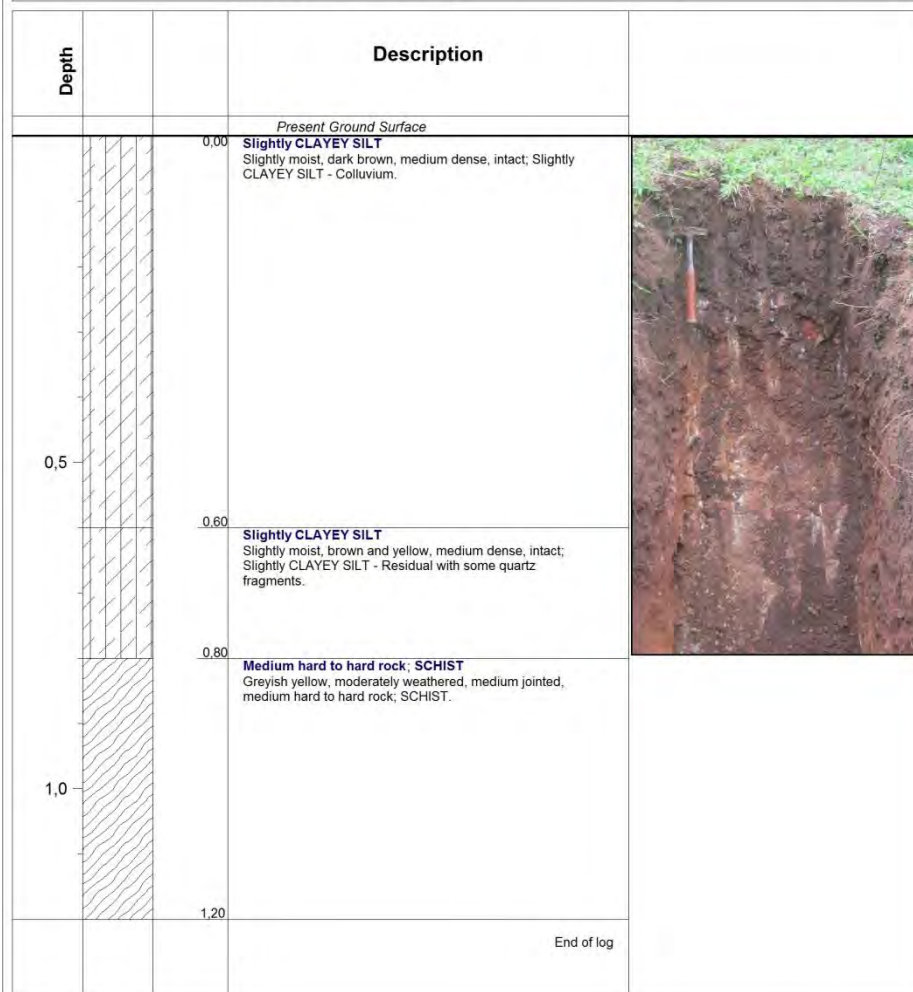


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH57
LATITUDE: 28°48'47"S
LONGITUDE: 31°00'34.6"E

Sheet 1 of 1



NOTES: 1: End of hole at 1.2m
2: Refusal at 1.2m
3: No groundwater encountered
4: No sample retrieved
5: Ng - Gazeni Formation

EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/28
PROFILED BY: MTB

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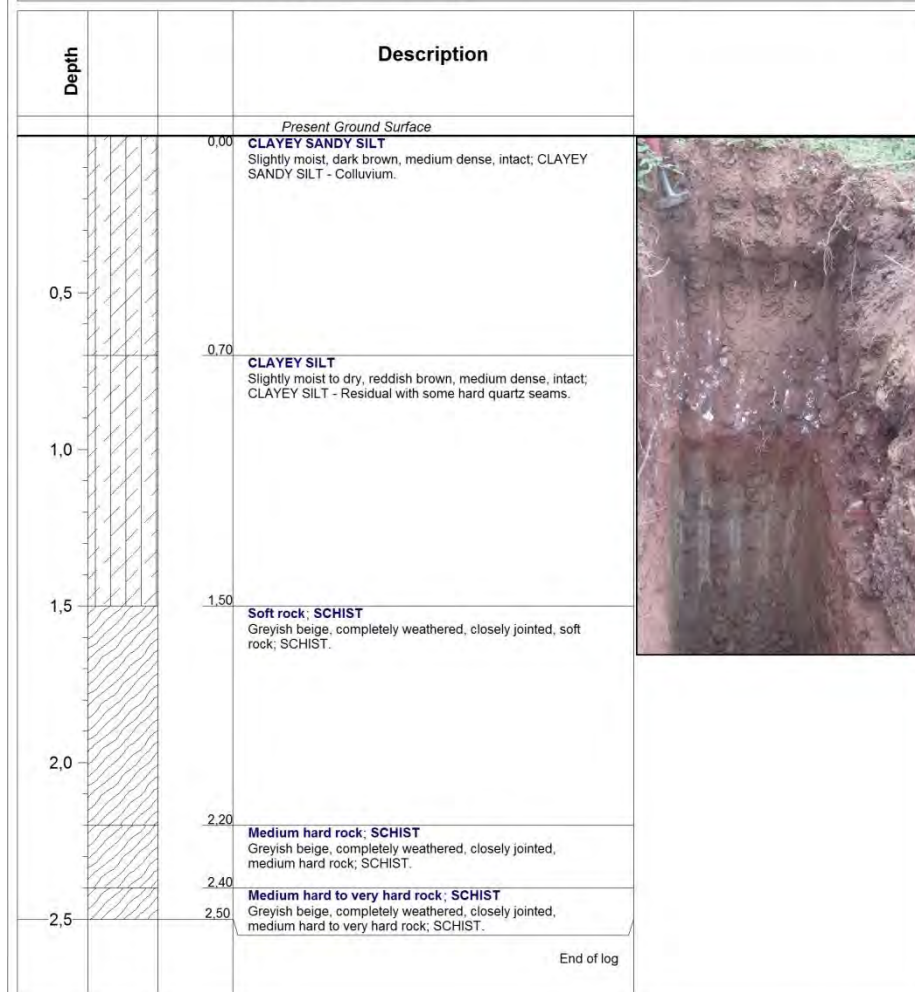


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH58
LATITUDE: 28°49'12.1"S
LONGITUDE: 31°00'42.7"E

Sheet 1 of 1



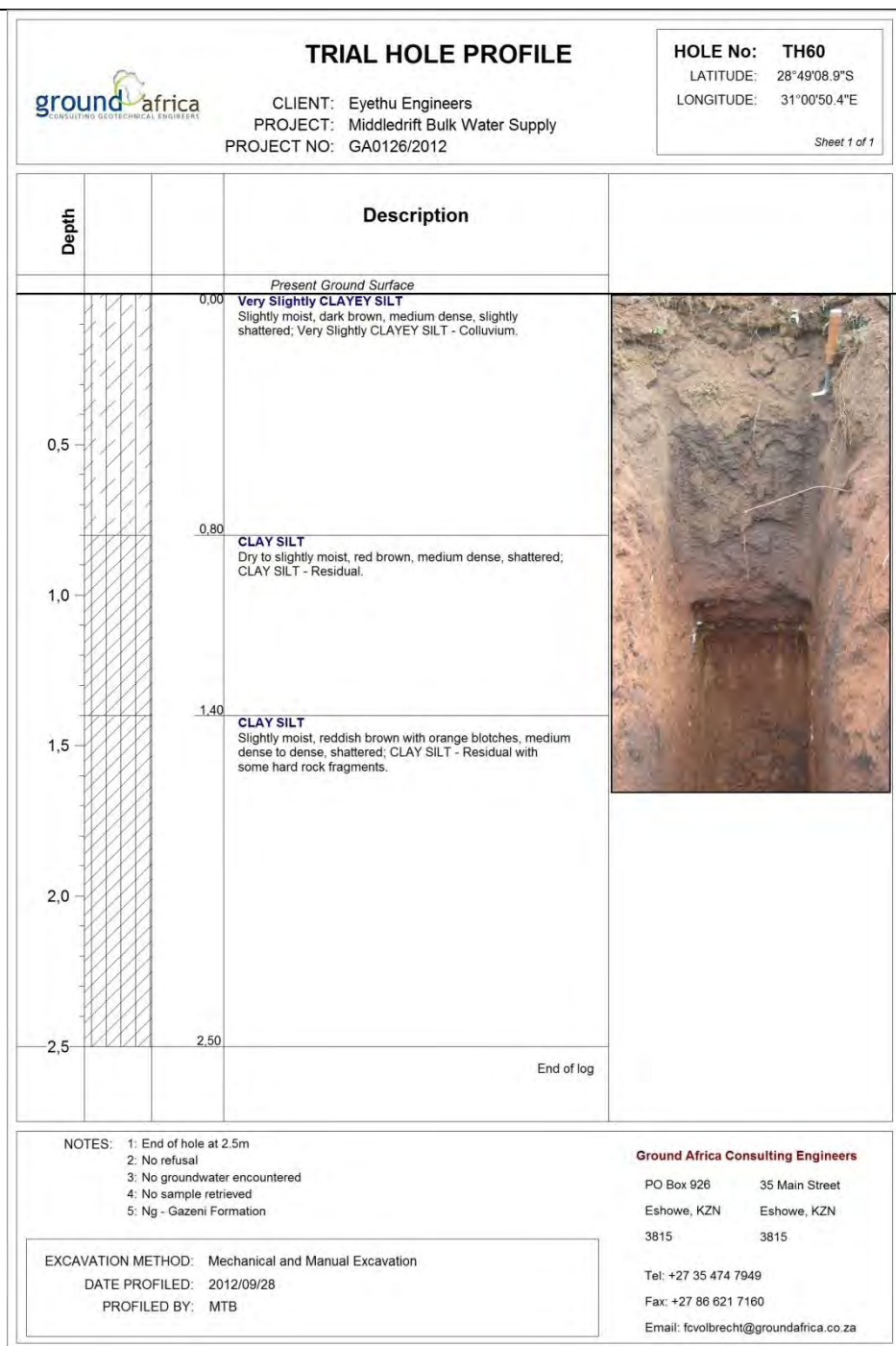
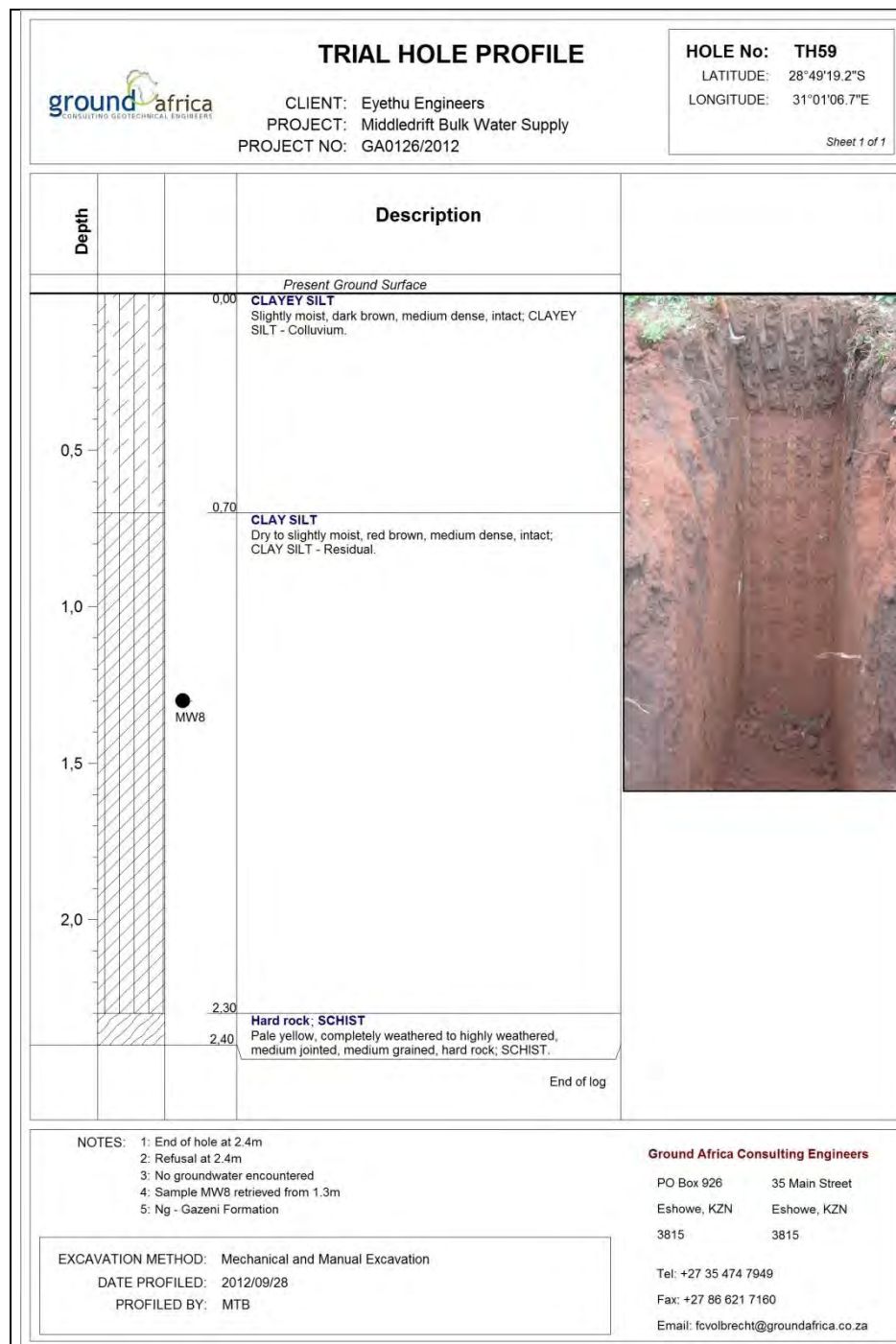
NOTES: 1: End of hole at 2.5m
2: No refusal
3: No groundwater encountered
4: No sample retrieved
5: Ng - Gazeni Formation

EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/28
PROFILED BY: MTB

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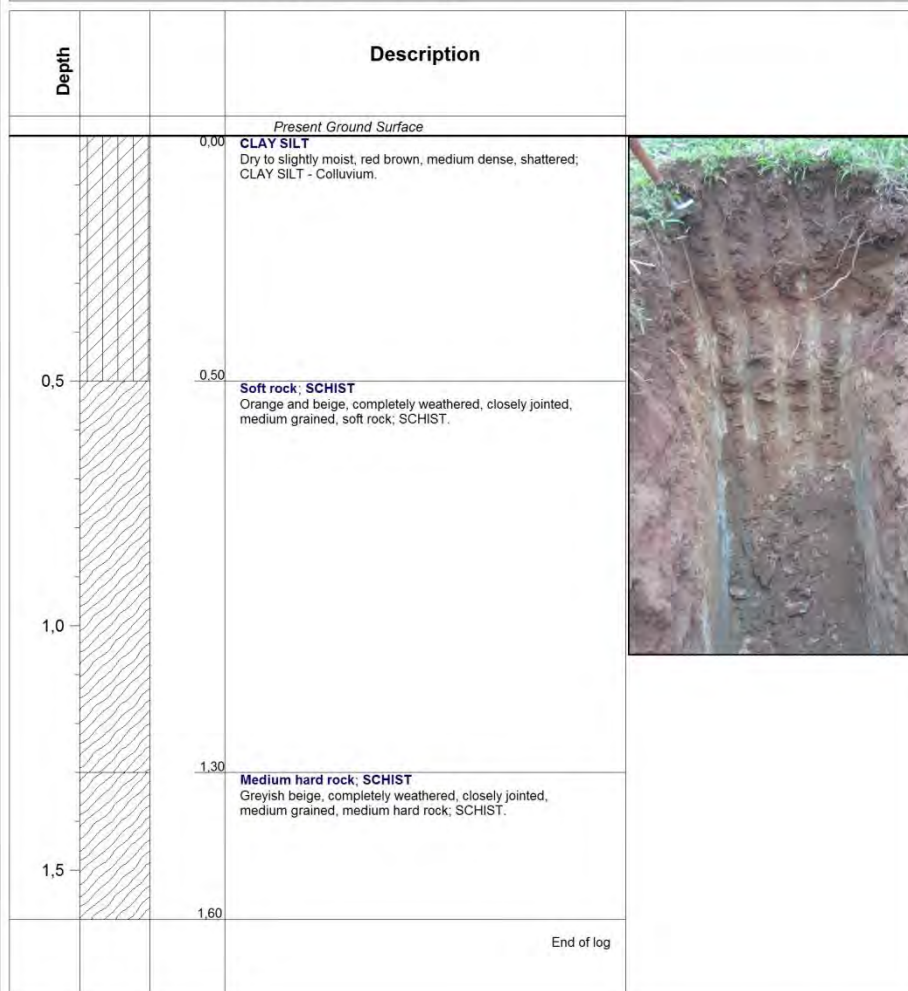


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH61
LATITUDE: 28°48'17.8"S
LONGITUDE: 31°01'38.0"E

Sheet 1 of 1



NOTES: 1: End of hole at 1.6m
2: Nearing refusal at 1.6m
3: No groundwater encountered
4: No sample retrieved
5: Ntu - Tuma Formation

EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/28
PROFILED BY: MTB

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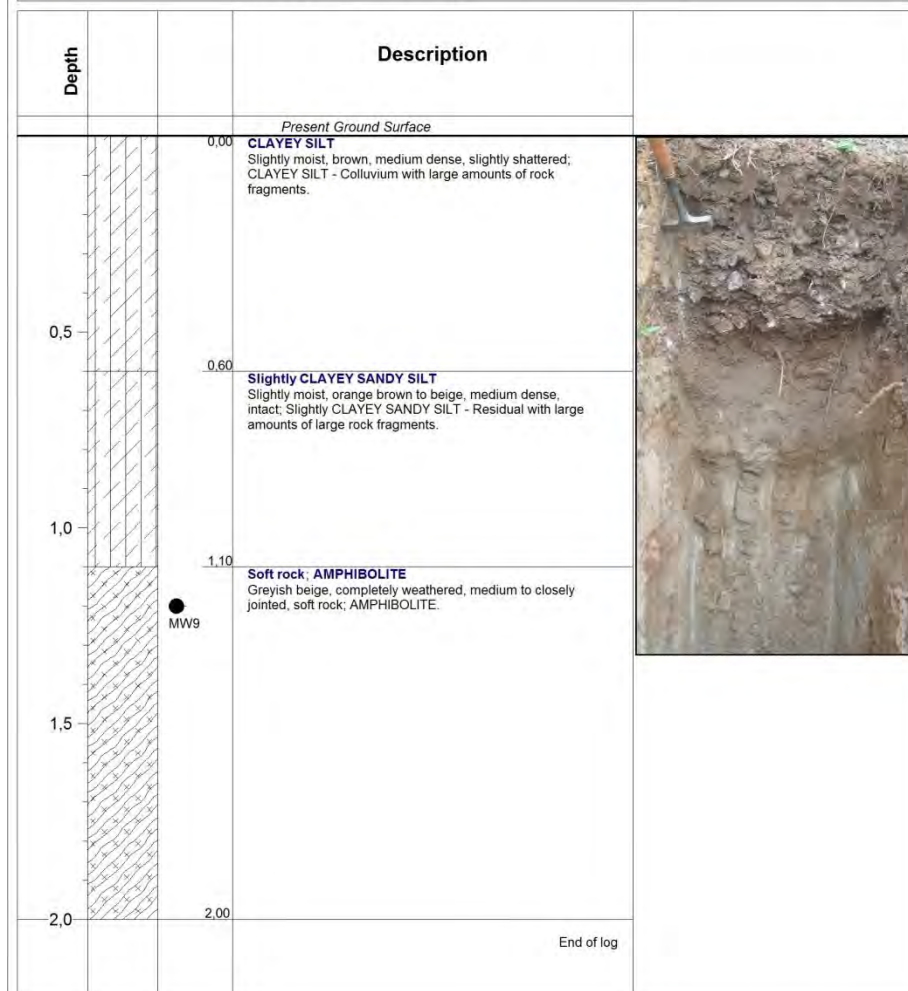


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH62
LATITUDE: 28°48'12.9"S
LONGITUDE: 31°02'12.8"E

Sheet 1 of 1



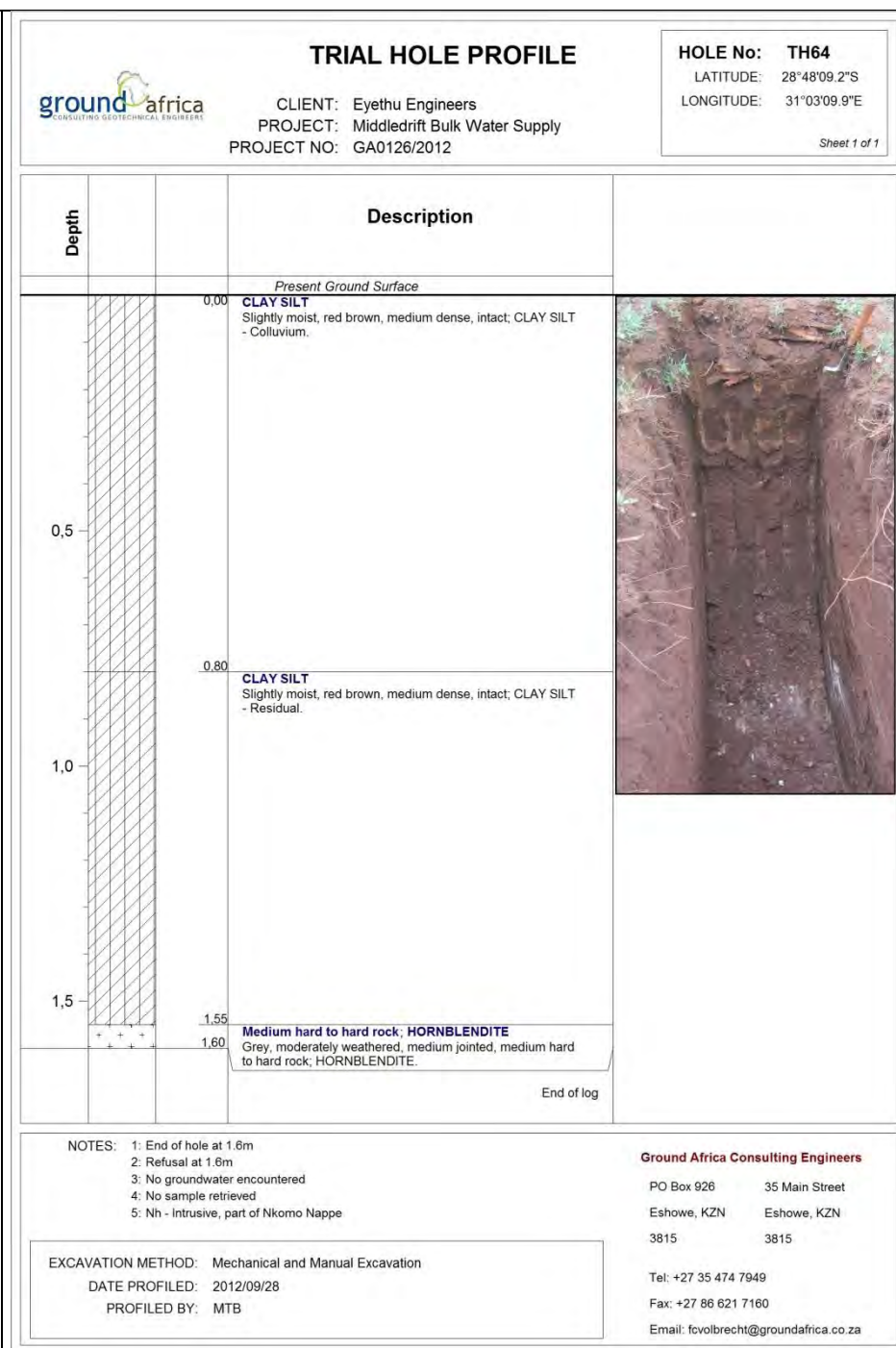
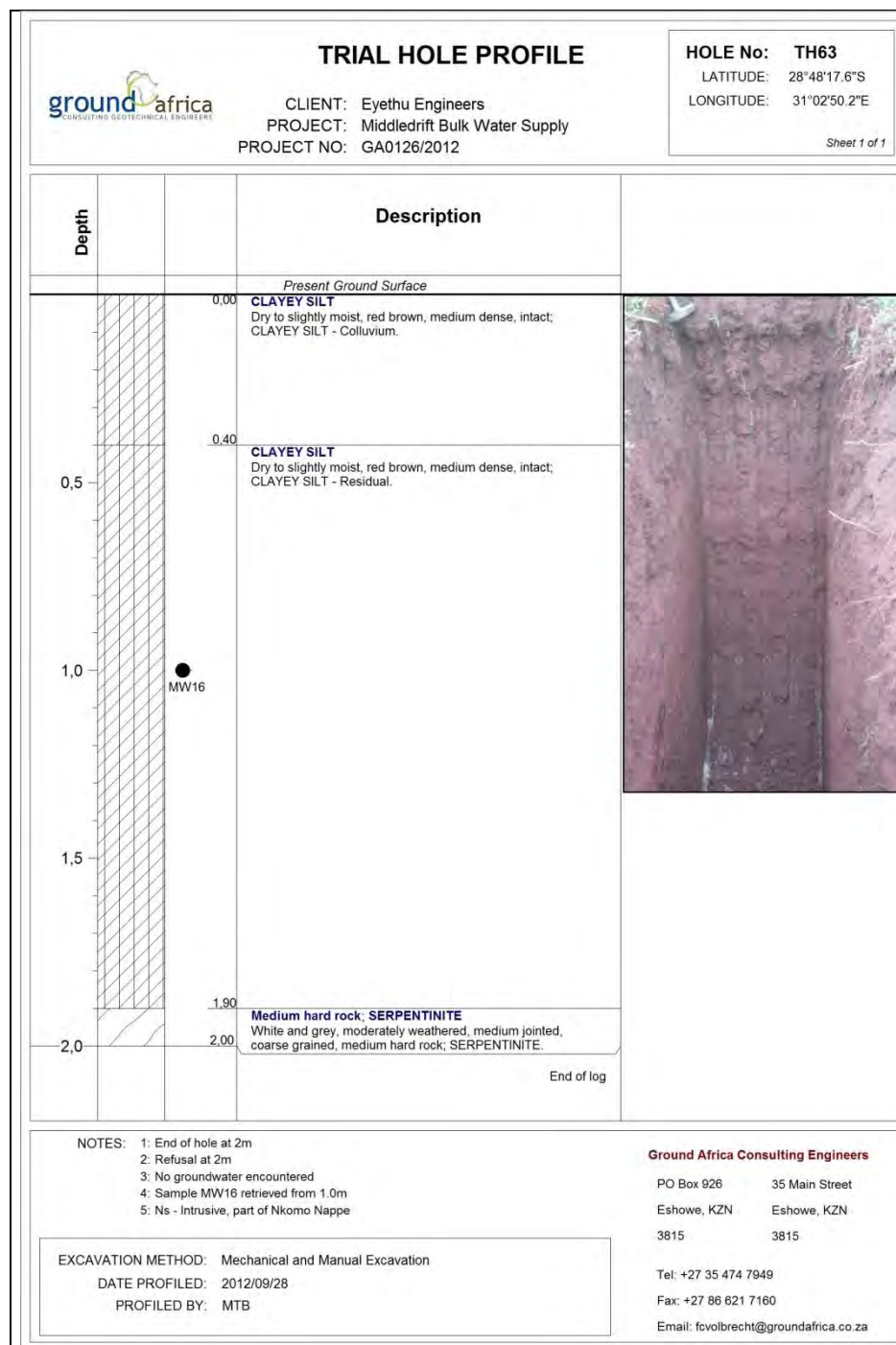
NOTES: 1: End of hole at 2m
2: Nearing refusal at 2m
3: No groundwater encountered
4: Sample MW9 retrieved from 1.2m
5: Ntu - Tuma Formation

EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/28
PROFILED BY: MTB

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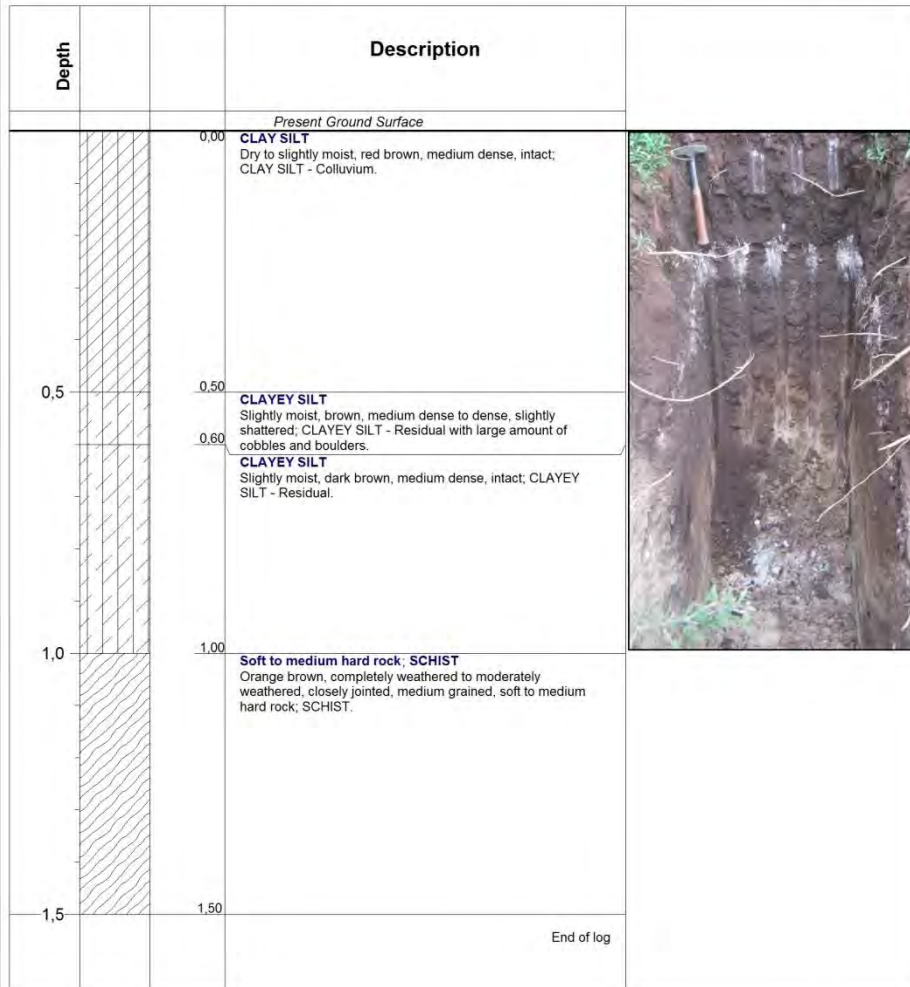


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH65
LATITUDE: 28°48'30.5"S
LONGITUDE: 31°02'56.2"E

Sheet 1 of 1



NOTES: 1: End of hole at 1.5m
2: Refusal at 1.5m
3: No groundwater encountered
4: No sample retrieved
5: Nka - Khomo Formation

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EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/28
PROFILED BY: MTB

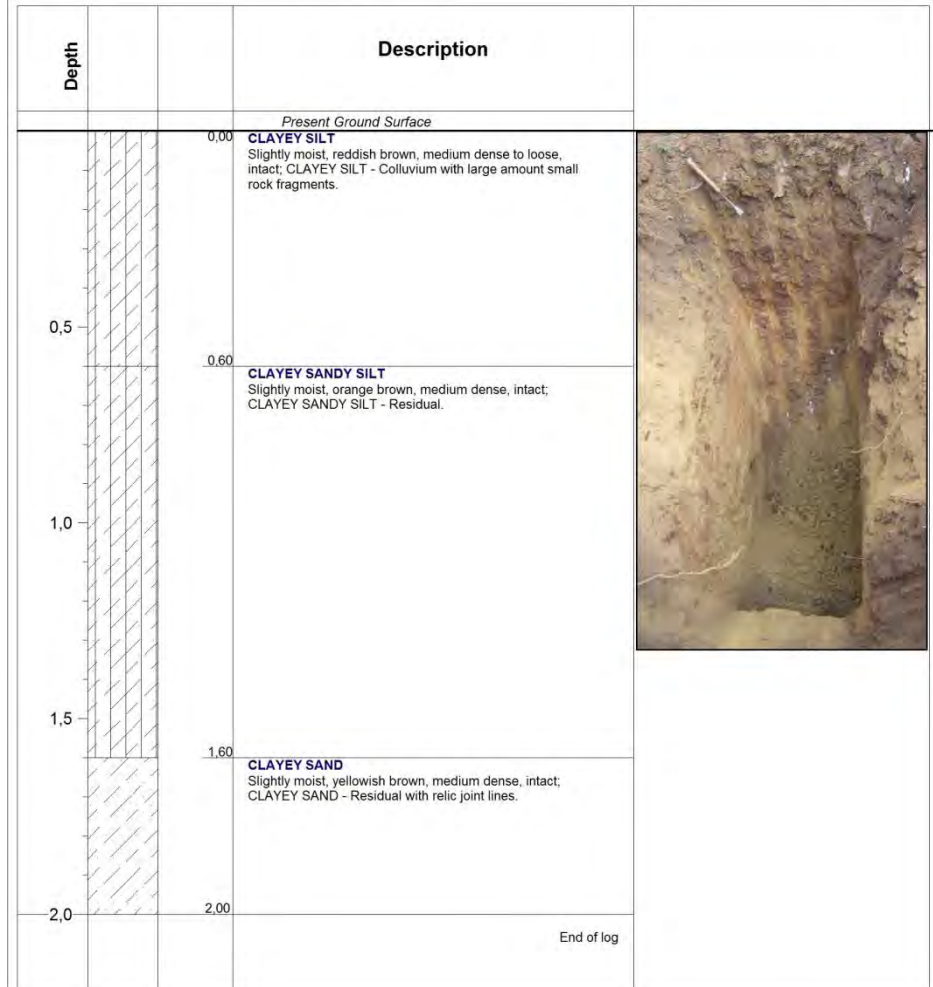


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH66
LATITUDE: 28°47'59.9"S
LONGITUDE: 31°02'08.2"E

Sheet 1 of 1



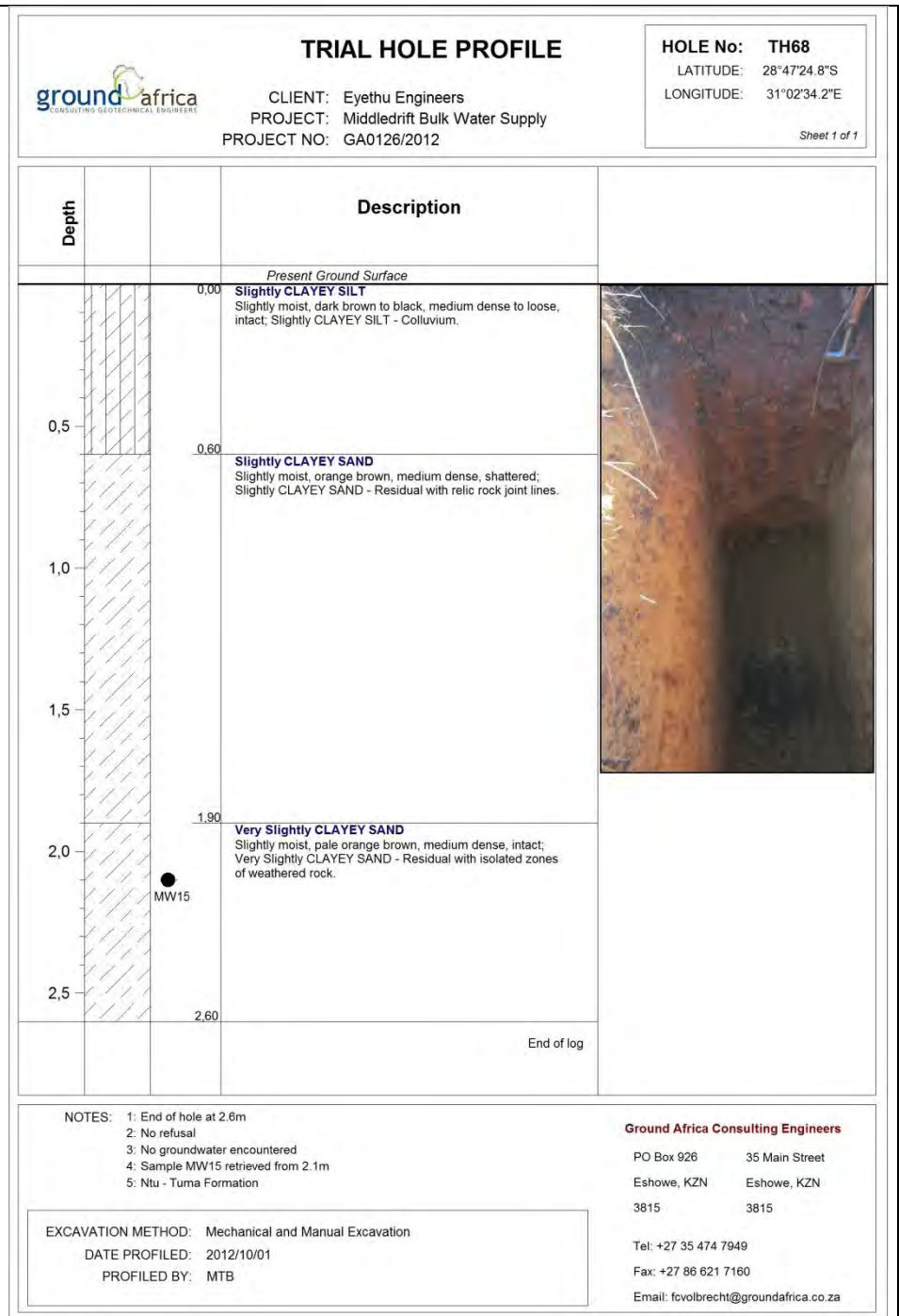
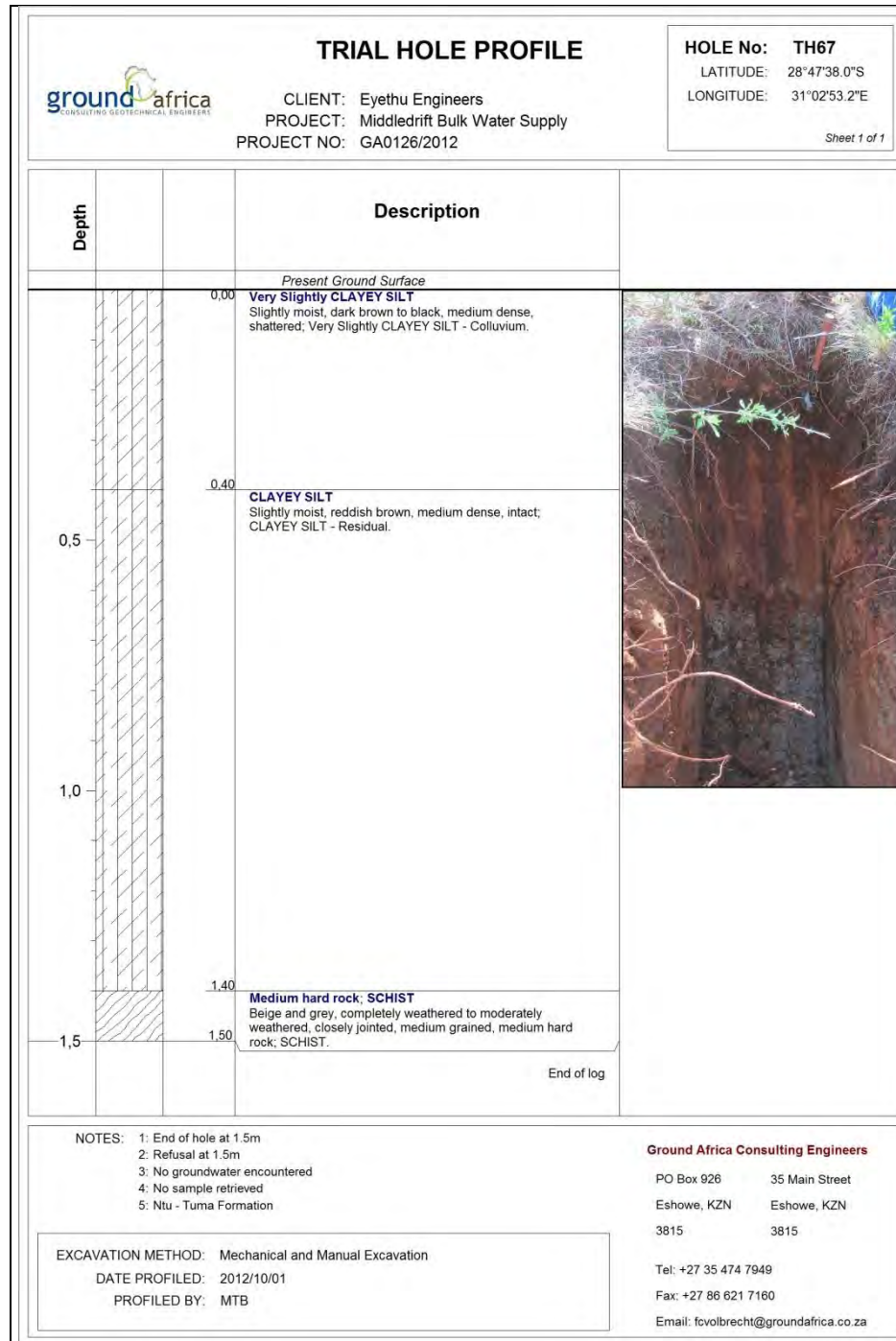
NOTES: 1: End of hole at 2m
2: No refusal
3: No groundwater encountered
4: No sample retrieved
5: Nhq - Halambu Gneiss

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EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/28
PROFILED BY: MTB



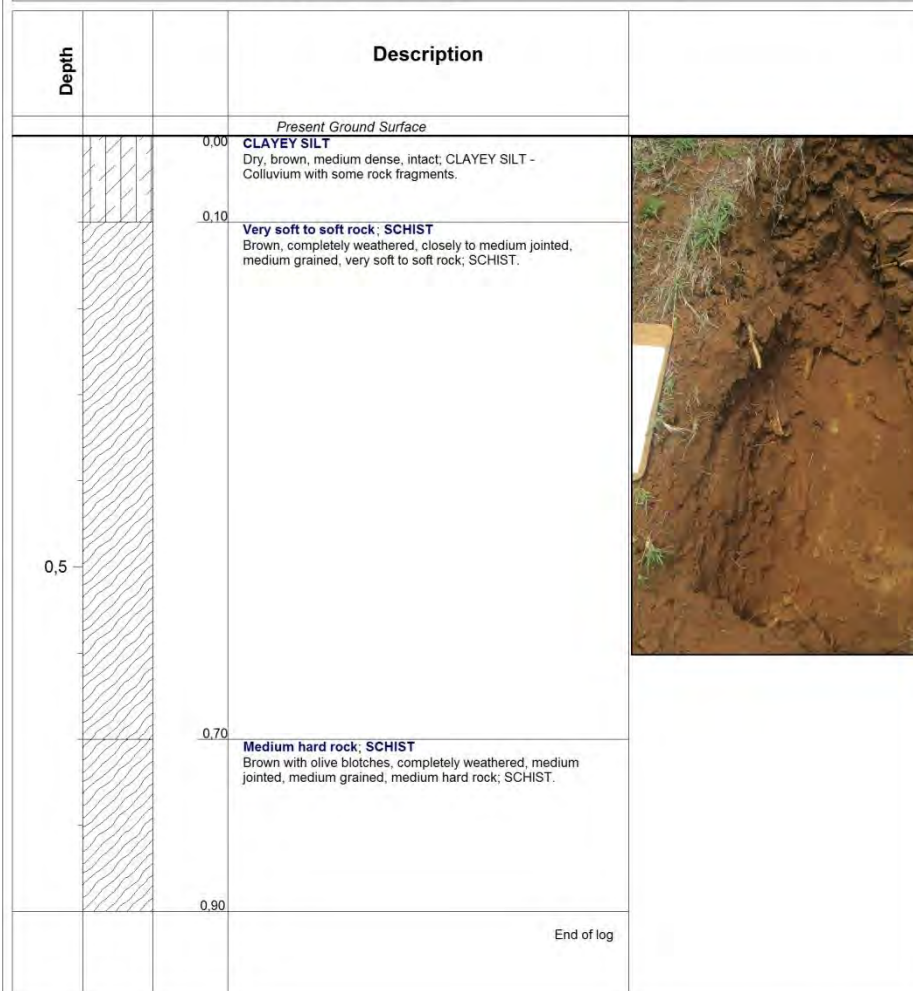


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH69
LATITUDE: 28°47'09.0"S
LONGITUDE: 31°02'27.6"E

Sheet 1 of 1



NOTES: 1: End of hole at 0.9m
2: Manual refusal at 0.9m
3: No groundwater encountered
4: No sample retrieved
5: Ntu - Tuma Formation

EXCAVATION METHOD: Manual
DATE PROFILED: 2012/10/15
PROFILED BY: MTB

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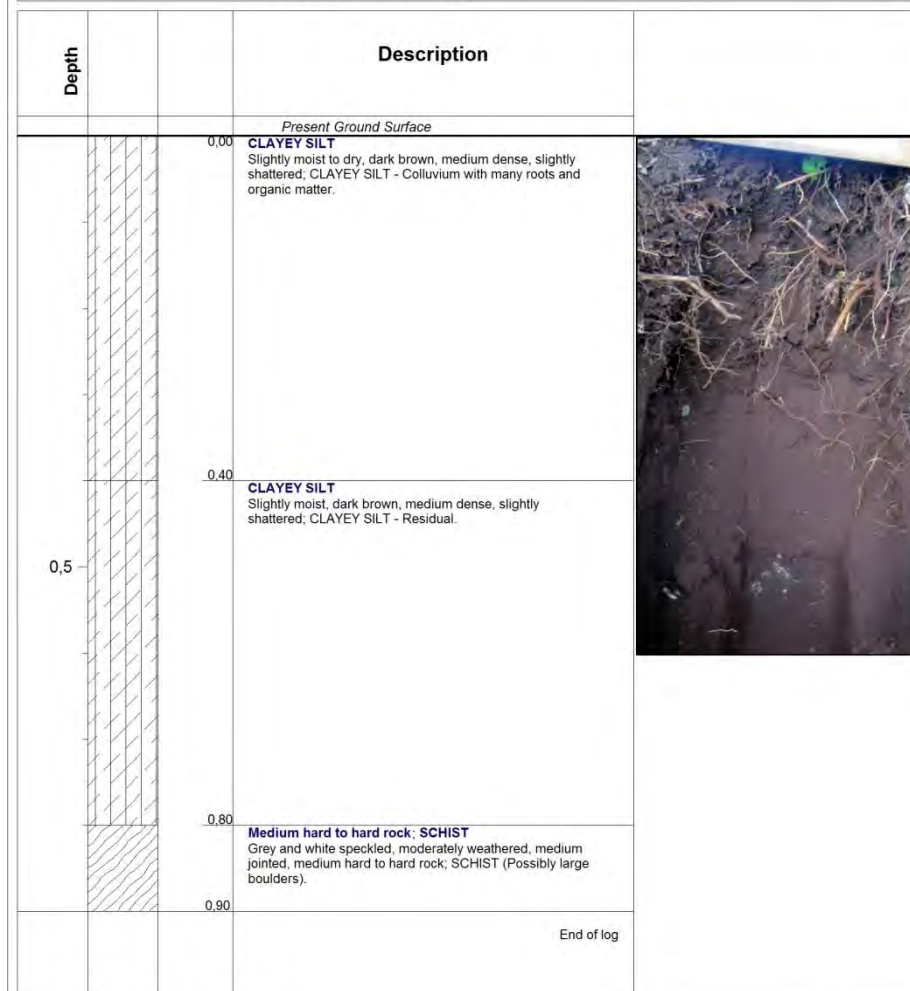


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH70
LATITUDE: 28°46'33.8"S
LONGITUDE: 31°02'35.5"E

Sheet 1 of 1



NOTES: 1: End of hole at 0.9m
2: Manual refusal at 0.9m
3: No groundwater encountered
4: No sample retrieved
5: Ntu - Tuma Formation

EXCAVATION METHOD: Manual
DATE PROFILED: 2012/10/15
PROFILED BY: MTB

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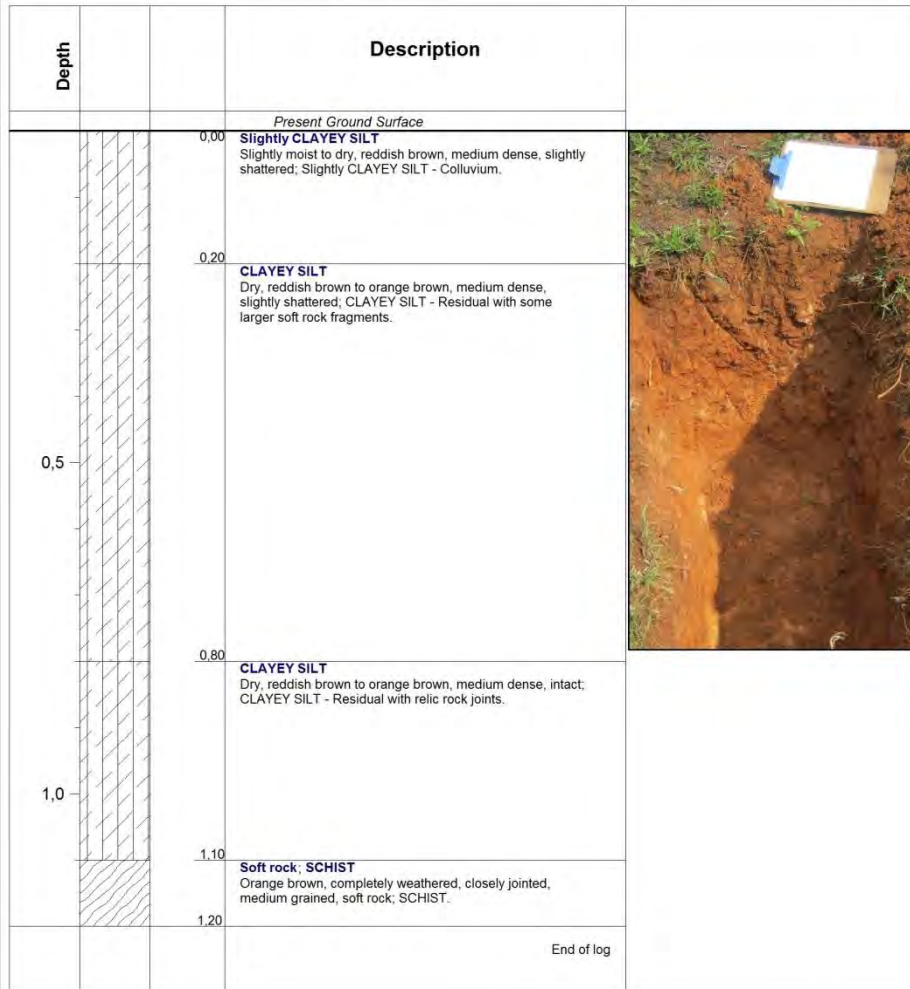


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH71
LATITUDE: 28°46'25.9"S
LONGITUDE: 31°02'23.0"E

Sheet 1 of 1



NOTES: 1: End of hole at 1.2m
2: Manual refusal at 1.2m
3: No groundwater encountered
4: No sample retrieved
5: Ntu - Tuma Formation

EXCAVATION METHOD: Manual
DATE PROFILED: 2012/10/15
PROFILED BY: MTB

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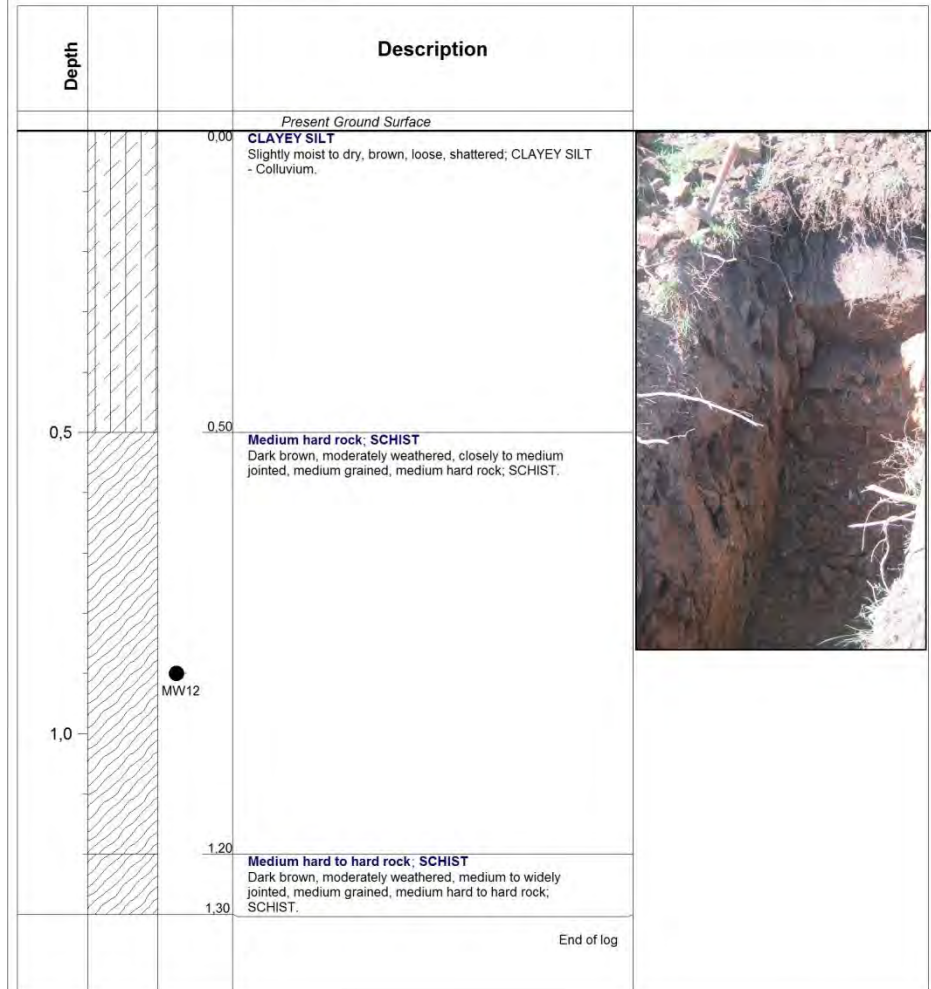


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH72
LATITUDE: 28°47'33.7"S
LONGITUDE: 31°02'45.4"E

Sheet 1 of 1



NOTES: 1: End of hole at 1.3m
2: Refusal at 1.3m
3: No groundwater encountered
4: Sample MW12 retrieved from 0.9m
5: Ntu - Tuma Formation

EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/10/01
PROFILED BY: MTB

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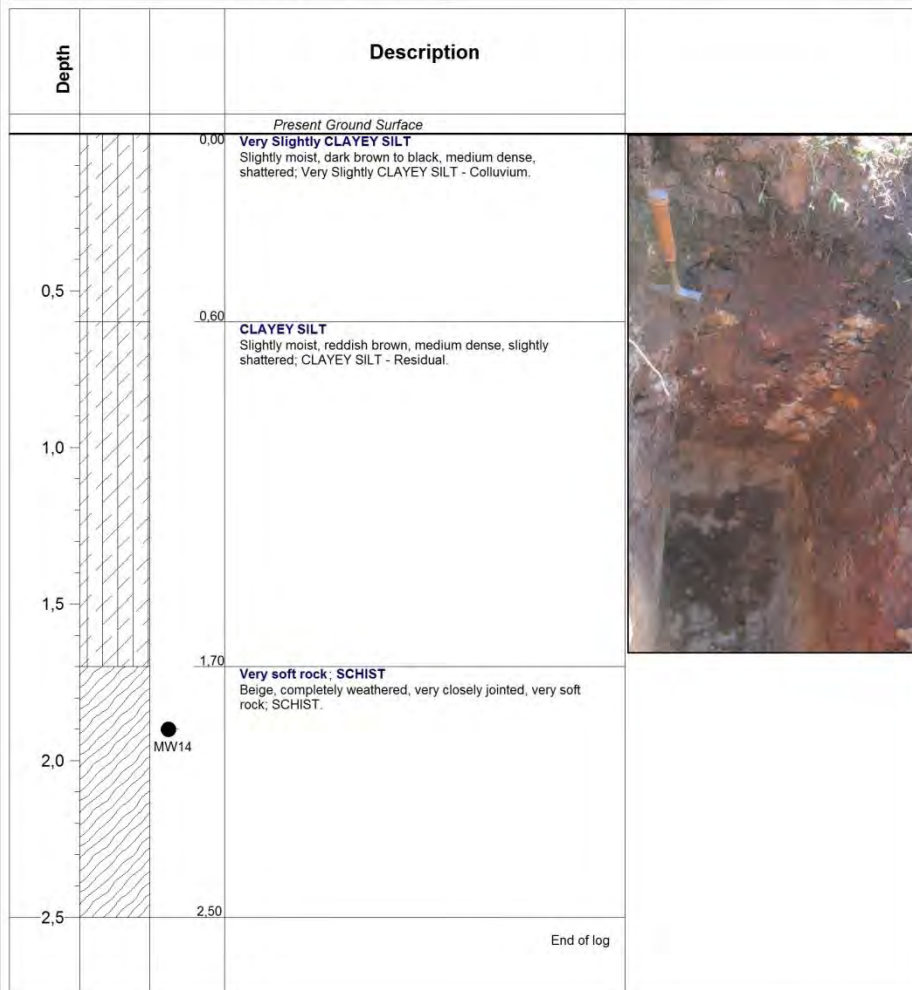


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH73
LATITUDE: 28°47'11.2"S
LONGITUDE: 31°03'19.2"E

Sheet 1 of 1



NOTES: 1: End of hole at 2.5m
2: No refusal
3: No groundwater encountered
4: Sample MW14 retrieved from 1.9m
5: Ntu - Tuma Formation

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EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/10/01
PROFILED BY: MTB

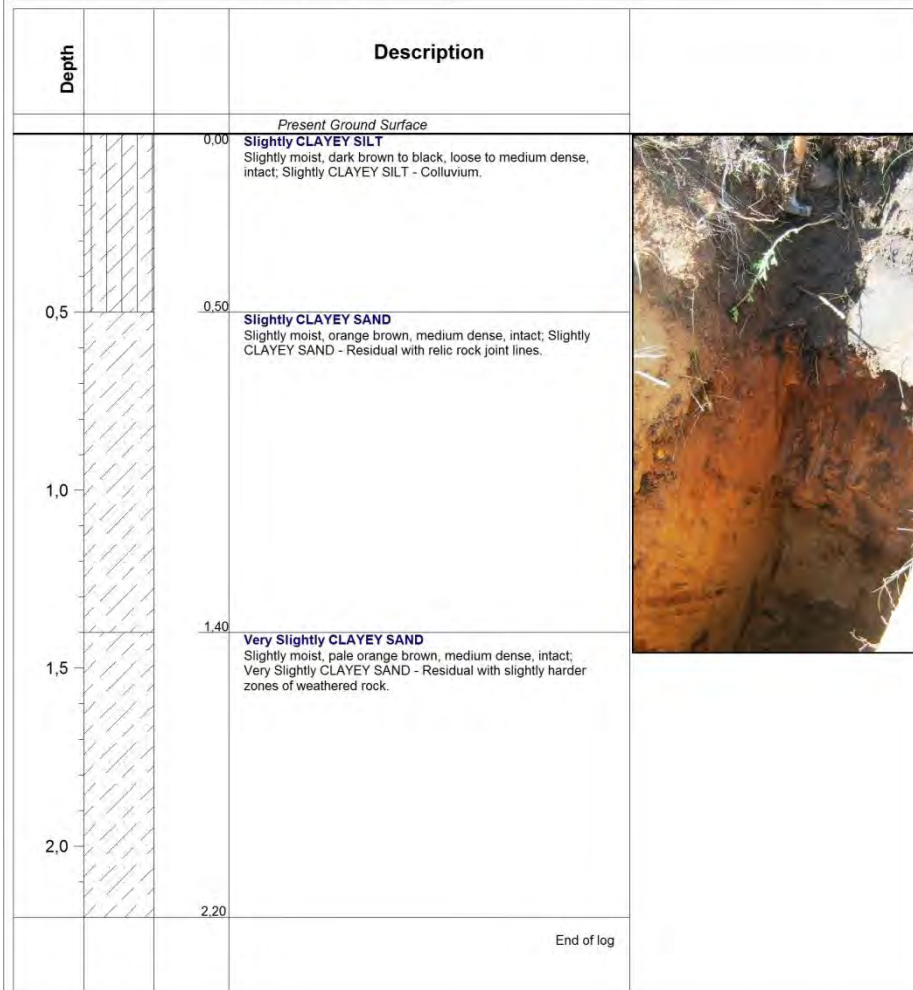


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH74
LATITUDE: 28°47'38.0"S
LONGITUDE: 31°03'05.0"E

Sheet 1 of 1



NOTES: 1: End of hole at 2.2m
2: No refusal
3: No groundwater encountered
4: No sample retrieved
5: Ntu - Tuma Formation

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EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/10/01
PROFILED BY: MTB

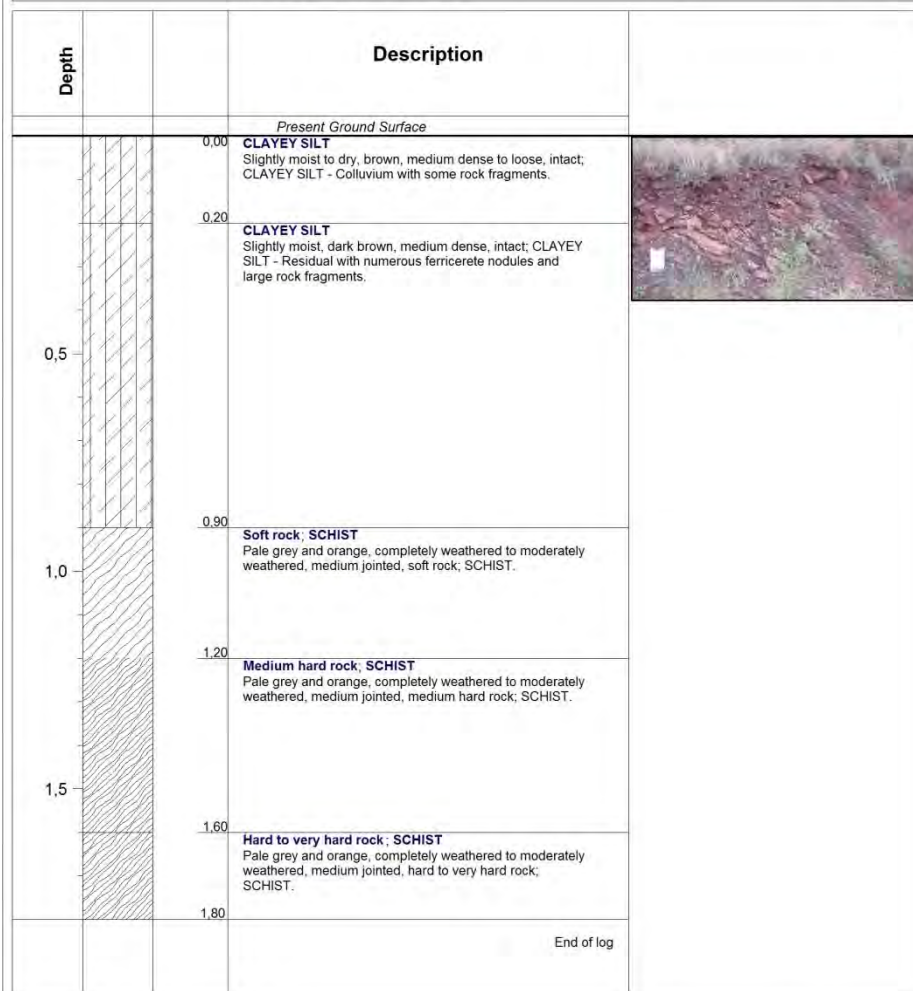


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH75
LATITUDE: 28°47'30.5"S
LONGITUDE: 31°03'15.7"E

Sheet 1 of 1



NOTES: 1: End of hole at 1.8m
2: No refusal
3: No groundwater encountered
4: No sample retrieved
5: Ntu - Tuma Formation

EXCAVATION METHOD: Manual
DATE PROFILED: 2012/09/28
PROFILED BY: MTB

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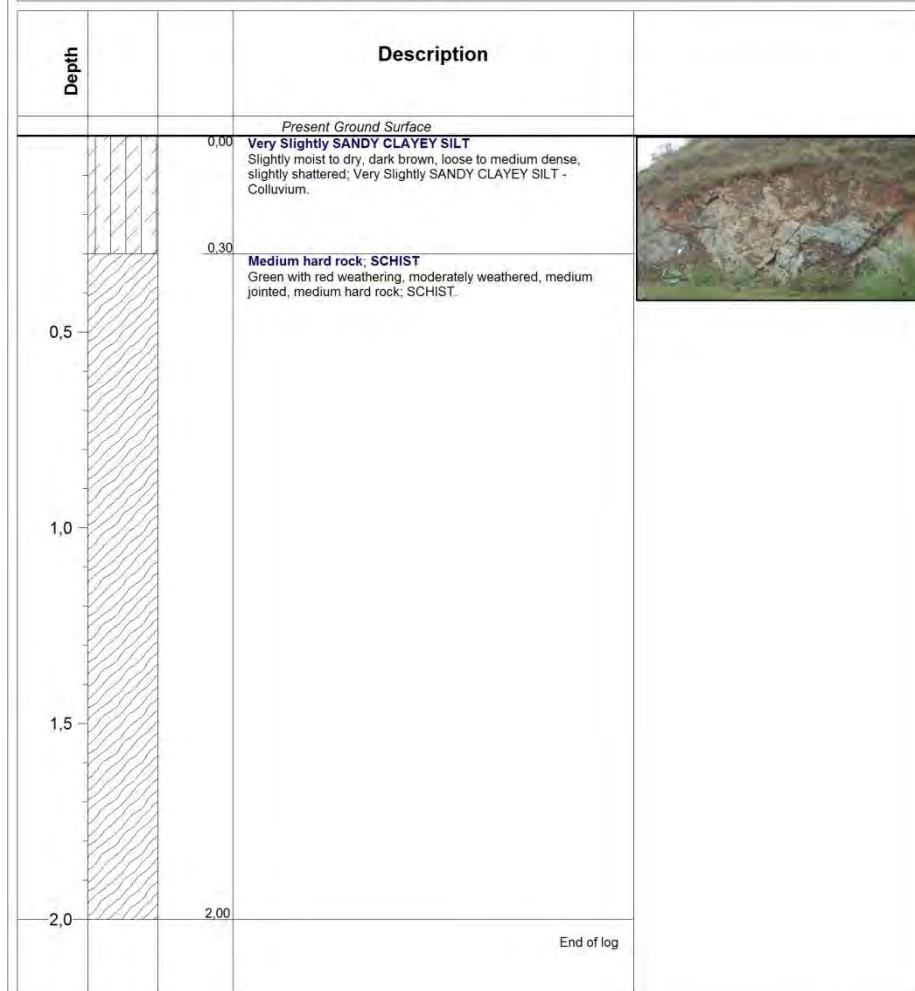


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH76
LATITUDE: 28°47'25.4"S
LONGITUDE: 31°03'23.1"E

Sheet 1 of 1



NOTES: 1: End of hole at 2m
2: No refusal
3: No groundwater encountered
4: No sample retrieved
5: Ntu - Tuma Formation

EXCAVATION METHOD: Manual
DATE PROFILED: 2012/09/28
PROFILED BY: MTB

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TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH77
LATITUDE: 28°48'10.4"S
LONGITUDE: 31°01'59.5"E

Sheet 1 of 1

Depth	Description	
	Present Ground Surface	
0.00	CLAYEY SILT Slightly moist, dark reddish brown, medium dense, shattered; CLAYEY SILT - Colluvium with large amount of quartzite fragments.	
0.40	CLAYEY SILT Slightly moist, reddish brown, medium dense, shattered; CLAYEY SILT - Residual with large amount of quartzite fragments.	
1.40	CLAYEY SILT Slightly moist, beige, medium dense, intact; CLAYEY SILT - Residual with relic joint lines.	
1.50	End of log	

NOTES: 1: End of hole at 1.5m
2: Refusal at 1.5m
3: No groundwater encountered
4: No sample retrieved
5: Ntu - Tuma Formation

EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/10/01
PROFILED BY: MTB

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TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH78
LATITUDE: 28°48'09.0"S
LONGITUDE: 31°02'39.8"E

Sheet 1 of 1

Depth	Description	
	Present Ground Surface	
0.00	Slightly CLAYEY SILT Slightly moist, reddish brown, medium dense to loose, intact; Slightly CLAYEY SILT - Colluvium with some ferricrete nodules.	
0.50	CLAYEY SILT Slightly moist, reddish brown, medium dense, intact; CLAYEY SILT - Residual with relic rock joint lines.	
1.60	Medium hard rock: SCHIST Pale orange brown, completely weathered, closely jointed, medium grained, medium hard rock; SCHIST.	
1.80	End of log	

NOTES: 1: End of hole at 1.8m
2: Refusal at 1.8m
3: No groundwater encountered
4: No sample retrieved
5: Ntu - Tuma Formation

EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/10/01
PROFILED BY: MTB

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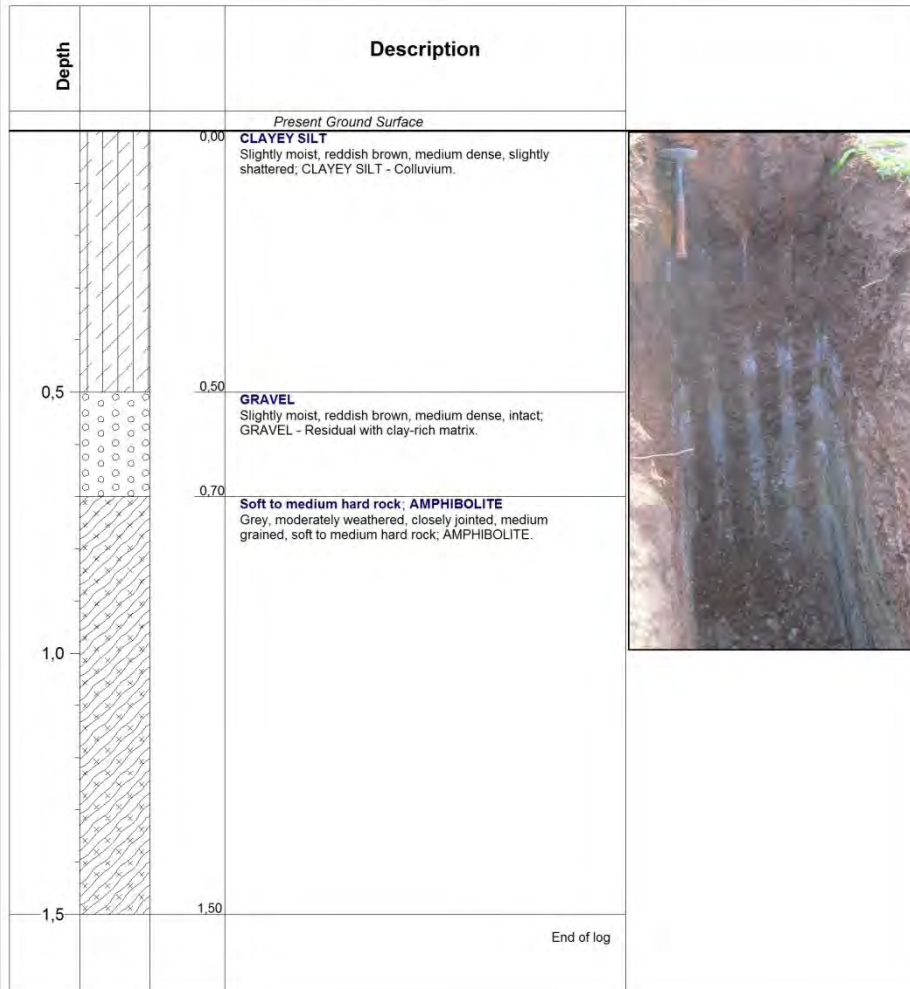


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH79
LATITUDE: 28°50'08.8"S
LONGITUDE: 31°04'04.9"E

Sheet 1 of 1



NOTES: 1: End of hole at 1.5m
2: Refusal at 1.5m
3: No groundwater encountered
4: No sample retrieved
5: Nza - Zwaneni Formation

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EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/27
PROFILED BY: MTB

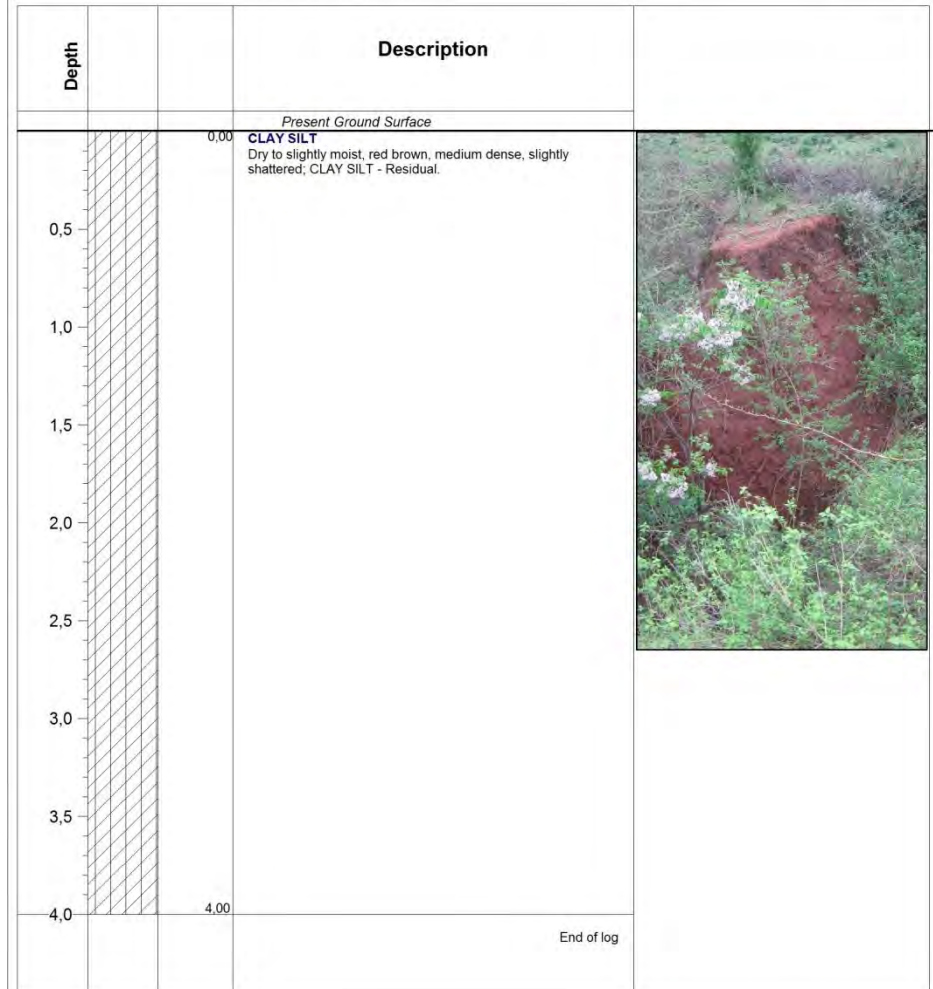


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH80
LATITUDE: 28°48'05.1"S
LONGITUDE: 31°01'47.7"E

Sheet 1 of 1



NOTES: 1: End of hole at 4m
2: Refusal at 4m
3: No groundwater encountered
4: No sample retrieved
5: Nhq - Halammbu Gneiss

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EXCAVATION METHOD: Manual
DATE PROFILED: 2012/09/28
PROFILED BY: MTB

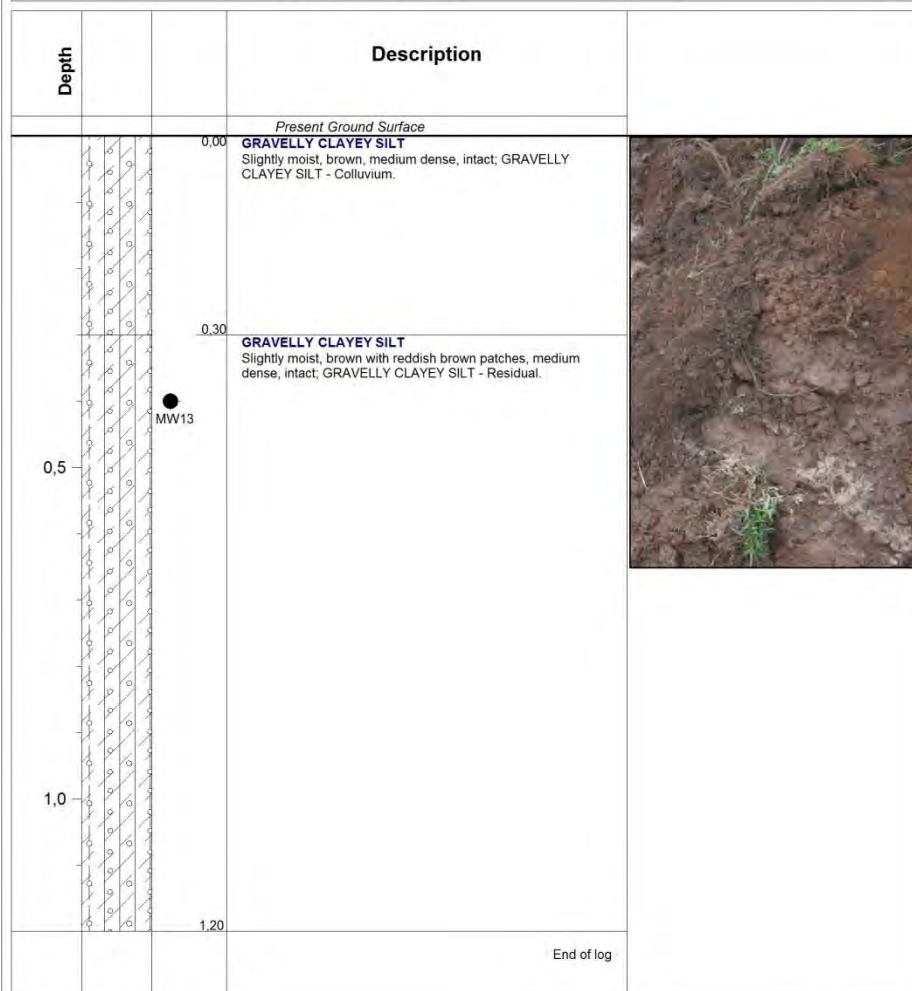


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middeldrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH81
LATITUDE: 28°49'1.47"S
LONGITUDE: 31° 0'39.13"E

Sheet 1 of 1



NOTES: 1: End of hole at 1.2m
2: Nearing refusal at 1.2m
3: No groundwater encountered
4: Sample MW13 retrieved from 0.4m
5: Ng - Gazeni Formation

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EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/09/28
PROFILED BY: MTB

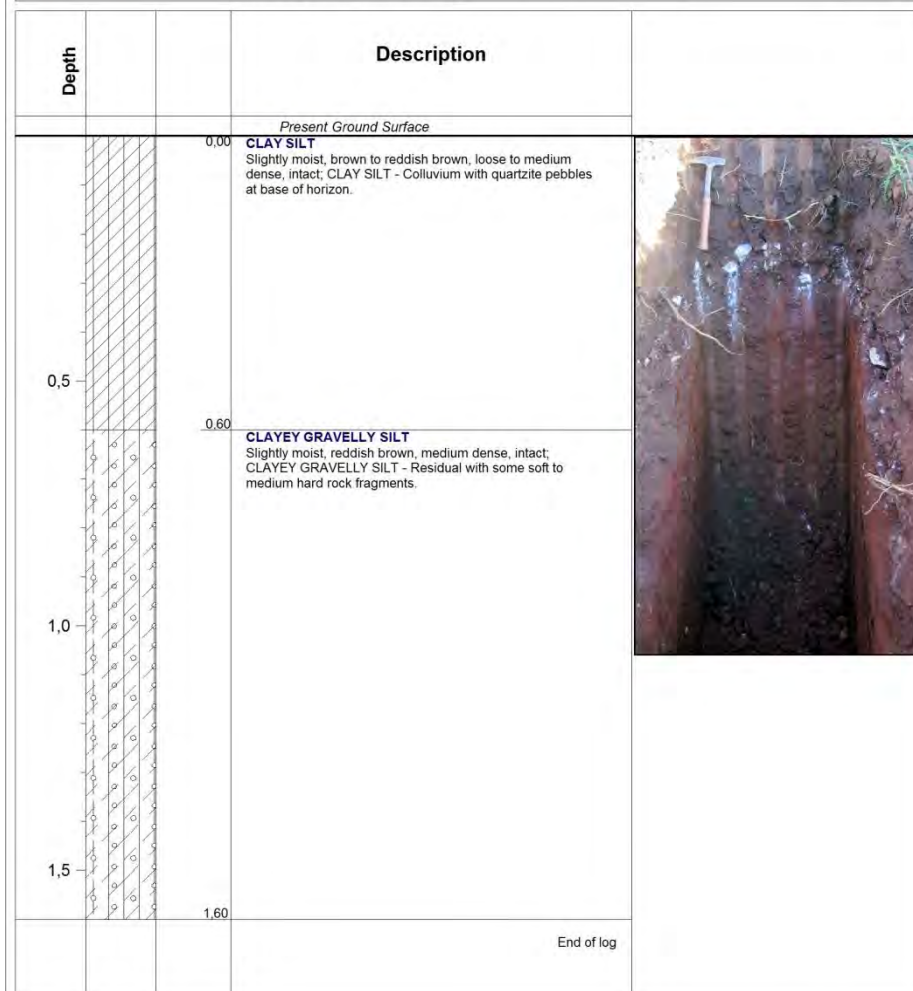


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middeldrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH82
LATITUDE: 28°48'56.2"S
LONGITUDE: 31°02'40.5"E

Sheet 1 of 1



NOTES: 1: End of hole at 1.6m
2: Refusal at 1.6m
3: No groundwater encountered
4: No sample retrieved
5: Nhg - Halambu Gneiss

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EXCAVATION METHOD: Mechanical and Manual Excavation
DATE PROFILED: 2012/10/01
PROFILED BY: MTB

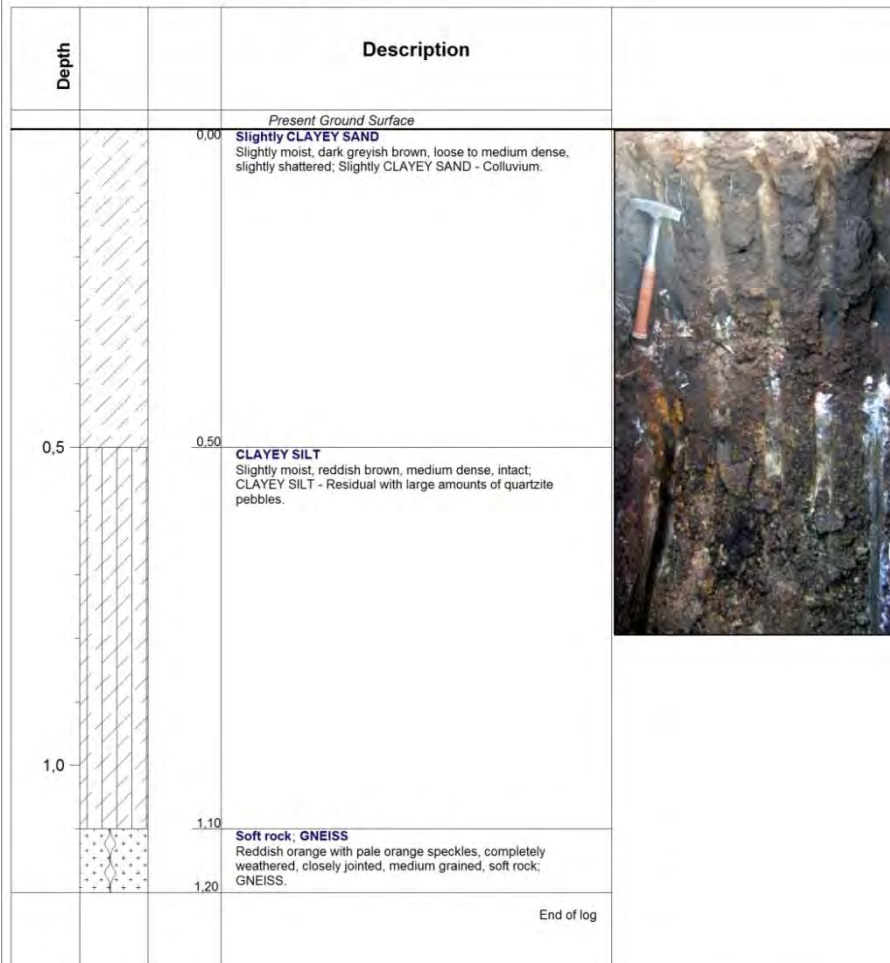


TRIAL HOLE PROFILE

CLIENT: Eyethu Engineers
PROJECT: Middledrift Bulk Water Supply
PROJECT NO: GA0126/2012

HOLE No: TH83
LATITUDE: 28°49'31.2"S
LONGITUDE: 31°02'18.5"E

Sheet 1 of 1



- NOTES:
- 1: End of hole at 1.2m
 - 2: Refusal at 1.2m
 - 3: No groundwater encountered
 - 4: No sample retrieved
 - 5: Nhg - Halambu Gneiss

EXCAVATION METHOD: Mechanical and Manual Excavation

DATE PROFILED: 2012/10/01

PROFILED BY: MTB

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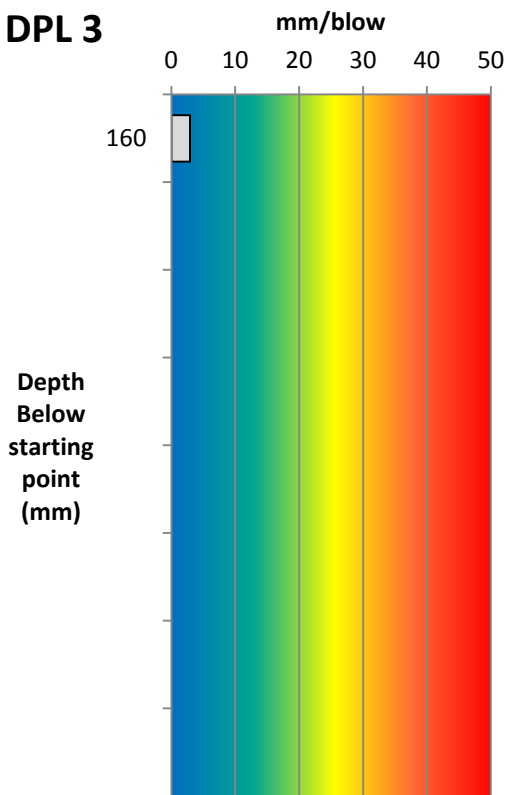
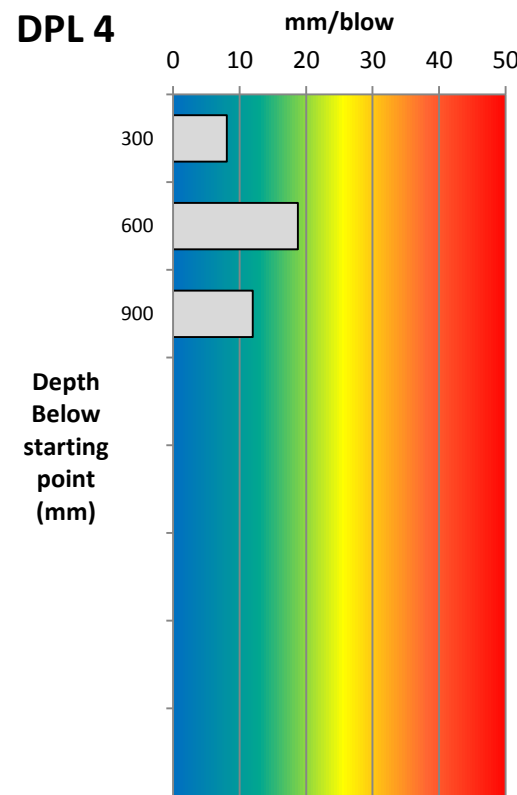
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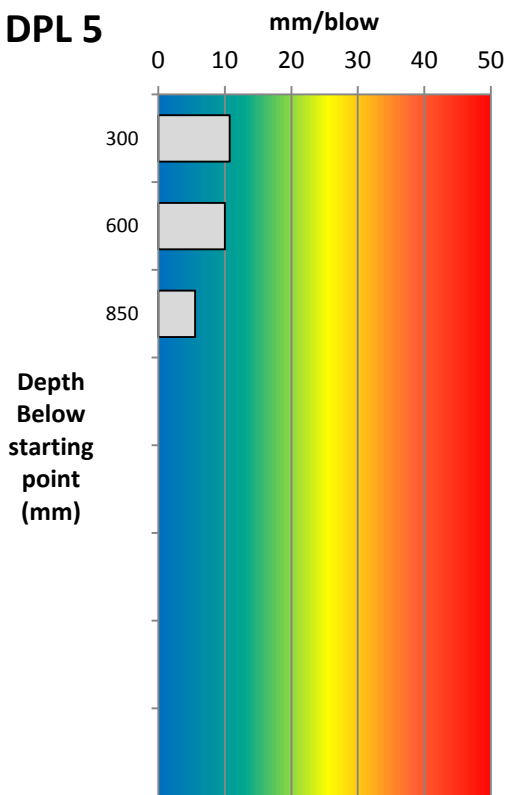
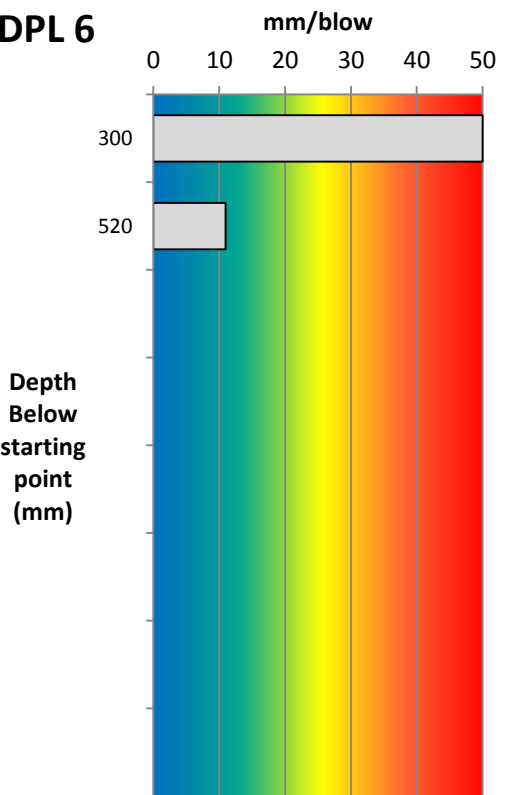
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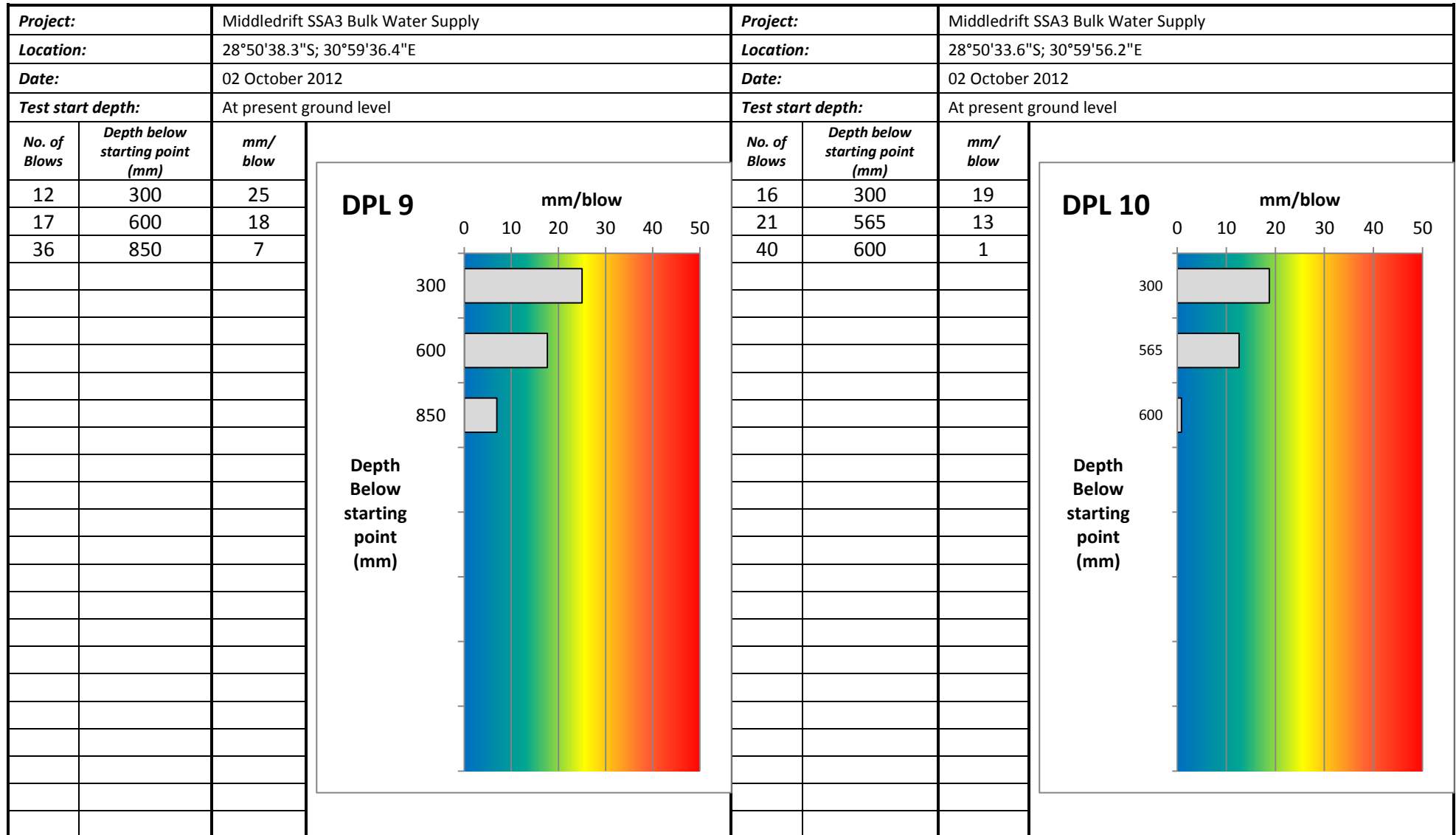
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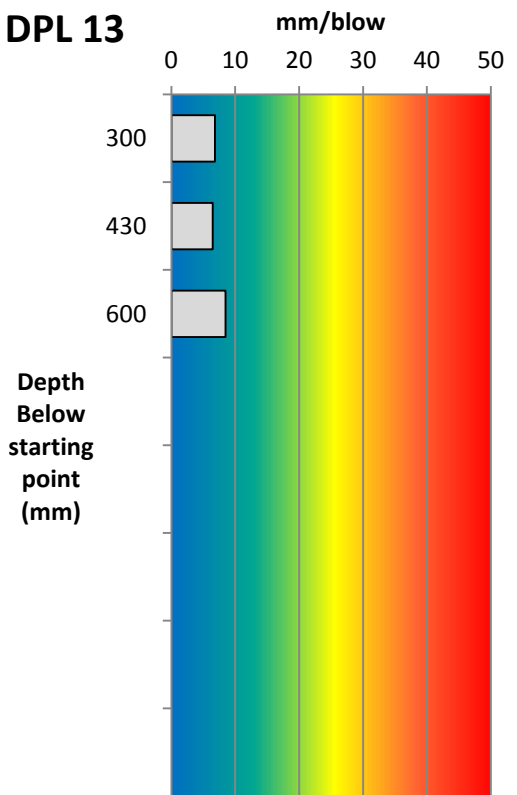
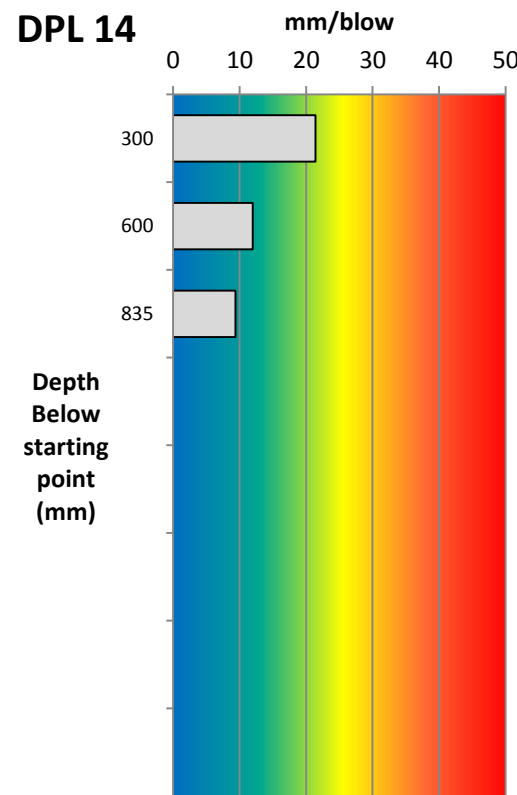
Email: fcvolbrecht@groundafrica.co.za

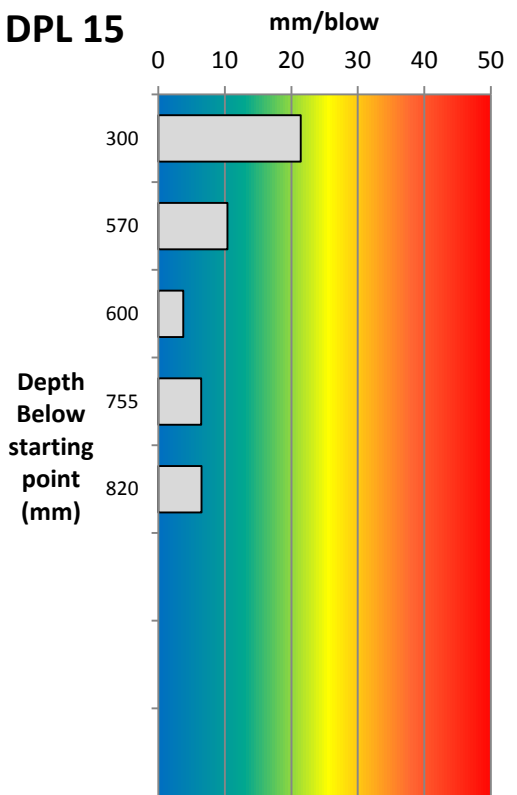
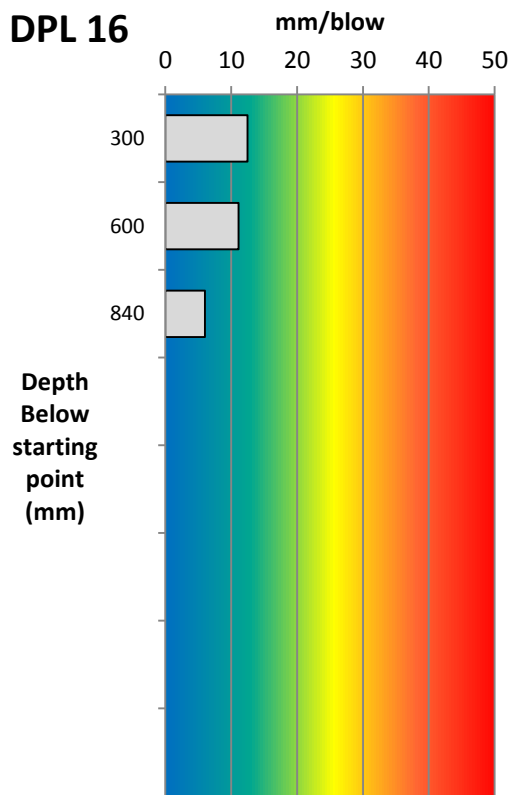
APPENDIX C
Dynamic Cone Penetrometer Light Test Results

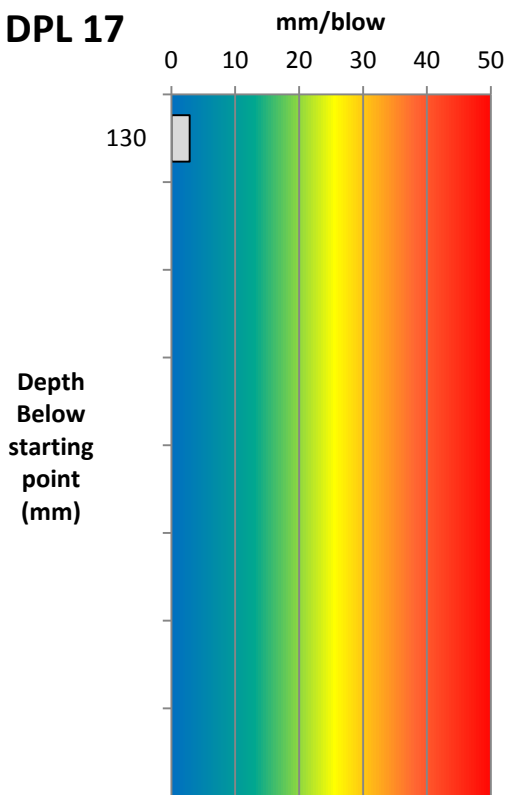
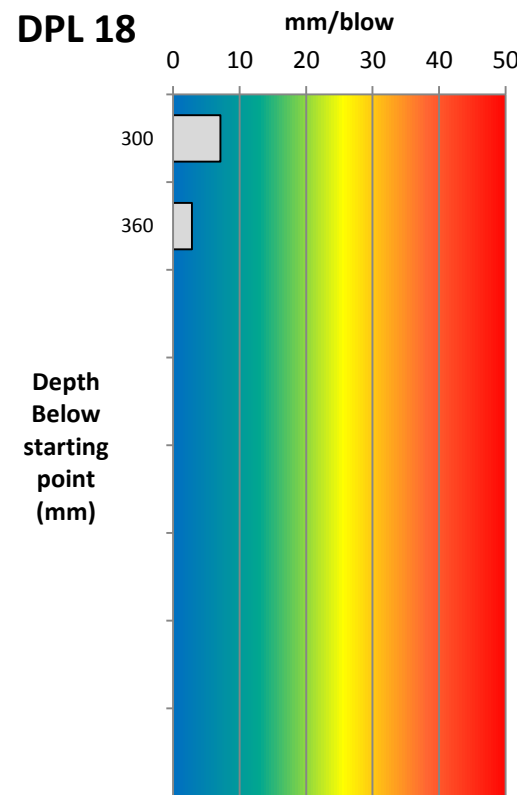
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Location:			28°49'03.6"S; 30°59'23.2"E	Location:			28°49'09.7"S; 30°59'12.4"E
Date:			02 October 2012	Date:			02 October 2012
Test start depth:			At present ground level	Test start depth:			At present ground level
No. of Blows	Depth below starting point (mm)	mm/blow	DPL 3  mm/blow 0 10 20 30 40 50 160 Depth Below starting point (mm)	No. of Blows	Depth below starting point (mm)	mm/blow	DPL 4  mm/blow 0 10 20 30 40 50 300 600 900 Depth Below starting point (mm)
55	160	3		37	300	8	
				16	600	19	
				25	900	12	

Project:			Middledrift SSA3 Bulk Water Supply	Project:			Middledrift SSA3 Bulk Water Supply
Location:			28°49'25.7"S; 30°58'42.9"E	Location:			28°48'42.0"S; 30°58'22.8"E
Date:			02 October 2012	Date:			02 October 2012
Test start depth:			At present ground level	Test start depth:			At present ground level
No. of Blows	Depth below starting point (mm)	mm/blow	DPL 5  mm/blow 0 10 20 30 40 50 300 600 850 Depth Below starting point (mm)	No. of Blows	Depth below starting point (mm)	mm/blow	DPL 6  mm/blow 0 10 20 30 40 50 300 520 Depth Below starting point (mm)
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30	600	10		20	520	11	
45	850	6					

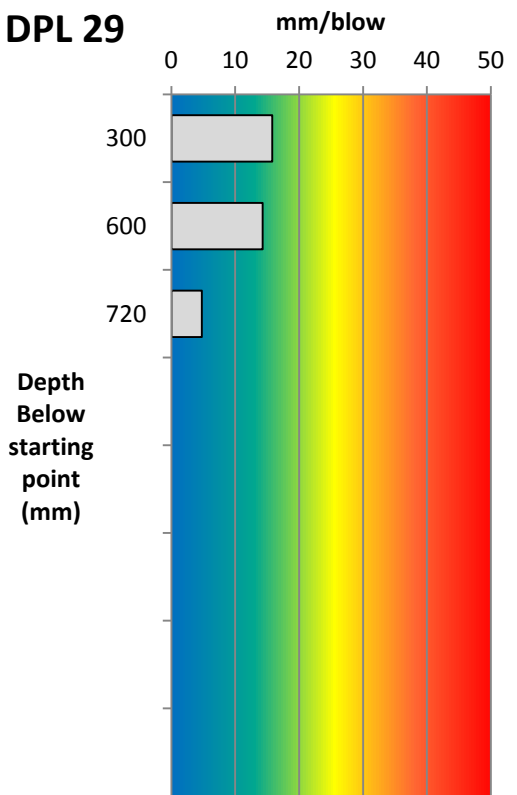
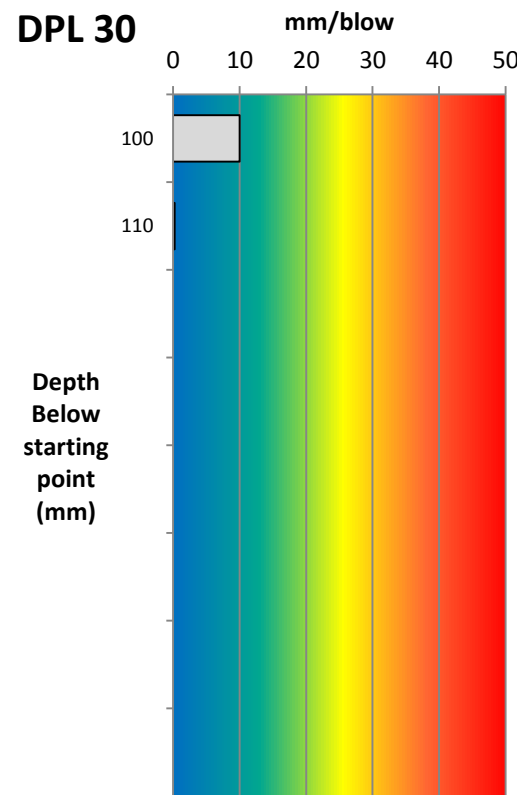


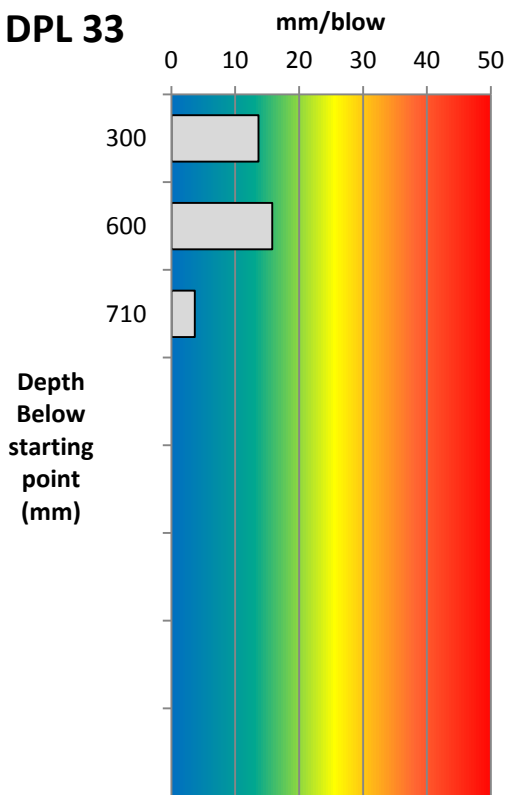
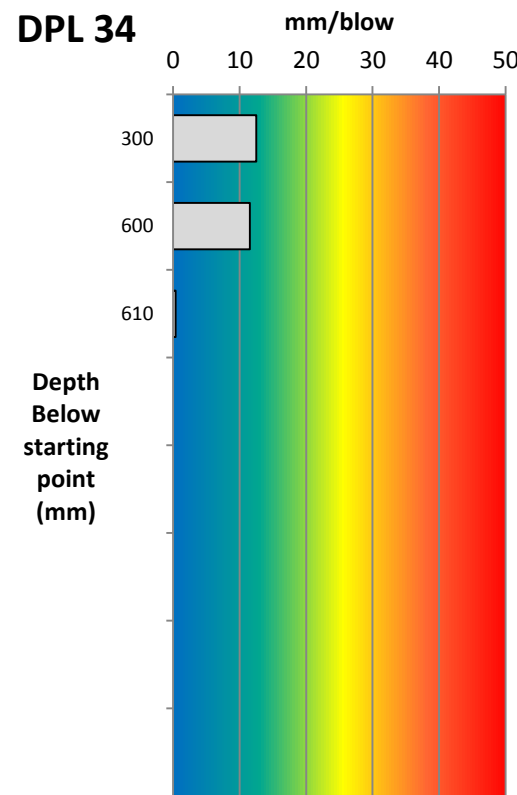
Project:			Middledrift SSA3 Bulk Water Supply	Project:			Middledrift SSA3 Bulk Water Supply
Location:			28°50'31.8"S; 31°01'15.8"E	Location:			28°49'55.6"S; 31°04'33.3"E
Date:			02 October 2012	Date:			02 October 2012
Test start depth:			At present ground level	Test start depth:			At present ground level
No. of Blows	Depth below starting point (mm)	mm/blow	DPL 13  mm/blow 0 10 20 30 40 50 300 430 600 Depth Below starting point (mm)	No. of Blows	Depth below starting point (mm)	mm/blow	DPL 14  mm/blow 0 10 20 30 40 50 300 600 835 Depth Below starting point (mm)
44	300	7		14	300	21	
20	430	7		25	600	12	
20	600	9		25	835	9	

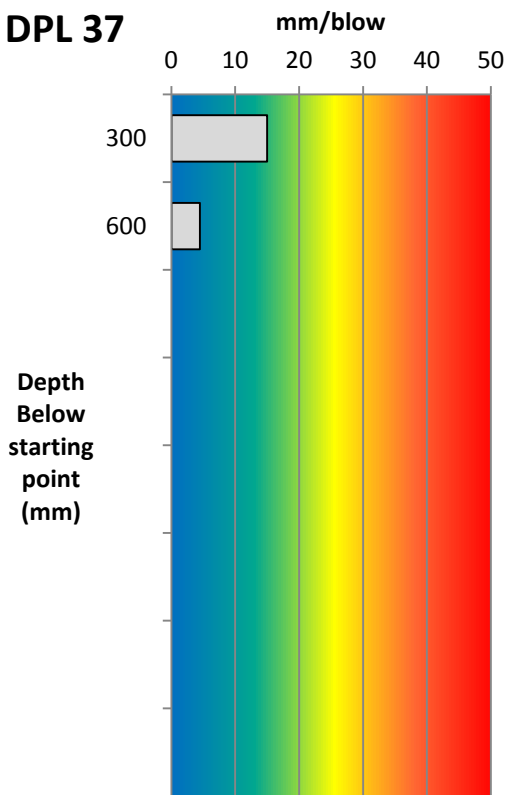
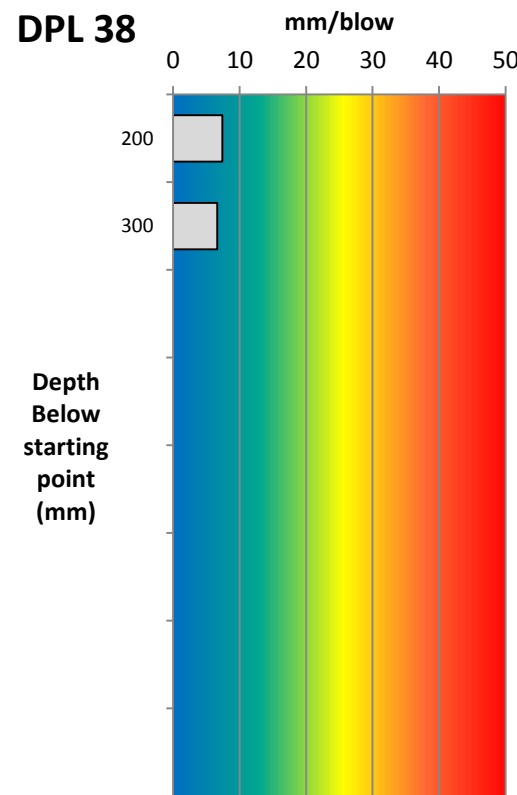
Project:			Middledrift SSA3 Bulk Water Supply	Project:			Middledrift SSA3 Bulk Water Supply
Location:			28°50'55.1"S; 31°01'46.8"E	Location:			28°51'05.1"S; 31°01'56.8"E
Date:			02 October 2012	Date:			02 October 2012
Test start depth:			At present ground level	Test start depth:			At present ground level
No. of Blows	Depth below starting point (mm)	mm/blow	DPL 15  mm/blow 0 10 20 30 40 50 300 570 600 755 820 Depth Below starting point (mm)	No. of Blows	Depth below starting point (mm)	mm/blow	DPL 16  mm/blow 0 10 20 30 40 50 300 600 840 Depth Below starting point (mm)
14	300	21		24	300	13	
26	570	10		27	600	11	
8	600	4		40	840	6	
24	755	6					
10	820	7					

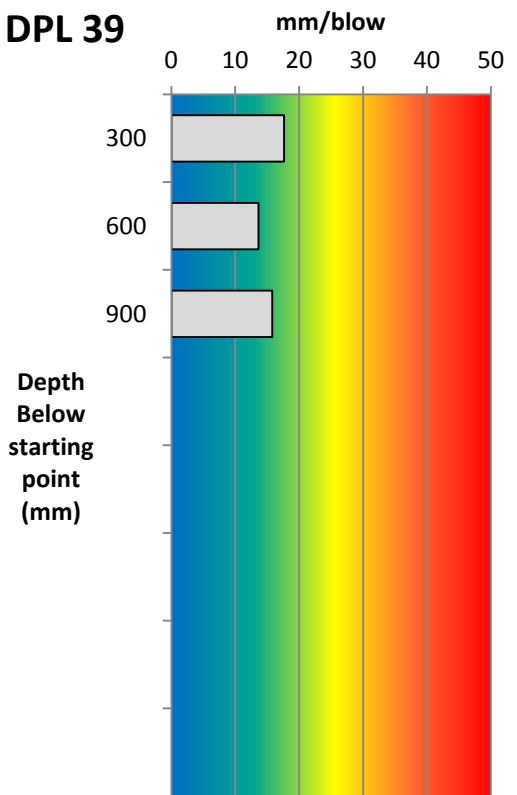
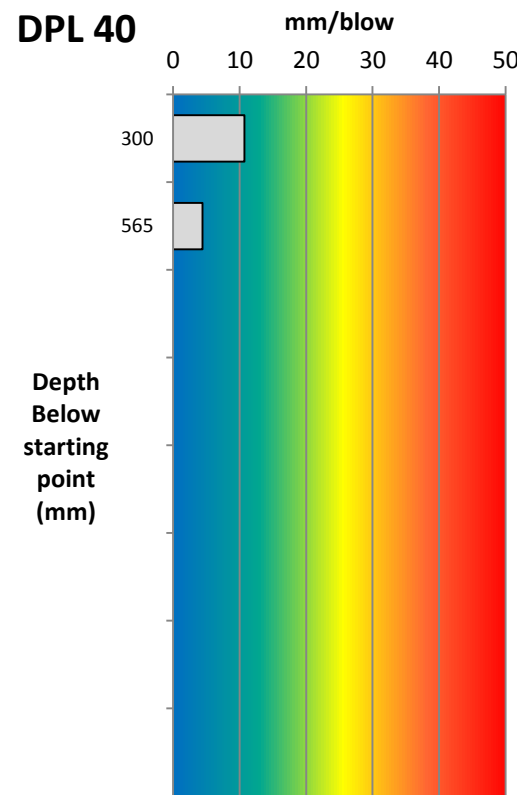
Project:			Middledrift SSA3 Bulk Water Supply	Project:			Middledrift SSA3 Bulk Water Supply
Location:			28°50'09.7"S; 31°01'58.3"E	Location:			28°49'49.7"S; 31°01'57.0"E
Date:			02 October 2012	Date:			02 October 2012
Test start depth:			At present ground level	Test start depth:			At present ground level
No. of Blows	Depth below starting point (mm)	mm/blow	DPL 17  mm/blow 0 10 20 30 40 50 130 Depth Below starting point (mm)	No. of Blows	Depth below starting point (mm)	mm/blow	DPL 18  mm/blow 0 10 20 30 40 50 300 360 Depth Below starting point (mm)
45	130	3		42	300	7	
				21	360	3	

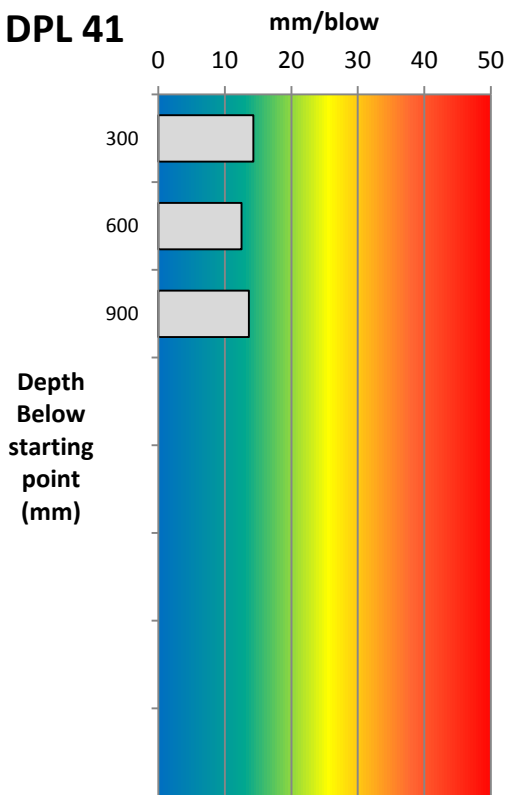
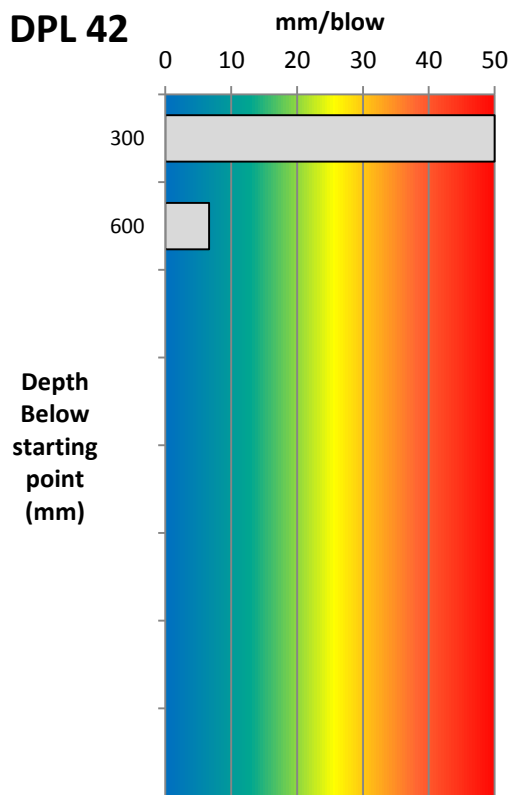
Project:			Middledrift SSA3 Bulk Water Supply	Project:			Middledrift SSA3 Bulk Water Supply
Location:			28°49'11.7"S; 31°00'42.9"E	Location:			28°49'01.7"S; 31°00'57.7"E
Date:			02 October 2012	Date:			02 October 2012
Test start depth:			At present ground level	Test start depth:			At present ground level
No. of Blows	Depth below starting point (mm)	mm/blow	DPL 23 	No. of Blows	Depth below starting point (mm)	mm/blow	DPL 24
22	300	14		32	300	9	
31	600	10		15	330	2	
17	900	18					

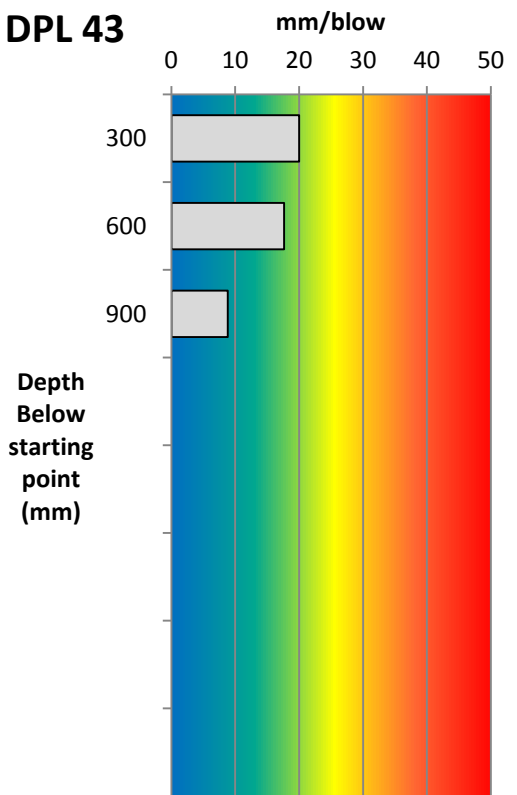
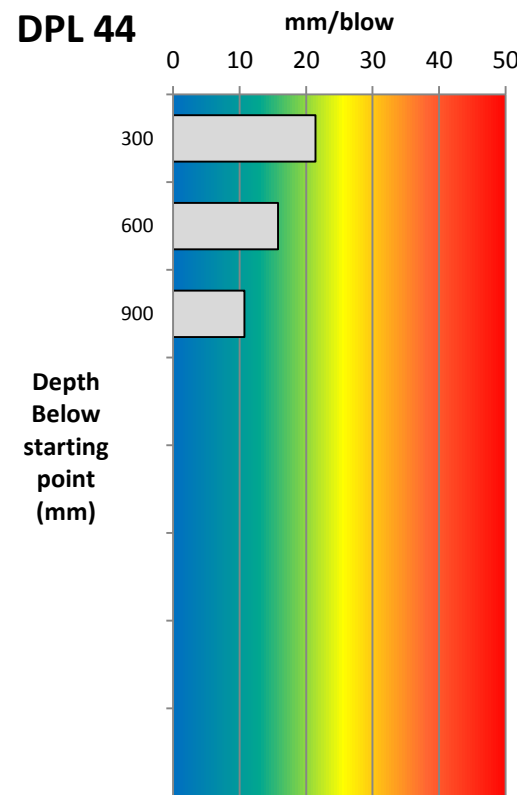
Project:			Middledrift SSA3 Bulk Water Supply	Project:			Middledrift SSA3 Bulk Water Supply
Location:			28°48'35.0"S; 31°01'32.7"E	Location:			28°48'22.2"S; 31°01'51.7"E
Date:			02 October 2012	Date:			02 October 2012
Test start depth:			At present ground level	Test start depth:			At present ground level
No. of Blows	Depth below starting point (mm)	mm/blow	DPL 29  mm/blow 0 10 20 30 40 50 300 600 720 Depth Below starting point (mm)	No. of Blows	Depth below starting point (mm)	mm/blow	DPL 30  mm/blow 0 10 20 30 40 50 100 110 Depth Below starting point (mm)
19	300	16		10	100	10	
21	600	14		40	110	0	
25	720	5					

Project:			Middledrift SSA3 Bulk Water Supply	Project:			Middledrift SSA3 Bulk Water Supply
Location:			28°48'12.7"S; 31°01'51.5"E	Location:			28°48'12.8"S; 31°02'12.3"E
Date:			02 October 2012	Date:			02 October 2012
Test start depth:			At present ground level	Test start depth:			At present ground level
No. of Blows	Depth below starting point (mm)	mm/blow	DPL 33  mm/blow 0 10 20 30 40 50 300 600 710 Depth Below starting point (mm)	No. of Blows	Depth below starting point (mm)	mm/blow	DPL 34  mm/blow 0 10 20 30 40 50 300 600 610 Depth Below starting point (mm)
22	300	14		24	300	13	
19	600	16		26	600	12	
30	710	4		25	610	0	

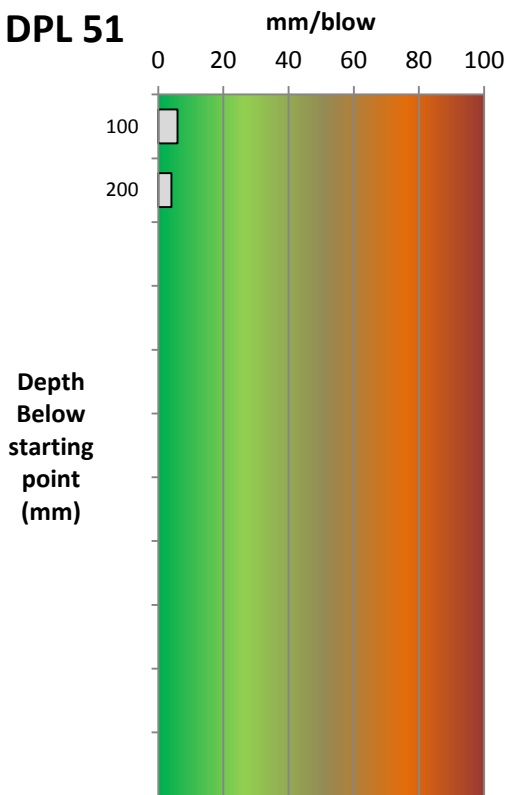
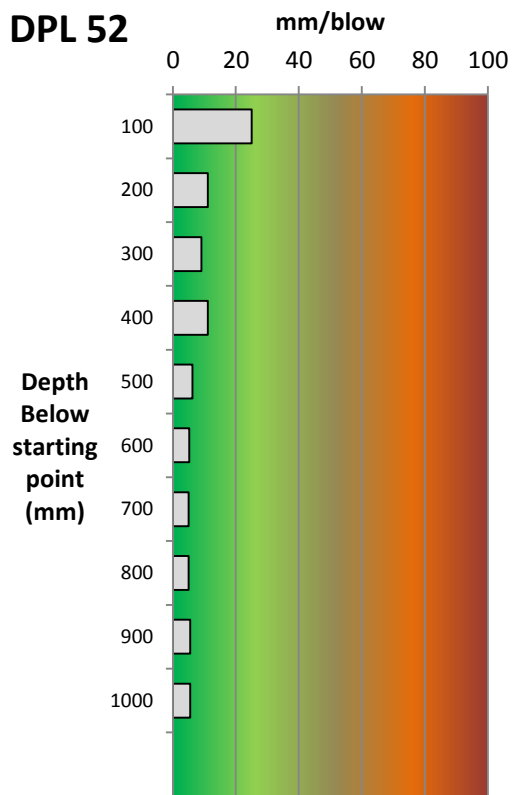
Project:			Middledrift SSA3 Bulk Water Supply	Project:			Middledrift SSA3 Bulk Water Supply
Location:			28°47'18.7"S; 31°03'16.1"E	Location:			28°47'30.7"S; 31°02'58.8"E
Date:			02 October 2012	Date:			02 October 2012
Test start depth:			At present ground level	Test start depth:			At present ground level
No. of Blows	Depth below starting point (mm)	mm/blow	DPL 37  mm/blow 0 10 20 30 40 50 300 600 Depth Below starting point (mm)	No. of Blows	Depth below starting point (mm)	mm/blow	DPL 38  mm/blow 0 10 20 30 40 50 200 300 Depth Below starting point (mm)
20	300	15		27	200	7	
67	600	4		15	300	7	

Project:			Middledrift SSA3 Bulk Water Supply	Project:			Middledrift SSA3 Bulk Water Supply
Location:			28°47'25.0"S; 31°02'34.4"E	Location:			28°47'33.4"S; 31°02'45.6"E
Date:			02 October 2012	Date:			02 October 2012
Test start depth:			At present ground level	Test start depth:			At present ground level
No. of Blows	Depth below starting point (mm)	mm/blow	DPL 39  mm/blow 0 10 20 30 40 50 300 600 900 Depth Below starting point (mm)	No. of Blows	Depth below starting point (mm)	mm/blow	DPL 40  mm/blow 0 10 20 30 40 50 300 565 Depth Below starting point (mm)
17	300	18		28	300	11	
22	600	14		60	565	4	
19	900	16					

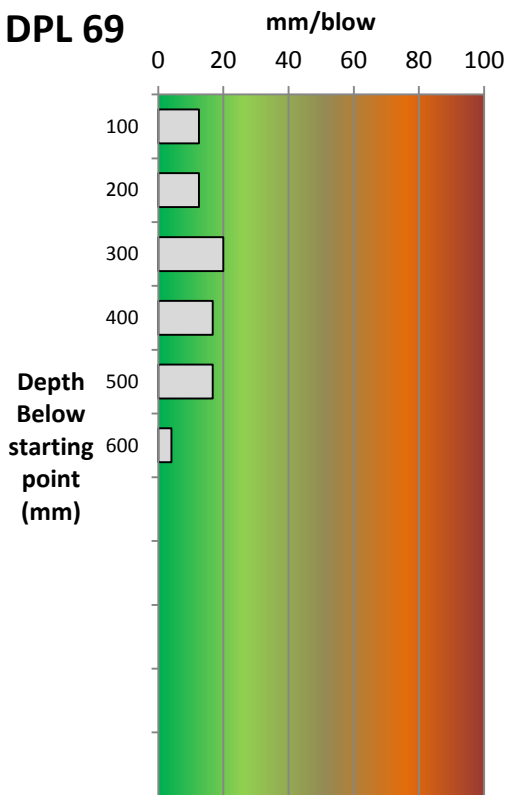
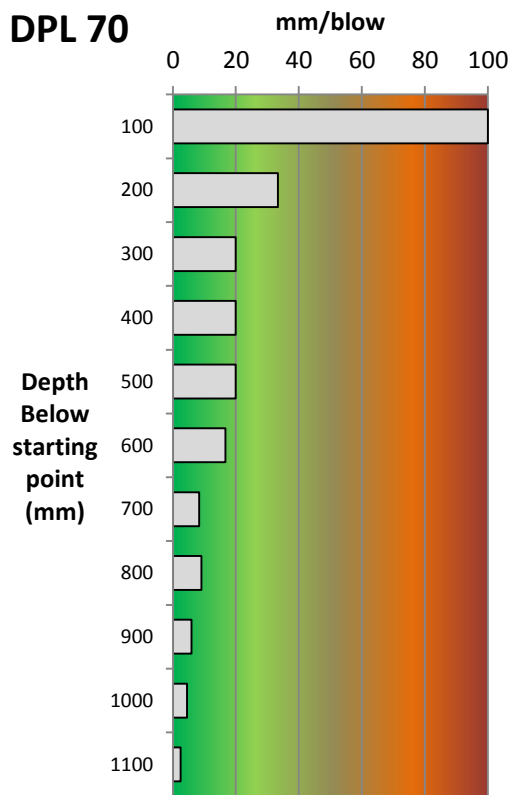
Project:			Middledrift SSA3 Bulk Water Supply	Project:			Middledrift SSA3 Bulk Water Supply
Location:			28°47'38.2"S; 31°02'53.3"E	Location:			28°47'37.8"S; 31°03'05.3"E
Date:			02 October 2012	Date:			02 October 2012
Test start depth:			At present ground level	Test start depth:			At present ground level
No. of Blows	Depth below starting point (mm)	mm/blow	DPL 41  mm/blow 0 10 20 30 40 50 300 600 900 Depth Below starting point (mm)	No. of Blows	Depth below starting point (mm)	mm/blow	DPL 42  mm/blow 0 10 20 30 40 50 300 600 Depth Below starting point (mm)
21	300	14		6	300	50	
24	600	13		45	600	7	

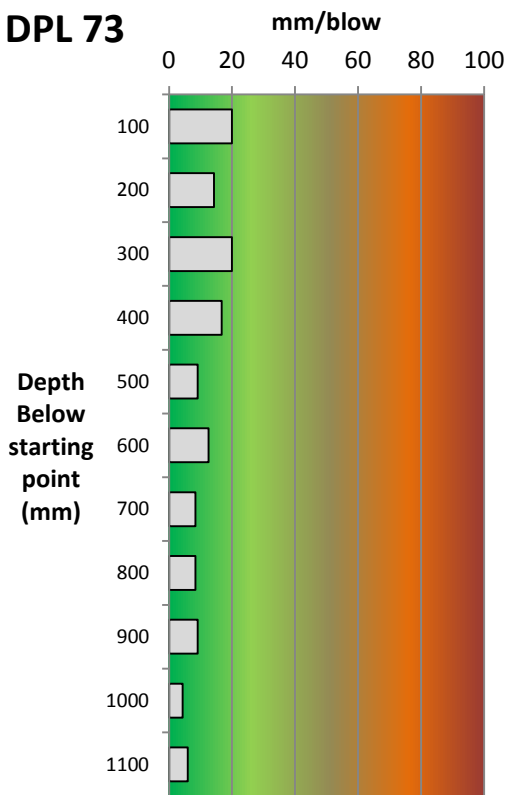
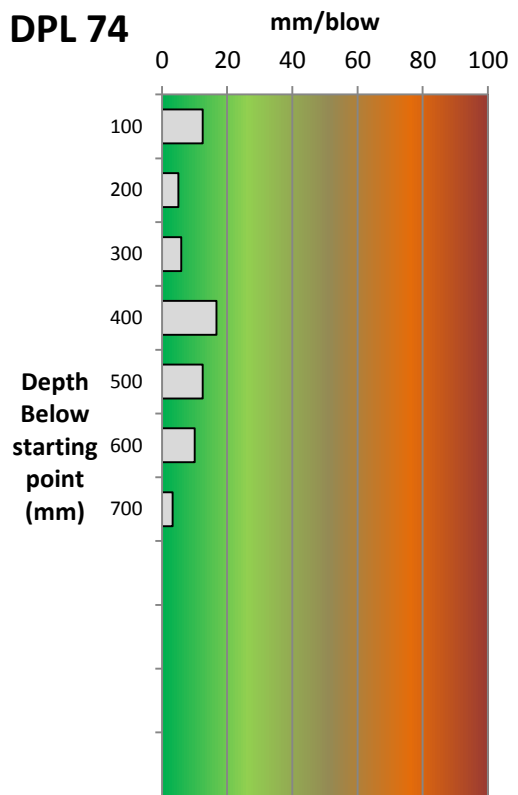
Project:			Middledrift SSA3 Bulk Water Supply	Project:			Middledrift SSA3 Bulk Water Supply
Location:			28°48'17.3"S; 31°02'50.4"E	Location:			28°48'30.8"S; 31°02'56.8"E
Date:			02 October 2012	Date:			02 October 2012
Test start depth:			At present ground level	Test start depth:			At present ground level
No. of Blows	Depth below starting point (mm)	mm/blow	DPL 43  mm/blow 0 10 20 30 40 50 300 600 900 Depth Below starting point (mm)	No. of Blows	Depth below starting point (mm)	mm/blow	DPL 44  mm/blow 0 10 20 30 40 50 300 600 900 Depth Below starting point (mm)
15	300	20		14	300	21	
17	600	18		19	600	16	
34	900	9		28	900	11	

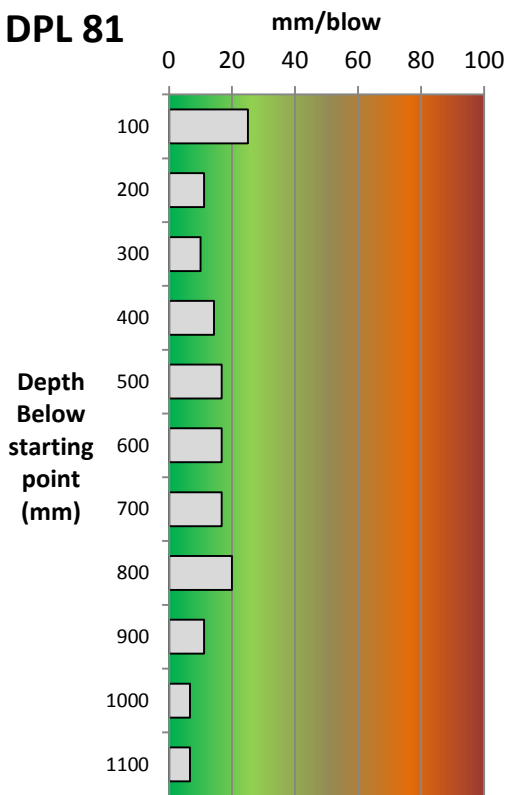
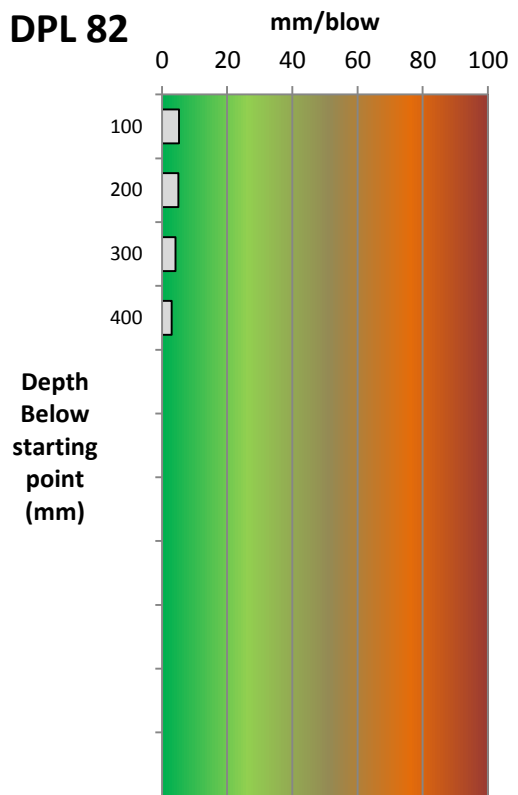
Project:			Middledrift SSA3 Bulk Water Supply			Project:			Middledrift SSA3 Bulk Water Supply		
Location:			28°49'30.9"S; 31°02'21.6"E			Location:			28°49'26.9"S; 31°02'52.2"E		
Date:			02 October 2012			Date:			02 October 2012		
Test start depth:			At present ground level			Test start depth:			At present ground level		
No. of Blows	Depth below starting point (mm)	mm/blow									

Project:			Middledrift SSA3 Bulk Water Supply	Project:			Middledrift SSA3 Bulk Water Supply
Location:			28°48'3.5"S; 31°04'52.8"E	Location:			28°48'23.6"S; 31°04'54.1"E
Date:			18 October 2012	Date:			18 October 2012
Test start depth:			At present ground level	Test start depth:			At present ground level
No. of Blows	Depth below starting point (mm)	mm/blow	DPL 51  mm/blow Depth Below starting point (mm)	No. of Blows	Depth below starting point (mm)	mm/blow	DPL 52  mm/blow Depth Below starting point (mm)
17	100	6		4	100	25	
25	200	4		9	200	11	
				11	300	9	
				9	400	11	
				16	500	6	
				19	600	5	
				20	700	5	
				20	800	5	
				18	900	6	
				18	1000	6	

Project:			Middledrift SSA3 Bulk Water Supply	Project:			Middledrift SSA3 Bulk Water Supply
Location:			28°48'51"S; 31°03'14.8"E	Location:			28°49'21.4"S; 31°03'25.4"E
Date:			18 October 2012	Date:			18 October 2012
Test start depth:			At present ground level	Test start depth:			At present ground level
No. of Blows	Depth below starting point (mm)	mm/blow	DPL 59 	No. of Blows	Depth below starting point (mm)	mm/blow	DPL 60
5	100	20		14	100	7	
6	200	17		12	200	8	
3	300	33					
12	400	8					

Project:			Middledrift SSA3 Bulk Water Supply	Project:			Middledrift SSA3 Bulk Water Supply
Location:			28°49'54.5"S; 31°03'28.5"E	Location:			28°50'4.8"S; 31°03'39.9"E
Date:			18 October 2012	Date:			18 October 2012
Test start depth:			At present ground level	Test start depth:			At present ground level
No. of Blows	Depth below starting point (mm)	mm/blow	DPL 69  mm/blow 0 20 40 60 80 100 Depth Below starting point (mm)	No. of Blows	Depth below starting point (mm)	mm/blow	DPL 70  mm/blow 0 20 40 60 80 100 Depth Below starting point (mm)
8	100	13		1	100	100	
8	200	13		3	200	33	
5	300	20		5	300	20	
6	400	17		5	400	20	
6	500	17		5	500	20	
25	600	4		6	600	17	
				12	700	8	
				11	800	9	
				17	900	6	
				22	1000	5	
				40	1100	3	

Project:			Middledrift SSA3 Bulk Water Supply	Project:			Middledrift SSA3 Bulk Water Supply
Location:			28°50'13.8"S; 31°03'2.7"E	Location:			28°50'23"S; 31°02'42.1"E
Date:			18 October 2012	Date:			18 October 2012
Test start depth:			At present ground level	Test start depth:			At present ground level
No. of Blows	Depth below starting point (mm)	mm/blow	DPL 73  mm/blow 0 20 40 60 80 100 Depth Below starting point (mm)	No. of Blows	Depth below starting point (mm)	mm/blow	DPL 74  mm/blow 0 20 40 60 80 100 Depth Below starting point (mm)
5	100	20		8	100	13	
7	200	14		20	200	5	
5	300	20		17	300	6	
6	400	17		6	400	17	
11	500	9		8	500	13	
8	600	13		10	600	10	
12	700	8		31	700	3	
12	800	8					
11	900	9					
23	1000	4					
17	1100	6					

Project:			Middledrift SSA3 Bulk Water Supply	Project:			Middledrift SSA3 Bulk Water Supply
Location:			28°49'28"S; 31°01'46.1"E	Location:			28°49'28.9"S; 31°01'46"E
Date:			18 October 2012	Date:			18 October 2012
Test start depth:			At present ground level	Test start depth:			At present ground level
No. of Blows	Depth below starting point (mm)	mm/blow	DPL 81  mm/blow 0 20 40 60 80 100 Depth Below starting point (mm) 100 200 300 400 500 600 700 800 900 1000 1100	No. of Blows	Depth below starting point (mm)	mm/blow	DPL 82  mm/blow 0 20 40 60 80 100 Depth Below starting point (mm) 100 200 300 400
4	100	25		19	100	5	
9	200	11		20	200	5	
10	300	10		24	300	4	
7	400	14		34	400	3	
6	500	17					
6	600	17					
6	700	17					
5	800	20					
9	900	11					
15	1000	7					
15	1100	7					

APPENDIX D

Laboratory Test Results

		Project: Ground Africa Ref name / No: Middledrift, KZN / GA0126 Section from: No Info Provided		Lab No: 57629 & 57641 Client No: 47508/2012 Date: 12/10/2012																
Criteria REFER PROJ SPEC																				
Laboratory & Field Data Laboratory No Field No Source Position Depth Description Sampled by		<table border="1"> <tr> <td>57629</td> <td></td> <td>57641</td> </tr> <tr> <td>3/10/GA.MW4</td> <td>EX SITE</td> <td>3/10/GA.MW17</td> </tr> <tr> <td>TH29</td> <td></td> <td>TH50</td> </tr> <tr> <td>0.8</td> <td></td> <td>1.8</td> </tr> <tr> <td>Dk Br Sty SAND</td> <td>CLIENT</td> <td>Du B SAND</td> </tr> </table>				57629		57641	3/10/GA.MW4	EX SITE	3/10/GA.MW17	TH29		TH50	0.8		1.8	Dk Br Sty SAND	CLIENT	Du B SAND
57629		57641																		
3/10/GA.MW4	EX SITE	3/10/GA.MW17																		
TH29		TH50																		
0.8		1.8																		
Dk Br Sty SAND	CLIENT	Du B SAND																		
SIEVE ANALYSIS (TMH1-A1a) 75.0 mm 63.0 mm 53.0 mm 37.5 mm 26.5 mm 19.0 mm 13.2 mm 4.75 mm 2.00 mm 0.425 mm 0.075 mm 0.060 mm 0.050 mm		UNIT % P																		
			100																	
			99																	
			94	100																
			89	97																
			67	75																
			19	13																
			17	10																
			15	8																
Grading Modulus			1.25	1.15																
HYDROMETER ANALYSIS (ASTM D422)# 0.026 mm 0.015 mm 0.010 mm 0.0050 mm 0.0020 mm 0.0015 mm		% P																		
			10	4																
			8	1																
			7	0																
			6	0																
			3	0																
			3	0																
SOIL TYPE DISTRIBUTION (M.I.T)# Gravel (> 2.0mm) Coarse Sand (2.0 - 0.6mm) Medium Sand (0.6 - 0.2mm) Fine Sand (0.2 - 0.06mm) Silt (0.06 - 0.002mm) Clay (<0.002mm)		%																		
			11	3																
			15	15																
			30	33																
			27	34																
			14	10																
			3	0																
SOIL CONSTANTS (TMH1-A2/A3) Liquid Limit Plasticity Index Linear Shrinkage (TMH1 - A4)#		% % %																		
			18	CBD																
			5	NP																
			2.5	0.0																
CLASSIFICATION AASHTO & GROUP INDEX ACTIVITY / HEAVE (TRH9 - 1978)		# #																		
			A - 2 - 4 (0)	A - 2 - 4 (0)																
			0.3 / LOW	0 / LOW																
Remarks: # Not SANAS Accredited HYDROMETER - SAMPLE SEPERATION ON 0.425mm SIEVE																				
				Date	15/10/2012															
				Technician																

SOIL TEST REPORT					
		Project : Ground Africa		Lab No : 57626-57629	
		Rd name / No : Middeldrift, KZN / GA0126		Client No : 47508/2012	
		Section from : No Info Provided		Date : 04/10/2012	
Criteria REFER PROJ SPEC					
Laboratory & Field Data Laboratory No Field No Source Position Depth Description Sampled by		RESULTS 57626 57627 57628 57629 3/10/GA.MW.1 3/10/GA.MW.2 3/10/GA.MW.3 3/10/GA.MW.5 MIDDLEDRIFT TH26 TH20 TH17 TH29 0.3 1.6 0.5 0.8 Lt Br Lt R Br SAND Dk Y O Sly Clay Lt R Br Sly Clay SAND With GRAVEL SAND SAND CLIENT			
SIEVE ANALYSIS (TMH1-A1a) 106.0 mm 90.0 mm 75.0 mm 63.0 mm 53.0 mm 37.5 mm 26.5 mm 19.0 mm 13.2 mm 4.75 mm 2.00 mm 0.425 mm 0.075 mm Grading Modulus		% P 100 100 100 100 98 98 99 99 97 97 99 97 94 94 99 95 93 93 99 92 94 84 97 86 90 77 94 80 70 62 83 68 11 14 33 22 1.29 1.46 0.91 1.30			
MECHANICAL ANALYSIS (TMH1-A5) Coarse Sand Coarse-fine Sand Medium-fine Sand Fine-fine Sand Silt and Clay		% 21 19 12 16 24 20 21 14 24 23 10 17 18 19 23 26 12 18 35 27			
SOIL CONSTANTS Liquid Limit (TMH1 A2) Plasticity Index (TMH1 A3) Linear Shrinkage (TMH1 A4)#		% - - - - - - 0.0 0.9 2.1 2.2			
MAXIMUM DRY DENSITY (TMH1-A7) OPT. MOISTURE CONTENT (TMH1-A7)		kg/m3 1828 2120 2022 1954 6.7 7.4 7.7 10.5			
CBR (TMH1-A8) CBR at : 100% Compaction : 98% Compaction : 95% Compaction : 93% Compaction : 90% Compaction Swell @ 100% Compaction		% 20 58 43 56 13 40 29 44 8 21 17 27 6 13 11 15 4 6 7 6 0.0 0.0 0.17 0.04			
CLASSIFICATION AASHTO & Group Index TRH 14 : 1985		# - A - 2 - 4 (0) A - 2 - 4 (0) A - 2 - 4 (0) A - 2 - 4 (0) # G10 G8 G8 G7			
Notes : This report relates only to the specific sample(s) tested herein. % P denotes "percentage passing"					
Remarks:				Date: 15/10/2012 Technician:	

SOIL TEST REPORT					
		Project : Ground Africa		Lab No : 57631-57634	
Ref name / No :		Middledrift, KZN / GA0126		Client No : 47508/2012	
Section from :		No Info Provided		Date : 04/10/2012	
Criteria REFER PROJ SPEC					
Laboratory & Field Data		RESULTS			
Laboratory No		57631	57632	57633	57634
Field No		3/10/GA.MW.7	3/10/GA.MW.8	3/10/GA.MW.9	3/10/GA.MW.10
Source		MIDDLEDRIFT			
Position		TH49	TH59	TH62	TH25
Depth		2.0-2.8	1.3	0.8-1.5	0.9
Description		Dk R Cly	Dk R Cly	Lt R Br Sty	Dk R Sty
Sampled by		SAND	SAND	SAND	SAND
		CLIENT			
SIEVE ANALYSIS(TM1-A1a)		% P			
106.0 mm					
90.0 mm					
75.0 mm					
63.0 mm				100	
53.0 mm				98	
37.5 mm				97	
26.5 mm				96	
19.0 mm				95	
13.2 mm				94	
4.75 mm		100	100	93	100
2.00 mm		92	95	90	90
0.425 mm		45	60	19	38
0.075 mm		0.64	0.45	0.98	0.73
Grading Modulus					
MECHANICAL ANALYSIS (TM1-A5)		%			
Coarse Sand		8	4	3	10
Coarse-fine Sand		15	5	12	15
Medium-fine Sand		16	13	31	20
Fine-fine Sand		16	17	33	17
Silt and Clay		45	61	21	38
SOIL CONSTANTS		%			
Liquid Limit (TM1 A2)		28	31	CBD	22
Plasticity Index (TM1 A3)		9	12	NP	5
Linear Shrinkage (TM1 A4)#		4.5	6.4	0.0	2.7
MAXIMUM DRY DENSITY (TM1-A7)		kg/m3			
OPT. MOISTURE CONTENT (TM1-A7)		12.8	15.7	8.2	10.1
CBR (TM1-A8)		%			
CBR at : 100% Compaction		4.0	9.0	11	42
: 98% Compaction		1.3	3.5	7	31
: 95% Compaction		0.2	0.4	4	17
: 93% Compaction		0.0	0.0	3	8
: 90% Compaction		0.0	0.0	3	3
Swell @ 100% Compaction		0.81	0.00	0.00	0.14
CLASSIFICATION					
AASHTO & Group Index		A - 4 (2)	A - 6 (6)	A - 2 - 4 (0)	A - 4 (1)
TRH 14 : 1985		NO CLASS	NO CLASS	G10	G9
Notes :					
This report relates only to the specific sample(s) tested herein.					
% P denotes "percentage passing"					
Remarks: NO CLASS = POORER THAN G10				Date:	
MOISTURE CONTENT (100% COMP. AFTER 4 DAYS SOAKING)				15/10/2012	
SAMPLE MW7 - 17.1%				 Q M Thile	
SAMPLE MW8 - 20.1%					
				Technician:	

SOIL TEST REPORT				
	Project :	Ground Africa	Lab No:	57635-57638
	Rd name / No :	Middledrift, KZN / GA0126	Client No:	47508/2012
	Section from :	No Info Provided	Date :	04/10/2012
Criteria REFER PROJ SPEC				
Laboratory & Field Data		RESULTS		
Laboratory No		57635	57636	57637
Field No		3/10/GA.MW.11	3/10/GA.MW.12	3/10/GA.MW.13
Source		MIDDLEDRIFT		
Position		TH37	TH72	TH P1
Depth	m	0.7 - 1.5	0.3 - 1.3	0.0 - 1.0
Description		Dk R Br Sty SAND With GRAVEL	Dk R Br Clay SAND With GRAVEL	Dk Br Clay SAND With GRAVEL
Sampled by		CLIENT		
SIEVE ANALYSIS (TMH1-A1a)				
	% P			
106.0 mm				
90.0 mm				
75.0 mm				
63.0 mm		100	100	100
53.0 mm		96	97	90
37.5 mm		94	92	80
26.5 mm		92	84	75
19.0 mm		90	74	71
13.2 mm		90	68	68
4.75 mm		83	59	61
2.00 mm		76	53	58
0.425 mm		67	48	52
0.075 mm		13	36	24
Grading Modulus		1.42	1.63	1.66
MECHANICAL ANALYSIS (TMH1-A5)				
	%			
Coarse Sand		14	10	9
Coarse-fine Sand		22	1	10
Medium-fine Sand		26	4	15
Fine-fine Sand		22	18	23
Silt and Clay		17	67	42
SOIL CONSTANTS				
	%			
Liquid Limit (TMH1 A2)		CB0	32	29
Plasticity Index (TMH1 A3)	-	NP	9	9
Linear Shrinkage (TMH1 A4)#		0.0	4.6	4.8
MAXIMUM DRY DENSITY (TMH1-A7)				
	kg/m ³	2050	2151	2026
OPT. MOISTURE CONTENT (TMH1-A7)				
	%	9.1	10.8	10.9
CBR (TMH1-A8)				
	%			
CBR at : 100% Compaction		36	74	48
: 98% Compaction		26	57	36
: 95% Compaction		15	37	24
: 93% Compaction		9	26	10
: 90% Compaction		4	15	3
Swell @ 100% Compaction		0.00	0.00	0.24
CLASSIFICATION				
	#			
AASHTO & Group Index	-	A - 2 - 4 (0)	A - 4 (0)	A - 2 - 4 (0)
TRH 14 : 1985	#	G9	G6	G8
Notes : This report relates only to the specific sample(s) tested herein. % P denotes "percentage passing"				
Remarks:		Date: 15/10/2012 Technician: 		

SOIL TEST REPORT					
	Project :	Ground Africa		Lab No:	57639-57642
	Rd name / No	Middledrift, KZN / GA0126		Client No.:	47508/2012
	Section from :	No Info Provided		Date :	04/10/2012
Criteria REFER PROJ SPEC					
Laboratory & Field Data			RESULTS		
Laboratory No	57639		57640	57642	
Field No	3/10/GA.MW.15		3/10/GA.MW.16	3/10/GA.MW.18	
Source	MIDDLEDRIFT				
Position	TH68	TH63	TH51		
Depth	2.1	1	1.5 - 2.2		
Description	Dk Y O Sly SAND	Dk R Clay SAND	Dk R Br / Dk Y O Clay SAND		
Sampled by	CLIENT				
SIEVE ANALYSIS (TMH1-A1a)		% P			
106.0 mm					
90.0 mm					
75.0 mm					
63.0 mm					
53.0 mm	100	100			
37.5 mm	98	97			
26.5 mm	96	96			
19.0 mm	94	95			
13.2 mm	88	95			
4.75 mm	85	94			
2.00 mm	82	93	100		
0.425 mm	76	89	92		
0.075 mm	42	66	67		
Grading Modulus	1.00	0.52	0.41		
MECHANICAL ANALYSIS (TMH1-A5)		%			
Coarse Sand	8	4	8		
Coarse-fine Sand	9	4	6		
Medium-fine Sand	12	7	8		
Fine-fine Sand	20	13	11		
Silt and Clay	51	72	67		
SOIL CONSTANTS		%			
Liquid Limit (TMH1 A2)	40	37	40		
Plasticity Index (TMH1 A3)	10	14	18		
Linear Shrinkage (TMH1 A4)#	5.1	7.6	9.3		
MAXIMUM DRY DENSITY (TMH1-A7)		kg/m3			
OPT. MOISTURE CONTENT (TMH1-A7)	1751	1698	1665		
CBR (TMH1-A8)	16.1	16.8	17.9		
CBR at : 100% Compaction	14	33	15		
: 98% Compaction	11	28	9		
: 95% Compaction	8	22	5		
: 93% Compaction	5	17	4		
: 90% Compaction	3	12	3		
Swell @ 100% Compaction	0.88	1.16	0.95		
CLASSIFICATION					
AASHTO & Group Index	#	A - 4 (1)	A - 6 (8)	A - 6 (10)	
TRH 14 : 1985	#	G10	G8	G10	
Notes :					
This report relates only to the specific sample(s) tested herein.					
% P denotes "percentage passing"					
Remarks:			Date:	15/10/2012	
			Technician:		