PROVINCIAL ADMINISTRATION OF KWAZULU-NATAL
DEPARTMENT OF PUBLIC WORKS

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

BILLS OF QUANTITIES

with GCC for Construction Works - Second Edition 2010

CONTRACTUAL SECTION

ONE VOLUME APPROACH
SECTION 2

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

PROJECT NAME	WIMS NO.	CONTRACT PERIOD	TYPE OF CONTRACT
MTHAMBALALA SS	060602	8 CALENDAR MONTHS	OPEN TENDER

ENGINEER/PRINCIPAL AGENT
LDM Quantity Surveyors DBN (Pty) Ltd
P.O. Box 19233
Dormerton
Durban
4015
031 - 207 1340 - Tel Number
031 - 209 9441 - Fax Number
rntlauzana@ldm.co.za

QUANTITY SURVEYORS
LDM Quantity Surveyors DBN (Pty) Ltd
P.O. Box 19233
Dormerton
Durban
4015
031 - 207 1340 - Tel Number
031 - 209 9441 - Fax Number
rntlauzana@ldm.co.za

EMPLOYER:
Head: Public Works
KZN Department of Public Works
Private Bag X 9041
PIETERMARITZBURG
3200
Tel Number: 033 - 897 1300
Fax Number: 033 - 897 1399

REGION:
Regional Manager
KZN Department of Public Works
Private Bag X 42
Ulundi
3838
Tel Number: 035-874 3349
Fax Number: 035-874 2519

Tender Number:	ZNTU04134W	Project Code:	060602
CIDB Grading:	4GB OR HIGHER	Document Date:	18-Aug-2023
ECDP Number:	N/A	Contract Period:	8 Calendar Months

Contracting Party: _____
CIDB Registration number: _____
Central Suppliers Database Registration Number: _____

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

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THE CONTRACT

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THE CONTRACT

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DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

C1 - AGREEMENT AND CONTRACT DATA

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DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

FORM OF OFFER AND ACCEPTANCE

FORM OF OFFER AND ACCEPTANCE

Tender No - ZNTU04134W

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C.1.1 - FORM OF OFFER AND ACCEPTANCE

THE OFFER AND ACCEPTANCE FORM IS BOUND INTO **SECTION 1** (See end of Returnable Documents) OF THIS DOCUMENT AS PART OF THE RETURNABLE DOCUMENTS. ONCE A CONTRACT IS CONCLUDED WITH A SUCCESSFUL TENDERER, THIS PAGE WILL BE REPLACED WITH THE FILLED AND SIGNED OFFER AND SIGN ACCEPTANCE BY THE EMPLOYER AND IT WILL BECOME PART OF THE CONTRACT.

PLEASE SUBMIT THE OFFER AND ACCEPTANCE FORM WITH THE OTHER RETURNABLE DOCUMENTS.

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
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DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

C1.2 - CONTRACT DATA

C 1.2 CONTRACT DATA:
with GCC for Construction Works - Second Edition 2010

CONTRACT DATA FOR:

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

Tender no: **ZNTU04134W**

The General Conditions of Contract are the clauses contained in the General Conditions of Contract (2010) (Second Edition) published by the South African Institution of Civil Engineering. Copies of these conditions of contract may be obtained through most regional offices of the South African Institution of Civil Engineering, telephone number 011 805 5947 or by visiting their website at www.saice.org.za.

CONTRACT SPECIFIC DATA
The following contract specific data are applicable to this contract:

CONTRACT VARIABLES

This schedule contains all variables specific to this document and is divided into pre-tender and post-tender categories. The pre-tender category must be completed in full and included in the tender documents. Both the pre-tender and post-tender categories form part of this **agreement.**

Spaces requiring information must be filled in, shown as 'not applicable' or deleted but not left blank. Where choices are offered, the non-applicable items are to be deleted. Where insufficient space is provided the information should be annexed hereto and cross referenced to the applicable clause of the schedule. Key cross reference clauses are italicised in *[ ]* brackets.
The Engineer/Principal Agent, in accordance with Clause 1.1.1.16, shall obtain the specific approval from the Employer before executing any of his functions according to the "Conditions under which Consultants are appointed", or in the event where an employee of the Employer represents the Employer, the relevant General Delegations applicable at the time of executing his/her duties as described in Clause 3.1.2.

Part 1: CONTRACT DATA PROVIDED BY THE EMPLOYER:

PRE-TENDER INFORMATION

CONTRACTING AND OTHER PARTIES

[1.1.1.15] **Employer:**

Head: Public Works (KZN Department of Public Works: Province of KwaZulu-Natal)

Postal address:
Private Bag X 9041
PIETERMARITZBURG
3200

Tel: ***033 - 897 1399*** Fax: ***033 - 897 1300***

[1.2.1.2] Physical address:
191 Prince Alfred Street
PIETERMARITZBURG
3200

[1.1.1.16] **Employers Agent 1**
LDM Quantity Surveyors DBN (Pty) Ltd

Agent's service:
PRINCIPAL AGENT

Postal address:
P.O. Box 19233
Dormerton
4015

Tel: ***031 - 207 1340*** Fax: ***031 - 209 9441***

Employers Agent 2
LDM Quantity Surveyors DBN (Pty) Ltd

Agent's service:
QUANTITY SURVEYORS

Postal address:
P.O. Box 19233
Dormerton
4015

Tel: ***031 - 207 1340*** Fax: ***031 - 209 9441***

Employers Agent 3
Map Africa Consulting Engineers

Agent's service:
STRUCTURAL / CIVIL ENGINEERS

Postal address:
Suite ESS106A, Strathmore Park, 305 Musgrave Rd,
Musgrave, Durban
4001

Tel: ***031 309 5831*** Fax: ***031 309 2929***

Employers Agent 4
Ibuya Consulting Engineers

Agent's service:
ELECTRICAL ENGINEERS

Postal address:
P.O. Box 1692
Wandsbeck
3631

Tel: ***031 266 7332*** Fax: ***031 266 7340***

Tender no:	ZNTU04134W	
	Employers Agent 5 ***Nathan Francis Architects*** ***Agent's*** service: ***ARCHITECTS*** Postal address: ***Suite 12, 40 Newport Avenue*** ***Glenashley, Durban*** ***4001*** Tel: insert ***0790379821***	Fax: ***N//A***
	Employers Agent 6 ***[Agents Name]*** ***Agent's*** service: ***[Identify Agent's Service, eg. Engineer]*** Postal address: ***[P.O. Box number]*** ***[Name of town]*** ***[Code]*** Tel: insert ***[Tel Number including Area Code]***	Fax: ***[Fax Number including Area Code]***
	Employers Agent 7 ***[Agents Name]*** ***Agent's*** service: ***[Identify Agent's Service, eg. Engineer]*** Postal address: ***[P.O. Box number]*** ***[Name of town]*** ***[Code]*** Tel: insert ***[Tel Number including Area Code]***	Fax: ***[Fax Number including Area Code]***
	Employers Agent 8 ***[Agents Name]*** ***Agent's*** service: ***[Identify Agent's Service, eg. Engineer]*** Postal address: ***[P.O. Box number]*** ***[Name of town]*** ***[Code]*** Tel: insert ***[Tel Number including Area Code]***	Fax: ***[Fax Number including Area Code]***

PART 1: DATA PROVIDED BY THE EMPLOYER

[1.1.1.13] **Defects Liability Period**

The defects liability period is: **A time measured from the date of the Certificate of Completion.**
Defects Liability Period is 12 Months for the whole of the Works

Latent Defect Period

[5.16.3] The latent defect period is: 5 years after the Final Approval Certificate

Documentation required before Commencement of the Works:

[5.3.1] The documentation required before commencement with the Works execution are;

[4.3]	Health and Safety Plan	The Contractor shall deliver his Health and Safety Plan of the Works within 14 calendar days after notice from the Employer, prior to the Commencement Date.
[5.6]	Initial Programme	The Contractor shall deliver his programme of work within 14 calendar days after notice from the Employer, prior to the Commencement Date.
[6.2]	Guarantee	The Contractor shall deliver his chosen Guarantee (security) for this Works within 14 calendar days after notice from the Employer, prior to the Commencement Date.
[8.6]	Insurance	The Contractor shall deliver his insurance for the Works within 14 calendar days after notice from the Employer, prior to the Commencement Date.
	Cash flow by contractor	The Contractor shall deliver his Cash flow for the Works within 14 calendar days after notice from the Employer, prior to the Commencement Date.
	Priced Bill of Quantity	The Contractor shall deliver his Priced Bill of Quantity at closing date of tenders.
	Programme	The Contractor is required to submit his Programme of Works in terms of Clause 5.6.1 and 5.3.1 and the Principal Agent is required to approve this within 7 days in terms of Clause 5.6.3
	Other requirements	

[5.3.2] The time to submit the documentation required before commencement with Works execution is: 14 calendar days

Non-Working days

[5.8.1]	Non-Working days	**Sundays**
	Special non- working days	**All Nationally Recognized Public Holidays and the year end break**
[5.8.1]	First Year end break - commences	***18-Dec-23***
	ends on	***8-Jan-24***
	Second Year end break - commences	***16-Dec-24***
	ends on	***13-Jan-25***
	Third Year end break - commences	***N/A***
	ends on	***N/A***
	Fourth Year end break - commences	***N/A***
	ends on	***N/A***

Engineer/Principal Agent to consult with Employer

[3.1.3] The Engineer shall obtain the specific approval from the Employer before executing any of his functions according to the "Conditions under which Consultants are appointed", or in the event where an employee of the Employer represents the Employer, the relevant General Delegations applicable at the time of executing his/her duties.

Security

[6.2.1] The time to deliver the deed of guarantee is Prior to site hand over in terms of clause 5.3.1 and 5.3.2.

[6.2.1] Please see CONTRACT DATA - below to select Guarantee Option

Commencement Date

Commencement date means the date of Site Hand over that should not occur prior to the tenderer receiving one fully signed copy of the Offer and Acceptance in terms of the Form of Offer and Acceptance.

*The **Agreement comes into effect** on the date when;*
The tenderer receives one fully completed original copy of this document, including the Schedule of Deviations (if any)

The agreement ("this document") consists of;
1. Agreement and Conditions of Contract.
2. Form of Offer and Acceptance.
3. Contract Data.
4. Scope of Works.
5. Site Information.
6. Drawings & documents referred to in the 1 to 4 above.

(See Form of Offer and Acceptance)

[5.3.1] The contractor shall commence executing the Works within 7 calendar days from the Commencement Date.

[5.4.1] ***Possession of the site*** will be given within 10 calendar days after the **contractor** has fulfilled the conditions (4.3, 5.6, 6.2, 8.6) and received the notification from the Employer of Site Hand Over where the contractor will receive one fully signed copy of the Form of Offer and Acceptance from the **employer.**

[5.6.1] The Contractor shall deliver his programme of work within 14 calendar days after notice from the Employer, prior to the Commencement Date.

CONTRACT DETAILS

[1.1.1.33] ***Works*** description: Refer to document C3 – Scope of Work.

[1.1.1.30] ***Site*** description: Refer to document C4 – Site Information.

Specific options that are applicable to a **State** organ only
Where so :

[6.10.6.2]

1) Interest rate legislation:
   (a) in respect of interest owed by the **employer**, the interest rate as determined by the Minister of Justice and Constitutional Development from time to time, in terms of section 1(2) of the Prescribed Rate of Interest Act, 1975 (Act No. 55 of 1975), will apply; and

   (b) in respect of interest owed to the **employer**, the interest rate as determined by the Minister of Finance, from time to time, in terms of section 80(1)(b) of the Public Finance Management Act, 1999 (Act No. 1 of 1999), will apply

2)	Lateral support insurance to be effected by the contractor:	***Yes***	***No X***
3)	Payment will be made for materials and goods	***Yes X***	***No***
4)	Dispute resolution by litigation	***Yes***	***No X***
5)	Extended **defects** liability period applicable to the following elements:	***Electrical, Mechanical, Civil and Building Work***	

[8.6.1.1.2] The Value of material, supplied by the Employer, and not included in the Contract Price, is: ***R0.00***

[8.6.1.1.3] The amount to cover Professional Fees, not included in the Contract Price, for repairing damage and loss to be included in the insurance:
30% of the Contract Price

[8.6.1.3] The limit for indemnity for liable insurance is: ***Unlimited***

[6.5.1.2.3] The percentage allowance to cover overhead charges for contractor and subcontractors, is: ***33.30%***

[1.1.1.14] **Practical Completion Date**

The Practical Completion date is: **8 calendar months after date of formal site handover.**

For the **works** as a whole:
The whole of the works shall be completed within: ***8*** *Months (which shall be deemed to include all Non – Working Days, Special Non – Working Days and the year-end Builders Annual Industry Holiday Periods)*

[5.5.1] The date for **practical completion** shall be ***8 calendar months after date of formal site handover***
[5.13.1] The penalty per calendar day shall be : ***0.04% of the Contract Price, rounded to the nearest R10***

	***For the* works in sections:**
	***The date for* practical completion** from the **commencement date** and the **penalty** per **calendar day:**
	Portion 1:
[5.5.1]	***N/A***
[5.13.1]	***0.04% of the Contract Price, rounded to the nearest R10***
	Portion 2:
[5.5.1]	***N/A***
[5.13.1]	***0.04% of the Contract Price, rounded to the nearest R10***
	Portion 3:
[5.5.1]	***N/A***
[5.13.1]	***0.04% of the Contract Price, rounded to the nearest R10***
	Portion 4:
[5.5.1]	***N/A***
[5.13.1]	***0.04% of the Contract Price, rounded to the nearest R10***
	Portion 5:
[5.5.1]	***N/A***
[5.13.1]	***0.04% of the Contract Price, rounded to the nearest R10***
	Portion 6:
[5.5.1]	***N/A***
[5.13.1]	***0.04% of the Contract Price, rounded to the nearest R10***
[1.3.2]	***The* law** applicable to this **agreement** shall be that of the: **Republic of South Africa**
[6.10.1.5]	The percentage advance on materials not yet built into the Permanent Works is: ***80.00%***
[6.10.3]	Percentage retention on amounts due to contractor is: ***The Percentage retention is nil. The only security required by the Employer will be such as selected by the Contractor on the Form of Offer and Acceptance and Part 2: CONTRACT DATA PROVIDED BY THE CONTRACTOR, point 2 - Documents, of the Contract Data.*** Maximum retention is: ***10.00%*** *of the Contract Price*
[6.8.1]	Notwithstanding anything to the contrary contained in the General conditions of Contract and Preliminaries, this contract could only, when the construction period exceeds 6 months **and** the contract exceeds R1,000,000.00, be subject to a Contract Price Adjustment Factor.
[6.8.2] *[6.8.3]*	Clause 6.8.2 the last part of the sentence saying *"calculated according to the formula and the conditions set out in the Contract Price Adjustment Schedule."* must be replaced by *"calculated according to the Contract Price Adjustment Provisions (CPAP) Indices Application Manual for use with P0151 indices (Revised 1 January 2013)" as published by Statistics South Africa. The Contract Price Adjustment Provision (CPAP) will be subject to the most recently released indices by Statistic South Africa. Tenderers are advised that with reference to Clause 3.4.6 of the Contract Price Adjustment Provisions (CPAP) Indices Applications Manual, the Head: Public Works will not accept the submission by Tenderers of lists of additional items."*
[6.8.2] *[6.8.3]*	Where this contract is a Lump Sum contract, the contract will only be subject to Contract Price Adjustment Provisions (CPAP)(Revised 1 January 2013) where the contract period equals or exceeds 6 calendar months. The applicable work group shall be WG 180 for domestic buildings or WG 181 for commercial and industrial buildings only.
[5.14.5]	***The following clause must be added to clause 5.14.5:*** *[5.14.5.6]* The employers agent shall submit the **final account** within 3 calendar months to the principal agent.
[10.5] *[10.5.3]* *[10.9.1]*	The determinations of disputes shall be by ARBITRATION ONLY. The number of Adjudication Board Members to be appointed is: One Replace the last part of the clause with the following: *"..on the application of either party, by the Chairman, or his nominee of the Association of Arbitrators."*
	***Where* CPAP** is applicable, the **contract sum** will be adjusted in accordance with the Contract Price Adjustment Provisions (**CPAP**) as set out in the **CPAP** Indices Application Manual as published by Statistics South Africa, dated 1 January 2013 and any amendments thereto: 1) Glass etc. measured in specialist section Metalwork, will be adjusted in terms of the index for that work group unless specifically stated otherwise in the bills of quantities. 2) In case of uninterruptible power supplies, elevators, escalators and hoists, generating sets, motor-alternator sets and intercommunication systems shall be adjusted in accordance with Work Group 170. 3) Further to clause 3.4.6 of the CPAP Indices Application Manual, the listing of additional items for exclusion by Tenderer's, will not be permitted. ***Alternative Indices:* Not Applicable** Details of changes made to the General Conditions of Contract for construction works (2010) Second Edition
[1.1]	***Clause*** *[1.1.1.5]* **COMMENCEMENT DATE** – means the actual date of Site Hand over that should not occur prior to the Tenderer receiving one fully signed copy of the Offer and Acceptance in terms of the Form of Offer and Acceptance. *[5.12.2.2]* **ABNORMAL CLIMATIC CONDITIONS** - means conditions over and above what could reasonably be expected for the specific locality where the Works are being executed and include inter alia excessive rain, heat, cold, wind and any other climatic condition that would not normally be experienced during the season that the Works are executed in that area. The South African Weather Service's (http://www.weathersa.co.za) 10 year average climatic conditions statistics would be what could be reasonably expected for the specific locality where the Works are executed. *[6.2.1]* **CONSTRUCTION GUARANTEE** – means an on demand guarantee at call obtained by the **contractor** from an institution approved by the **employer** in terms of the **employer's** construction guarantee form as selected in the Offer and Acceptance Form and the **contract data.** **CONSTRUCTION PERIOD** – means the period commencing on the **commencement date** and ending on the date of **due completion date.** This period will be deemed to commence on actual site hand over date to the contractor and end on the date of practical completion and shall include all annual industrial holiday periods, Sundays and public holidays. **CORRUPT PRACTICE** – means the offer, giving, receiving, or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution. **FINAL ACCOUNT** - The document prepared by the principal agent, which reflects the contract value of the works at final approval or termination. **FRAUDULENT PRACTICE** – means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of any tenderer and includes collusive practise among tenderers (prior to or after the tender submission) designed to establish tender prices at artificial non-competitive levels and to deprive the tenderer of the benefits of free and open competition.

		INTEREST – the interest rates applicable on this contract, whether specifically indicated in the relevant clauses or not, will be in terms of the legislation of the Republic of South Africa, and in particular: (a) in respect of interest owed by the **employer,** the interest rate as determined by the Minister of Justice and Constitutional Development from time to time, in terms of section 1(2) of the Prescribed Rate of Interest Act, 1975 (Act No. 55 of 1975), will apply; and (b) in respect of interest owed to the employer, the interest rate as determined by the Minister of Finance, from time to time, in terms of section 80(1)(b) of the Public Finance Management Act, 1999 (Act No. 1 of 1999), will apply
	[1.1.1.16]	**ENGINEER/PRINCIPAL AGENT** – means the person or entity appointed by the **Employer** and named in the **Contract Data** as the **Engineer /Principal Agent** to act as agent of the **Employer**. In the event of an Engineer/**Principal Agent** not being appointed, then all the duties and obligations of an Engineer/**Principal Agent** as detailed in the **Contract** shall be fulfilled by a representative of the **Employer** as named in the **Contract Data. (Hereafter referred to as Engineer)**
	[1.1.1.21]	**GENERAL ITEMS** - or preliminaries means items stipulated in the Pricing Data relating to general obligations, site services, facilities and/or items that cover elements of the cost of the work which are not considered as proportional to the quantities of the Permanent Works.
	[4.4.1]	Add the following to the clause 4.4.1: *"The Contract shall only use subcontractors who are duly registered with the CIDB and who has an ACTIVE status at the time of submitting the tender"*
	[6.2.1]	Refer to Offer and Acceptance form for the various options that the contractor may choose from in providing a form of **Guarantee** under "GUARATEE OPTIONS".
	[6.10.6.2]	Replace *"at the prime overdraft rate, as charged by the Contractor's Bank,"* with *"..at the interest rate as determined by the Minister of Justice and Constitutional Development from time to time, in terms of section 1(2) of the Prescribed Rate of Interest Act, 1975 (Act No. 55 of 1975)."* Omit *",on all overdue payments from the date on which the same should have been paid..." and replace with " only after 30 calendar days from receiving written notice from the Contractor that the amount is overdue,.."*
	SPECIAL CONDITIONS OF CONTRACT	
[5.12.3]		Omit clause 5.12.3 and add the following: *"5.12.3. If an extension of time is granted, the Contractor shall be paid such additional time-related General Items, including for special non-working days, if applicable as are appropriate regarding to any other compensation which may already have been granted in respect of the circumstances concerned. The reasons for extension of time that would invoke payment of time related General Items are inter alia;* *5.12.3.1 Failure to give possession of the site to the contractor.* *5.12.3.2 Making good physical loss and repairing damage to the works where the contractor is not at risk.* *5.12.3.3 Contract instructions not occasioned by default by the contractor.* *5.12.3.4 Failure to issue construction information timeously or the late issue of a contract instruction following a request from the contractor.* *5.12.3.5 Late acceptance by the principal agent of a design undertaken by a selected subcontractor where the contractor's obligations have been met.* *5.12.3.6 Suspension or cancellation termination invoked by a nominated or selected n/s subcontractor due to default by the employer or the principal agent.* *5.12.3.7 Insolvency of a nominated subcontractor.* *5.12.3.8 A direct contractor.* *5.12.3.9 Opening up and testing of work and materials and goods where such work is according to in accordance with the contract documents.* *5.12.3.10 The execution of additional work for which the quantity included in the bills of quantities is not sufficiently accurate.* *5.12.3.11 Late or failure to supply materials and goods for which the employer is responsible.* *5.12.3.12 Suspension of the works."*
[5.14.5.1]		Omit entire clause 5.14.5.1
[5.16.4]		Add the following new clause *"5.16.4. Upon the issue of a Final Approval Certificate, unless otherwise provided in the Contract:* *5.16.4.1. The performance Guarantee (if any) shall be returned within 14 days to the guarantor in terms of Clause 7."*
[6.2.2]		Replace the following *"..it shall be deemed that the Contractor has selected a security of ten percent retention of the value of the Works."* with *"..it shall be deemed that the Contractor has selected a security of a bank or insurance guarantee of 5% of the value of the Works and a payment reduction of 5% of the value certified in the payment certificate excluding value added tax."*
[6.2.3]		Add to clause 6.2.3 the following *"The Contractor shall provide proof of paid-up premium payments to accompany his payment certificate as proof that his performance guarantee has not expired yet. The Contractor will not receive payment without proof of the validity of their performance*
[9.3.2.2]		Omit *"without prejudice to the exercise of any lien the Contractor may have acquired over the Employer's property."*
		Duties and functions of the **Engineer** requiring the specific approval of the **Employer** BEFORE execution of any part of these duties are as follows:
		(a) Determinations of contractors claims for extension of time (revision of the contract completion date). All claims for extension of time shall be submitted by the **Engineer,** together with the **Engineer's** recommendations, to the **Employer** for determination. Omit "Engineer" in clause 42.2
		(b) Drawings, instructions or communications of any kind requiring variations of the works and involving EXTRA's shall NOT be given effect by the **Contractor** UNTIL BOTH the "Official Variation Order" and the "Financial Request for Variation Order and Additional Funds" form, as issued by the Department of Public Works, have been approved and signed by the **Employer**.
		(c) Insurance policies to be approved by the **Employer** within 21 days of the date of the **Commencement** of the Works.
		(d) Any notice of disagreement raised by the **Contractor** or written Dispute Notice given by the **Contractor** to the **Engineer** shall be submitted by the **Engineer**, together with the **Engineer's** recommendations, to the **Employer** for determination.
		(e) The issue of the certificate of practical completion, certificate of completion and the final approval certificate shall be signed and submitted by the **Engineer**, to the **Employer** for final approval and signature. The certificates shall not be considered as officially issued until signed by the
	MANAGING PROJECT DURATION	
		(a) The Contractor shall co-ordinate his programme with all other contractors whose work may precede or be executed simultaneously to his own. The Contractor will be called upon to plan and control the project using the Project Evaluation and Review Technique (PERT) or other approved Critical Path Method (CPM) network analysis of his events and activities and those of the dub-contractors in his employ and must co-ordinate his planning with any other contractor employed on the project. A fortnightly project control report will be expected from the Contractor in writing, evaluating any gains or delays against the critical path and he should allow for all costs involved in planning reviewing and updating the programme to the satisfaction of the Principal Agent against this item.
		(b) Activity-and total float shall belong to the Employer.
		(c) The Contractor shall deliver his programme of work within 14 calendar days after notice from the Employer, prior to the Commencement Date. It is a condition of this contact that, the contractor submit to the Engineer/principal agent a detailed CPM Programme which shall be to the approval of the Engineer/principal agent. In this regard tenderers are advised to consult with the Engineer/Principal Agent as to the format and requirements of the programme as no claim whatsoever will entertained should the programme fail to meet the requirements of the Engineer/Principal Agent. Failure to submit the programme within the stipulated time may result in the contractor being held in breach of contract. The approved programme will form the basis of time management of the project and extension of time will not be guaranteed unless the Contractor has strictly complied with this provision. The programme shall make allowance for rain and the number of rain days allowed within the critical path shall be on the provisions of the clause dealing with inclement weather and claiming for delays in performance in this bill. Allowance for the above must be made under this item as no claims for failing to comply with this precondition will later be entertained.

INCLEMENT WEATHER AND CLAIMS FOR DELAYS IN PERFORMANCE

(a) The Contract Sum includes a monthly allowance of 3 working days inclement weather during which rainfall exceeds 10mm per day for months as indicated in the Scope of Works. These days shall be reflected on the critical path of the Contractor's programme as specified in MANAGING PROJECT DURATION above.

(b) Claims for delays in performance due to inclement weather shall be calculated separately for each calendar month and for the project as a whole. Delays or gains to the critical path shall be reflected in all revisions of the programme. An extension of time will only be granted where the following conditions are met:

(i) The criteria to be used for WORK stoppages shall be for safety hazards or poor quality of work.

(ii) The Employer's site representative or the Employer's Principal Agent, if the site representative is not available shall be notified when the Contractor stops the work and intends to claim performance delays. The Employer representative shall inspect the situation together with the Contractor and give an immediate decision.

1. The stoppage claimed must cause a delay in the Completion Date of work. If the critical activities can proceed and a non-critical activity is delayed due to inclement weather no claims for delay shall be granted.
2. No claims for stoppages less than 2(two) hours per day shall be considered.
3. Claims granted for more than 2 (two) hours, but less than 10 (ten) hour (lunch included) day, shall be added together and expressed as full days.
4. All claims shall be submitted in writing to the Principal Agent within one working day of the actual stoppage.
5. The total delay in performance granted to the Contractor expressed in days shall be added to the contractual Completion Date of each section of the Works. The contractual penalty clause shall only come into effect after this newly arrived date.
6. Total delays (in hours) will be rounded up or down to the nearest integer for the calculation of Working Days. The total hours (including lunch) per Working Day shall be 10 unless otherwise indicated on the Contractor's programme.
7. Where the programmed delays for inclement weather exceed the actual delays incurred the Completion Date(s) will not be adjusted.
8. Where the project includes builder's holidays the programmed durations for inclement weather shall be adjusted pro-rate to the actual Working Days.
9. The total of all monthly delays due to inclement weather shall be calculated in accordance with the example given below:

Description		Months					Total
		Sept	Oct	Nov	Dec	Jan	
		Hours	Hours	Hours	Hours	Hours	Hours
Programmed	Rain days	0	30	30	15	15	90
Actual	Rain days	16	22	35	15	18	106
Difference		-16	8	-5	0	-3	-16
8 hrs/day*						Estimated Extension of time - in working days	2

See point 5.2 in the Scope of Works for the specific days the tenderer must allow for in this contract.

Tender no: **ZNTU04134W** **Part 2: CONTRACT DATA PROVIDED BY THE CONTRACTOR:**

POST-TENDER INFORMATION

Note: All information for this section requires consultation with the **Contractor**. The **Engineer/Principal Agent** shall not pre-select any of the alternatives available to the **Contractor.**

1 CONTRACT DETAILS

[1.1.1.9] **Contractor Name:** .....

[1.2.1.2] Postal address:

.....

.....

.....

Tel no ..... Fax no .....

Tax / VAT Registration No: ..... e-mail address .....

Physical address:

.....

.....

.....

[1.1.1.10] The accepted **contract price** inclusive of **tax** is R :

.....

[Amount in words]

Payment Of Preliminaries (Clause 6.7, 6.8, 6.10 and 6.11)

The preliminaries amounts shall be paid in terms of:

***Alternative A**	**Yes**
****Alternative B**	**N/A**

** Assessed by the Engineer/Principal Agent as an amount prorated to the value of the Work duly executed in the same ratio as the Preliminaries bears to the Contract Price excluding VAT, Preliminary amount, Contingencies and any CPAP.*

*** Calculated from the priced Bill of Quantity/Lump Sum document. The Contractor and the Engineer/Principal Agent shall agree on a division of the priced Preliminaries items into: initial establishment charge, monthly charge and final disestablishment charge.*

If the Contractor and the Engineer/Principal Agent can not agree, within 10 Working Days from the Commencement Date, on such a division then the Engineer/Principal Agent shall make a division of the Preliminaries to be incorporated in the valuations for each monthly payment certificate as follows;

10% of the General Items/Preliminaries amount shall not be varied

15% of the General Items/Preliminaries shall only be varied in proportion of the Contract Price to the Contract Sum

75% of the General Items/Preliminaries shall be varied in proportion to the revised Construction Period compared with the initial Construction Period.

Adjustment of Preliminaries (Clause 6.7, 6.8, 6.10 and 6.11)

Alternative A

For the adjustment of Preliminaries both the Contract Sum and the Contract Value (including tax) shall exclude the amount of Preliminaries, all Contingency Sum(s) and any provision for Cost Price Adjustment Provisions:-

- An amount which shall not be varied.

- An amount varied in proportion to the contract value as compared to the Contract Sum.

- An amount varied in proportion to the Construction Period as compared to the initial Construction Period (excluding revisions to the Construction Period to which the Contractor is not entitled) to adjustment of the Contract Value in terms of the agreement.

The Contractor shall provide a breakdown of charges (including tax) within 15 working days of the date of acceptance of tender and, where applicable, an apportionment of Preliminaries per section

If the Contractor and the Principal Agent cannot agree, within ten (10) Working Days from the Commencement Date, on such a division then the Principal Agent shall make a division of the Preliminaries to be incorporated in the valuations for each monthly payment certificate as follows;

10% of the amount shall not be varied

15% varied in proportion of the Contract Value to the Contract Sum

75% varied in proportion to the revised Construction period compared with the initial Construction Period

Sectional Completion : Subdivision of Preliminaries Costs

For the adjustment of preliminaries for sections of the work the value of fixed, value, and time related amounts of the preliminaries for each section is required. The contractor is to provide such information within fifteen (15) working days of taking possession of the site, failing which the categorised preliminaries amounts shall be prorated to the value of each section.

The above shall apply equally for projects where sectional completion was not contemplated at tender stage but subsequently occurred on an adhoc basis during construction of the works as agreed between the client and the employer. The original priced categorised amounts for fixed, value, and time related amounts shall be prorated to the value of each section.

When an extension of time has been granted in terms of the GCC and the preliminaries require to be adjusted accordingly, the pertinent sectional (subdivided) categorised preliminaries amounts shall be utilised, where applicable and not the overall preliminary amounts.

Where sectional completion is required in terms of the agreement, the Contractor shall provide the Principal Agent with the division of the above categorized amounts into sections. Should the Contractor fail to provide such information within the period stipulated the categorized amounts shall be prorated to the value of each section.

YES *yes / no*

or

Alternative B

The Contractor shall within 15 working days of the date of possession of the site provide the Principal Agent with a detailed breakdown of Preliminaries amounts for the works as a whole, or per section where applicable, including administrative and supervisory staff charges and for the use of construction equipment in terms of the programme.

NO *yes / no*

The contractor is informed that only alternative 'A' shall apply

2 DOCUMENTS

Contract documents marked and annexed hereto:

Priced **Bills of Quantities:**	**Yes**	X	**No**	
Lump Sum document: :	**Yes**		**No**	X

Guarantee Options:

Not applicable

2.2 DESIGN BRIEF

Not applicable	YES	YES or NO
2.3 DRAWINGS	YES	YES or NO
See list of Drawings/Annexures attached to this document.	YES	YES or NO
2.4 DESIGN PROCEDURES	YES	YES or NO

Not applicable

Contract drawings:	**Yes**	X	**No**	
Other documents:				

Waiver of the Contractors lien or right of continuing possession is required. YES

GUARANTEE OPTIONS

The Tenderer agrees to provide a bank or insurance guarantee in accordance with clause 6.2.3 of the Conditions of the GCC2010 Contract within the period stated in the Contract Data. This guarantee shall be for a sum equal to an amount stated in the Contract Data.

Guarantees submitted must be issued by either an insurance company duly registered in terms of the Insurance Act (Long Term Insurance Act No 52 of 1998 or Short Term Insurance Act No 53 of 1998) or by a bank duly registered in terms of the Banks Act No 94 of 1990, on the pro-forma referred to above. No alterations or amendments of the wording of the pro-forma will be accepted.

(a) the tenderer accepts that in respect of contracts up to R1 million, a payment reduction of 5% of the contact value will be applicable and will be reduced by the Employer in terms of the applicable conditions of contract.

(b) in respect of contracts above R1 million, the Tenderer offers to provide security as indicated below: select one option

(i) cash deposit of 10 % of the Contract Price	
(ii) bank or insurance Performance Guarantee of 10 % of the Contract Price	
(iii) cash deposit of 5% of the Contract Price and a payment reduction of 5% of the value certified in the payment certificate (excluding VAT)	
(iv) bank or insurance guarantee of 5% of the Contract Price and a payment reduction of 5% of the value certified in the payment certificate (excluding VAT)	

NOTE: Where the Tenderer has not selected one of the guarantee options above, the default option will be as if the Tenderer has selected a security of a bank or insurance guarantee of 5% of the value of the Works and a payment reduction of 5% of the value certified in the payment certificate excluding value added tax. - See GCC2010 clause 6.2.2 as amended in Contract Data.

3 SIGNATURES OF THE CONTRACTING PARTIES

Thus done and signed at.....on .....of.....20.....

Name of signatory — for and behalf of the **Employer** who by signature hereof

Capacity of signatory — as Witness.

Thus done and signed at.....on .....of.....20.....

Name of signatory — for and behalf of the **Contractor** who by signature hereof

Capacity of signatory — as Witness.

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

C1.3 - FORM OF GUARANTEE

C1.3 PERFORMANCE GUARANTEE - GCC FOR CONSTRUCTION WORKS (2nd Edition - 2010)

Head: Public Works
KZN Department of Public Works:
Private Bag X 9041
PIETERMARITZBURG
3200

Sir,

ON DEMAND PERFORMANCE GUARANTEE

Tender Number ZNTU04134W	**Project Code 060602**

For use with the General Conditions of Contract for Construction Works, Second Edition, 2010.

GUARANTOR DETAILS AND DEFINITIONS

"Guarantor" means: _____

Physical Address: _____

"Employer" means: The Provincial Administration of KwaZulu-Natal in its Department of Public Works

"Contractor" means: _____

"Engineer" means: _____

"Works" means: **DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER**

"Site" means: _____

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

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

Amount in Words: _____

"Guaranteed Sum" means: The maximum aggregate amount of: 10% *Of Contract Sum* _____

Amount in Words: _____

"Expiry Date" means: _____

CONTRACT DETAILS

Engineer Issues: Interim Payment Certificates, Final Payment Certificates and the Certificate Completion of the Works as defined in the Contract.

PERFORMANCE GUARANTEE

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

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

3 The Guarantor hereby acknowledges that:

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

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

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

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

4.2 A first written demand issued by the Employer to the Guarantor at the Guarantor's physical address with a copy to the Contractor stating that a period of seven (7) days has elapsed since the first written demand in terms of 4.1 and the sum certified has still not been paid;

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

5 Subject to the Guarantor's maximum liability referred to in 1, the Guarantor undertakes to pay to the Employer the Guaranteed Sum or the full outstanding balance upon receipt of a first written demand from the employer to the Guarantor at the Guarantor's physical address calling up this Performance Guarantee, such demand stating that:

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

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

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

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

7 Where the Guarantor has made payments in terms of 5, the Employer shall upon the date of issue of the Final Payment Certificate submit an expense account to the Guarantor showing how all monies received in terms of this Payment Guarantee have been expended and shall refund to the Guarantor any resulting surplus. All monies refunded to the Guarantor in terms of this Performance Guarantee shall bear interest at the prime overdraft rate of the Employer's bank compounded monthly and calculated from the date payment was made by the Guarantor to the Employer until the date of refund.

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

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

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

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

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

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

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

Signed at _____

Date _____

Guarantor's signatory (1) _____

Capacity _____

Guarantor's signatory (2) _____

Capacity _____

Witness signatory (1) _____

Witness signatory (2) _____

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

PART C2 - PRICING DATA

C2.1 PRICING INSTRUCTIONS
GCC FOR CONSTRUCTION WORKS (Second Edition 2010)

Project title:	**DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER**		
Tender no:	**ZNTU04134W**	**Project Code:**	**060602**

C2.1 Pricing Instructions

Where any item is not relevant to this specific contract, such item is marked N/A (signifying "not applicable")

The adjustment of the preliminaries each item priced is to be allocated to one or more of the three categories by insertion of "F", "V", "T" as the case may be against the price in the "rate" column immediately preceding the "amount" column, where "F" denotes a fixed amount (amount not varied), "V" denotes an amount variable in proportion to value and "T" denotes an amount variable in proportion to time.

1 MASSES AND MEASURING UNITS

These shall be in accordance with the Measuring Units and National Measuring Standards Act No. 76 of 1973 and amendments thereto.

The pages of each of these documents are numbered consecutively and before the Tenderer submits his tender he should check the number of pages, and if any are found missing or duplicated, or the figures or writing indistinct, or the documents contain any obvious error, he should apply to the Head : Public Works AT ONCE and have same rectified as no liability whatsoever will be admitted by the Administration in respect of errors in Tender due to the foregoing.

2 PRICES FOR VARIATIONS

Where prices or quotations for variations are submitted by the Contractor during the currency of the Contract, it is to be clearly understood that these are for the purpose of consideration by the Head : Public Works and that there is no assumption of acceptance. The Contractor will be notified of acceptance of prices or quotations either by insertion of the amount on the variation order or by written intimation.

3 SCALE

The scale to which the Drawings are made is only to be made use of when no figured dimensions are given either on the Drawings or in the tender documents and the figured dimensions are always to be followed though they may not coincide with the scale of the Drawings, but dimensions where possible are to be taken from the buildings.

4 PROVISIONAL ITEMS

All items described as "Provisional" shall be used as directed by the Employer and measured and valued or paid for.

No work for which "Provisional" items are allowed shall be commenced without written instructions from the Head : Public Works.

5	**TIMELY ORDERING OF MATERIALS** The Contractor is warned to place all orders for materials or special articles as early as possible, as he will be held solely responsible for any delay in the delivery of such goods. Nevertheless this tender is conditional upon no liability being attached to the Contractor if delivery of materials is rendered impossible by reason of any act of the Government.
6	**ELECTRICAL LIGHTING, POWER AND WATER** The Contractor shall provide any artificial lighting which may be necessary or required for the proper execution of the works, and provide electric power and water required by all Sub-Contractors, Nominated Sub-Contractors and Sub-Contractors appointed directly by the Employer. The Contractor shall give all notices and pay all fees in connection with temporary electrical and water connections and shall connect temporary Electrical and Water meters for and pay for all current and water consumed. Tenderers are advised that the permanent light fittings and water points of any kind installed in the Works are not to be used to provide temporary lighting and supplement water requirements for construction purposes.
7	**IMPORT PERMITS, DUTIES AND SURCHARGES.** All tenders by means of which imported products are being called for, must use the rate of exchange 14 days prior to the closing date indicated in the tender documents. If this day falls on a weekend or public holiday, the next working day must be used. Furthermore, Tenderers must submit documentary proof (in the form of a certified copy) from their bank or legally recognised financial institution, clearly indicating what the rate of exchange was 14 days prior to the closing date, as mentioned above. Together with this, the Tenderer must confirm that the tender price relating to an imported product, was based on the rate of exchange 14 days prior to the closing date as mentioned above.
8	**STANDARD SYSTEM OF MEASUREMENT WHERE BILLS OF QUANTITIES FORM PART OF THE TENDER DOCUMENTS** The work executed under this Contract has been measured in accordance with the; **Standard System of Measuring Builders Work (7th Edition)** including all amendments unless descriptions of items indicate a deviation and it shall be understood that the system of measurement which is herein adopted is the only system of measurement which will be recognised in connection with this contract. Any contradictions to this system of measurement contained in the "ASAQS Model Preambles for Trades 2008" shall be disregarded (unless same have been accommodated in the system of measurement) but applicable rates shall be included for all requirements stated and not measured separately in compliance with this system.
9	**PRICING OF ROCK EXCAVATIONS** It is a condition of this tender that should the tenderer elect to price the Rock Excavation included in this tender, the rates must be market related and should be identically priced for the same classification of excavations and not vary for similar billed items in the different sections.

10 BROAD BASED BLACK ECONOMIC EMPOWERMENT

1. It is the deliberate policy of the Provincial Administration of KwaZulu-Natal to foster and to encourage the economic empowerment of Black South Africans. This policy will be implemented without prescription and without prejudicing the principles and the integrity of the Provincial Administration of KwaZulu-Natal. Subject to these constraints and also subject to good business practice and commercial consideration, it is therefore considered appropriate that the Provincial Administration of KwaZulu-Natal should encourage business relationships with companies which actively pursue Affirmative Action and Black Economic Empowerment Programmes.
2. In responding to this tender you are therefore encouraged to devote attention to these two subjects of Affirmative Action and Economic Empowerment. In addition, in considering the appointment of sub-contractors, you are requested to extend the spirit of these policies.
3. The foregoing enunciations of this policy are not intended to be prescriptive nor to preclude any individual or operation from responding to this tender.

11 REGISTRATION ON THE CENTRAL SUPPLIERS DATABASE

1. In terms of the Public Finance Management Act (PFMA), 1999 (Act No 1 of 1999) Section 38 (1) (a) (iii) and 51 (1) (iii) and Section 76 (4) of PFMA National Treasury developed a single platform, The Central Supplier Database (CSD) for the registration of prospective suppliers including the verification functionality of key supplier information.
2. Prospective suppliers will be able to self - register on the CSD website: www.csd.gov.za
3. Once the supplier information has been verified with external data sources by National Treasury a unique supplier number and security code will be allocated and communicated to the supplier. Suppliers will be required to keep their data updated regularly and should confirm at least once a year that their data is still current and updated.
4. Suppliers can provide their CSD supplier number and unique security code to organs of state to view their verified CSD information.
5. Tenderers are required to fill in clearly, legibly, in bold print and black ink their CSD supplier number in the space hereunder:

Name of Supplier	
Central Supplier Database (CSD) Supplier Number:	

12 TAX CLEARANCE REQUIREMENTS

It is a condition of tender that the taxes of the successful tenderer must be in order, or that satisfactory arrangements have been made with South African Revenue Service (SARS) to meet the Tenderer's tax obligations. It is a condition of this Offer of Commission that your practice remains in good standing with SARS (South African Revenue Services) in terms of its tax clearance, during the project, which is required to process your payment certificates.

1. In order to meet this requirement tenderers are required to apply via e-filing at any SARS branch office nationally. The Tax Compliance Status (TCS) requirements are also applicable to foreign Tenderers / individuals who wish to submit Tenders.
2. SARS will then furnish the Tenderer with a Tax Compliance Status (TCS) PIN that will be valid for a period of 1 (one) year from the date of approval.
3. In tenders where Consortia / Joint Ventures / Sub-contractors are involved, each party must submit a separate Tax Compliance Status (TCS) PIN.
4. Application for Tax Compliance Status (TCS) PIN can be done via e-filing at any SARS branch office nationally or on the website www.sars.gov.za.

	5 Tax Clearance Certificates may be printed via eFiling. In order to use this provision, taxpayers will need to register with SARS as eFilers through the website www.sars.gov.za. 6 Tax Clearance Certificates may be printed via eFiling. In order to use this provision, taxpayers will need to register with SARS as eFilers through the website www.sars.gov.za.	
	Security PIN Number	
	Company / Entity Tax Reference Number	

13 BILLS OF QUANTITIES/LUMP SUM DOCUMENT

The Bills of Quantities document forms part of and must be read and priced in conjunction with all the other documents forming part of the contract documents, the Standard Conditions of Tender, Conditions of Contract, Standard Preambles to all Trades, Specifications, Drawings and all other relevant documentation.

14 VALUE ADDED TAX

The tender price must include for Value Added Tax (VAT). All rates, provisional sums, etc. in the Bills of Quantities must however be net (exclusive of VAT) with VAT calculated and added to the Total Value thereof in the Final Summary.

15 FIXED PRICE CONTRACT

Should the Bills of Quantities/Lump Sum Document be a fixed price contract, the following clause must be inserted in the Pricing Instructions:

Tenderers are to take note that the contract price adjustments are not applicable to this contract. Tenderers should therefore make provision in the Contract Sum, schedule of rates, etc. for possible price increases during the contract period, as no claims in this regard shall be entertained.

KWAZULU-NATAL PROVINCE
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C2.2 - Preliminaries for GCC for Construction works - 2nd Edition 2010

Item No		Quantity	Rate	Amount

SECTION NO. 1

BILL NO. 1

PRELIMINARY AND GENERAL

NOTES

i) The agreement is to be the General Conditions of Contract for Works of Civil Engineering Construction (2010) (Second Edition), published by the S. A. Institution Of Civil Engineering.

ii) The Preliminaries are to be the Construction and management requirements for works contracts - Part 1: General engineering and construction works (SANS 1921-1: 2004 Edition 1) prepared by Standards South Africa and shall be deemed to be incorporated herein.

iii) Tenderers are referred to the abovementioned documents for the full intent and meaning of each clause thereof (hereinafter referred to by heading and clause number only) for which such allowance must be made as may be considered necessary.

iv) Where standard clauses or alternatives are not entirely applicable to this contract such modifications, corrections or supplements as will apply are given under each relevant clause heading.

v) Where any item is not relevant to this specific contract such item is marked N/A (signifying "not applicable").

vi) Adjustment of the preliminaries: each item priced, is to be allocated to one or more of the three categories, where "F" denotes a fixed amount (amount not to be varied), "V" denotes an amount variable in proportion to value and "T" denotes an amount in proportion to time.

Carried Forward R

				R
	Brought Forward			
	vii) Time (T) related Preliminaries will only be adjusted for ommissions or additions, issued by the Employer, or delays caused by the Employer, for which variation and extension of time has been granted.			
	PRELIMINARY AND GENERAL (CPAP WORK GROUP NO. 190 UNLESSOTHERWISE STATED)			
	SECTION A: GENERAL CONDITIONS OF CONTRACT			
1	**A1** General(clause 1) F:_____ V:_____ T:_____		Item	
2	**A2** Basis of contract (clause 2) F:_____ V:_____ T:_____		Item	
3	**A3** Engineer (clause 3) F:_____ V:_____ T:_____		Item	
4	**A4** Contrators general obligations (clause 4) F:_____ V:_____ T:_____		Item	
5	**A5** Time and related matters (clause 5) - As referred to in the Contract Data under Special Condition of Contract. The Contract Period shall be deemed to include all Non Working Days, Special Non - Working Days and the year-end Builders Annual Industry Holiday Periods. F:_____ V:_____ T:_____		Item	
6	**A6** Payment and related matters (clause 6) F:_____ V:_____ T:_____		Item	
7	**A7** Quality and related matters (clause 7) F:_____ V:_____ T:_____		Item	
8	**A8** Risks and related matters (clause 8) F:_____ V:_____ T:_____		Item	
9	**A9** Terminations of contract (clause 9) F:_____ V:_____ T:_____		Item	
	Carried Forward			R

	Brought Forward			R
10	**A10** Claims and disputes (clause 10) F:_____ V:_____ T:_____	Item		
	SECTION B: SANS 1921-1:2004 (Edition 1): CONSTRUCTION AND MANAGEMENT REQUIREMENTS FOR WORKS CONTRACTS: PART 1			
	Refer to the SCOPE OF WORK for detail requirements:			
11	**B1** Scope (clause 1) F:_____ V:_____ T:_____	Item		
12	**B2** Normative references (clause 2) F:_____ V:_____ T:_____	Item		
13	**B3** Definitions (clause 3) F:_____ V:_____ T:_____	Item		
14	**B4** Requirements for construction and management (clause 4) F:_____ V:_____ T:_____	Item		
15	**B4.1** General (Clause 4.1) F:_____ V:_____ T:_____	Item		
16	**B4.2** Responsibilities for design and construction (clause 4.2) F:_____ V:_____ T:_____	Item		
17	**B4.3** Planning, programme and method statements (clause 4.3) F:_____ V:_____ T:_____	Item		
18	**B4.4** Quality assurance (clause 4.4) F:_____ V:_____ T:_____	Item		
19	**B4.5** Setting out (clause 4.5) F:_____ V:_____ T:_____	Item		
20	**B4.6** Management and disposal of water (clause 4.6) F:_____ V:_____ T:_____	Item		
	Carried Forward			R

	Brought Forward			R
21	**B4.7** Blasting (Clause 4.7) F:_____ V:_____ T:_____	Item		
22	**B4.8** Works adjacent to services and structures (clause 4.8) F:_____ V:_____ T:_____	Item		
23	**B4.9** Management of the Works and site (clause 4.9) F:_____ V:_____ T:_____	Item		
24	**B4.10** Earthworks (clause 4.10) F:_____ V:_____ T:_____	Item		
25	**B4.11** Testing (clause 4.11) F:_____ V:_____ T:_____	Item		
26	**B4.12** Materials, samples and fabrication drawings (clause 4.12) F:_____ V:_____ T:_____	Item		
27	**B4.13** Equipment (clause 4.13) F:_____ V:_____ T:_____	Item		
28	**B4.14** Site establishment (clause 4.14) F:_____ V:_____ T:_____	Item		
29	**B4.15** Survey control (clause 4.15) F:_____ V:_____ T:_____ As built survey information prepared by an engineering surveyor to be submitted upon request to the engineer.	Item		
30	**B4.16** Temporary works (clause 4.16) F:_____ V:_____ T:_____	Item		
31	**B4.17** Existing services (clause 4.17) F:_____ V:_____ T:_____ The contractor to note that the water and electricity supplies at the specific school may be restricted or possibly non-existent. Accordingly, the tenderer to ensure that temporary supplies(water tanks/ electrical generators) are available on site to meet the project demands and to achieve continuity of the works on site.The use of potable water for construction activities is prohibited.	Item		
	Carried Forward			R

	Brought Forward			R
32	**B4.18** Health and safety (clause 4.18) F:_____ V:_____ T:_____ The Contractor shall provide all PPE requirements for all employees and visitors to the site, during the execution of the works.	Item		
33	**B4.19** Environmental requirements (clause 4.19) F:_____ V:_____ T:_____	Item		
34	**B4.20** Alterations, additions, extensions and modifications to existing works (clause 4.20) F:_____ V:_____ T:_____	Item		
35	**B4.21** Inspection of adjoining structures, services, buildings and property (clause 4.21) F:_____ V:_____ T:_____	Item		
36	**B4.22** Attendance on nominated and selected subcontractors (clause 22) F:_____ V:_____ T:_____	Item		
	SECTION C: SCOPE OF WORK IN ACCORDANCE WITH SANS 10403 *(The reference to Clauses refer to Table B.1 of SANS 1921-1:2004)*			
37	**C.1** Certification by recognised bodies (clause 4.4) F:_____ V:_____ T:_____ The contractor shall provide all original certification of compliance in respect of all specialist installations and compliance testing as deemed necessary or as stipulated by the engineer.Payment will be withheld in the abscence of the provision of original compliance certificates.	Item		
38	**C.2** Agrément certificates (clause 4.5) F:_____ V:_____ T:_____	Item		
39	**C.3** Other services and facilities (clause 4.8) F:_____ V:_____ T:_____	Item		
	Carried Forward			R

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	Brought Forward			R
40	**C.4** Recording of weather (clause 5.2) F:_____ V:_____ T:_____ A rain gauge shall be provided on site for the duration of the contract. A diary shall be maintained with all rainfall records and signed off by the school principal and thereafter submitted to the engineer at every site meeting.		Item	
41	**C.5** Management meetings (clause 5.3) F:_____ V:_____ T:_____		Item	
42	**C.6** Daily records (clause 5.6) F:_____ V:_____ T:_____		Item	
43	**C.7** Bond and guarantees (clause 5.7) F:_____ V:_____ T:_____		Item	
44	**C.8** Permits (clause 5.9) F:_____ V:_____ T:_____		Item	
45	**C.9** Proof of compliance with the law (clause 5.10) F:_____ V:_____ T:_____		Item	
	SECTION D: SPECIFICATION DATA ASSOCIATED WITH SANS 1921-1:2004 (Table A.1)			
46	**D.1** Requirements for drawings, information and calculations for which the contractor is responsible (clause 4.1.7) F:_____ V:_____ T:_____		Item	
47	**D.2** The responsibility strategy assigned to the contractor for the works (clause 4.2.1) F:_____ V:_____ T:_____		Item	
48	**D.3** The planning, programme and method statements (clause 4.3) F:_____ V:_____ T:_____ The Contractor must provide weekly programme updates to the engineer including the identification of all the activities that are delayed and the proposed plan for corrective action.		Item	
	Carried Forward			R

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	Brought Forward			
49	**D.4** Samples of materials, workmanship and finishes (clause 4.12.1) F:_____ V:_____ T:_____	Item		
50	**D.5** Fabrication drawings that the contractor is to provide and deliver to the employer (clause 4.12.2) F:_____ V:_____ T:_____	Item		
51	**D.6** Office for the foreman (clause 4.14.3) F:_____ V:_____ T:_____	Item		
52	**D.7** Telephone (clause 4.14.3) F:_____ V:_____ T:_____	Item		
53	**D.8** Office for inspector of works (clause 4.14.3) F:_____ V:_____ T:_____	Item		
54	**D.9** Telephone in office for inspector of works (clause 4.14.3) F:_____ V:_____ T:_____	Item		
55	**D.10** Sheds (clause 4.14.3) F:_____ V:_____ T:_____	Item		
56	**D.11** Provision and erection of signboards (clause 4.14.6) F:_____ V:_____ T:_____	Item		
57	**D.12** Termination, diversion or maintenance of existing services (clause 4.17.1) F:_____ V:_____ T:_____	Item		
58	**D.13** Services which are known to exist (clause 4.17.3) F:_____ V:_____ T:_____	Item		
59	**D.14** Detection apparatus (clause 4.17.4) F:_____ V:_____ T:_____	Item		
60	**D.15** Additional health and safety requirements (clause 4.18) F:_____ V:_____ T:_____	Item		
	Carried Forward			R

		Brought Forward			R
		SECTION E: SPECIFIC PRELIMINARIES			
		Section E contains Specific Preliminary items which apply to this contract except where "N/A" (Not Applicable) appears against the item.			
61	**E1**	**PROPRIETARY BRANDED PRODUCTS**			
		The tenderer shall take delivery of, handle, store, use apply and/or fix all proprietary branded products in strict accordance with the manufacturers' instruction after consultation with the manufacturer's authorised representative.			
		F:_____ V:_____ T:_____		Item	
62	**E2**	**OVERTIME**			
		Should overtime be required to be worked for any reason whatsoever, the costs of such overtime are to be borne by the Contractor unless the Engineer/Principal Agent has specifically authorised in writing, prior to the execution thereof, that costs for such overtime are to be borne by the Employer.			
		F:_____ V:_____ T:_____		Item	
63	**E3**	**AS BUILT DRAWINGS**			
		The position of construction breaks and the extent of individual concrete pours are to be recorded by the contractor on the Structural Engineer's drawings and are to be submitted to the Engineer/Principal Agent and the Structural Engineer for their records.			
		F:_____ V:_____ T:_____		Item	
64	**E4**	**SITE INSTRUCTIONS**			
		Site instructions issued on site are to be recorded in triplicate in a site instruction book which is to be maintained on site by the contractor.			
		F:_____ V:_____ T:_____		Item	
		Carried Forward			R

		Brought Forward		R
65	**E5**	**LABOUR RECORD** At the end of each week for the full duration of the contract, the contractor shall provide the Engineer/principal agent with a written record, in schedule form, reflecting the number and description of tradesmen and labourers employed by him and all sub-contractors on the works each day. The contractor shall provide the completed DPW local labour forms , records and schedules together with all supporting documentation (certified ID copies , employee details, wage rates, proof of payment , period of employment, employment contracts, etc). The client reserves the right to conduct random inspections on site to verify the local labour employed on the project. F:_____ V:_____ T:_____	Item	
66	**E6**	**PLANT RECORD** At the end of each week the Contractor shall provide the Engineer/Principal Agent with a written record, in schedule form, reflecting the number, type and capacity of all plant, excluding hand tools, currently used on the works. F:_____ V:_____ T:_____	Item	
67	**E7**	**NON CESSION OF MONIES** The Contractor shall not cede nor assign his rights or claims to any monies due or to become due under this contract. F:_____ V:_____ T:_____	Item	
68	**E8**	**SECTIONAL COMPLETION** When it is required that the contract be executed in sections or portions, the tenderer shall allow for all costs in this regard as no claim for additional costs will be entertained. F:_____ V:_____ T:_____	Item	
		Carried Forward		R

		Brought Forward			R
69	**E9**	**LOCAL LABOUR** It is a general requirement of this contract that persons normally resident in the locality of the works (local labour) be given preference for employment on the contract. Provided, however, that should adequate and appropriate Labour not be available within the locality, other may be employed subject to satisfactory proof being provided that every reasonable endeavour has been made to employ local Labour. The Contractor shall identify the local community leaders with the purpose of negotiating with them regarding the utilization of local Labour in the construction process. In this regard, the Contractor shall furthermore give preference, wherever possible to the employment of single heads of households, women and youth and preference should be given to parents of those children that are enrolled in the school whom are not currently employed. The Contractor shall, in general, maximize the involvement of the local labour and it is required that 100% of unskilled labour should be from the local community. All standard local labour employment forms (EPWP local labour forms) together with the supporting documentation (certified ID copies, employee details, wage rates, proof of payment, period of employment, employment contracts, etc) must be submitted with the monthly payment certificates and issued to the engineer. F:_____ V:_____ T:_____	Item	
		Carried Forward			R

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	Brought Forward			R
70	**E10 IMPORT PERMITS AND DUTIES** The responsibility for obtaining the necessary import permits shall rest with the successful Tenderer. No foreign exchange will be arranged or provided by the Administration. Tenderers are to allow in their tenders and pay the ordinary levy imposed on imported items in terms of item 196.10 of Part 8 of Schedule No. 1 of the Customs and Excise Act, 1964 with effect from 1 October 1989. F:_____ V:_____ T:_____		Item	
71	**E11 CONTRACT PRICE ADJUSTMENT PROVISIONS (CPAP)** Notwithstanding anything to the contrary contained in the GCC for Construction Works 2010 2nd Edition, this Contract shall only when the Construction Period exceeds 6 months and the Contract sum exceeds R1,000,000,00 be subject to the Contract Price Adjustment Provisions Indices Application Manual for use with P0151 indices (CPAP) (Revised 1 January 2013) as published by Statistics South Africa. Tenderers are advised that with reference to Clause 3.4.6 of the Contract Price Adjustment Provisions (CPAP) Indices Applications Manual, the Head: Public Works will not accept the submission by Tenderers of lists of additional items unless otherwise instructed. Where this contract is a Lump Sum contract, the contract will be subject to Contract Price Adjustment Provisions (CPAP) only where the contract period equals or exceeds 6 calendar months. The applicable work group shall be WG 180 for domestic buildings or WG 181 for commercial and industrial buildings. F:_____ V:_____ T:_____		Item	
	Carried Forward			R

		Brought Forward			R
72	**E12**	**EXPANDED PUBLIC WORKS PROGRAMME (EPWP)** Tenderers are advised that this contract will be subject to certain provisions of the Expanded Public Works Program (EPWP) aimed at alleviating and reducing unemployment. Tenderers must allow for any costs for the following employment requirements of the EPWP. 1. 55% of unskilled labour to be women. 2. 40% of unskilled labour to be youth aged between 18 and 35 years. 3. 2% of unskilled labour to be people living with disability. 4. 100% Unskilled labour utilised must reside within the boundries of the Municipality Ward where this contract is executed, with preference to the local community closest or at the walking distance to the contract site. Wherever possible local skilled tradesmen are to be employed on this contract with the view to maximize utilization of local resources. This is not an EPWP project. **TENDERERS TO NOTE:** Those parts of the contract to be constructed using Labour intensive methods have been marked in the bills of quantities/lump sum document with the letters LI (indicating "Labour Intensive") against every item so designated. The works, or parts of the works so designated are to be constructed using Labour intensive methods only. F:_____ V:_____ T:_____	Item	
		Carried Forward			R

	Brought Forward			R
73	**E12.1 LABOUR RATE AND PAYMENT INTERVALS** The contractor should ensure that labour rate paid to unskilled local labour is commensurate to the daily task. When determining the rate, consideration should be given to beneficiaries are mostly bread winners in their families, as the program intends alleviating poverty. There should also be consideration that the labour rate promotes creation of expanded number of jobs created and person days of work. The labour rate for local unskilled shall also be determined in consideration of the location of the project, i.e. for projects implemented in urbanized municipalities will not be the same as that for rural municipalities. F:_____ V:_____ T:_____		Item	
74	**E12.2 RECORD KEEPING** 12.3.1 Every employer must keep in the project site office the following minutes of site progress minutes; contractors' monthly site progress reports; accurately recorded attendance register; proof of payment as means to verify authenticity of data in the EPWP Beneficiary form submitted with payment certificates. Copies of submitted EPWP beneficiary data forms should also be kept in the site office. F:_____ V:_____ T:_____		Item	
	Carried Forward			R

Brought Forward		R
E12.3 COMMUNITY LIAISON OFFICER (CLO)		
UTILISATION OF A COMMUNITY LIAISON OFFICER		
The Contractor shall allow for and pay any and all costs necessary for the engagement of the services of a Community Liaison Officer (CLO) for the full duration of this contract.		
A CLO will be identified by the local structures (Project Steering Committee) of the ward areas and appointed, following fair and transparent interviewing process, to be conducted in the presence of local structures and the Contractor's representative, in order to assist the Contractor in the procurement of any local labour, etc. required for this project. The Contractor is to liaise with the CLO and afford him any assistance needed in ensuring sound working relations with the local community.		
Carried Forward		R

Brought Forward		R	
Key responsibilities of the CLO are envisaged to include and not necessarily be limited to: 1. Assisting local leadership in conducting skills and resources audit which facilitates sourcing labour from within the ward or targeted areas for employment, as required by Contractor. 2. Assisting in sourcing labour-only domestic Sub-contractors and the procurement of materials from local resources, as required by the Contractor. 3. Assisting the Contractor by identifying areas of potential conflict and or threats to the project or to stakeholders in the project and recommend appropriate action to the Contractor. 4. Assisting Contractor and stakeholders in the project in the resolution of any conflicts which may arise. 5. Establishing and ensuring that sufficient and open communication channels between the Contractor and the work force are maintained. 6. Establish and ensuring that efficient and open communication channels between the Contractor and the community are maintained. 7. Identifying and reporting to the Contractor regarding issues where communication between stakeholder is necessary, recommend courses of action and facilitate such communications. 8. Assisting the Contractor and the workforce in the establishment of grievance procedures and necessary recommendations to the Contractor regarding the grievances and solution thereto. 9. Attending to site meetings and project implementation meetings as required by the Contractor and preparing periodic reports as may be required by the Contractor, from time to time. 10. Attending to such other duties which are consistent with the functions of a CLO, as may be required by the Contractor, from time to time.			
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75	Tenderers are to price twice the rate of unskilled local labour rate for the Community Liason Officer (CLO) against this item for any and all costs arising out of compliance with the foregoing and in the event of a Tenderer failing to price against this item or making inadequate financial provision against this item for compliance as aforesaid, then no claim for costs or additional cost incurred will be entertained by the Head: Public Works. F:_____ V:_____ T:_____	Item		
76	**E13 HIV/AIDS AWARENESS** Tenderers are to price against the following items for compliance with the SPECIFICATION FOR HIV/AIDS AWARENESS bound into this document (The clauses referred to are those of the Specification for HIV/AIDS) Provide and maintain a condom dispenser in terms of Clause 5.1a F:_____ V:_____ T:_____	Item		
77	**E13.1** Provide and maintain HIV/AIDS awareness posters terms of Clause 5.1b F:_____ V:_____ T:_____	Item		
78	**E13.2** HIV /Aids Awareness Programme on Site for not less than 90% of workers inclusive of all direct and indirect costs; Engage a qualified service provider as described in the scope of works to conduct an HIV Awareness Programme in terms of Clause 5.2.1a F:_____ V:_____ T:_____	Item		
79	**E13.3** Arrange for workers to attend the HIV Awareness Programme in terms of Clause 5.2.1b F:_____ V:_____ T:_____	Item		
	Carried Forward			R

	Brought Forward			R
80	**E13.4 REPORTING** Prepare and attach to claims for payment a brief report in terms of Clause 5.3 (see also HIV/STI Compliance Report (included with this document). F:_____ V:_____ T:_____	Item		
	Note: In the event that the contractor fails to satisfy the requirements of this specification, the employer (Head: Public Works) may apply any of the sanctions provided for in the contract. Sanctions may include the application of a financial penalty of .04% of the Contract Sum.			
81	**E14 OCCUPATIONAL HEALTH AND SAFETY ACT NO. 85 OF 1993** Tenderers are to allow for costs in providing a project specific ' Construction Phase Safety, Health and Environmental Plan' in accordance with "Section 2 - Specification Data associated with SANS 1921-1:2004" clause C4.18 in "Part C3 - Scope of Work" F:_____ V:_____ T:_____	Item		
82	**E15 NOTICE BOARD, SITE OFFICE, ETC** Bidders are to allow for the provision and removal of a project notice board and a site office in accordance with the Principal Agent's requirements. F:_____ V:_____ T:_____	Item		
83	**E16 IMPORTED MATERIALS AND EQUIPMENT** Where imported items are listed in the tender documents, the tenderer shall provide all information called for, failing which the price of any such item, material or equipment shall be excluded from currency fluctuations. F:_____ V:_____ T:_____	Item		
	Carried Forward			R

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		Brought Forward			
84	**E17**	**CONTRACT DOCUMENTS** The drawings issued with these Bid documents do not comprise the complete set but serves as a guide only for Biding purposes and for indicating the scope of works to enable the Bidder to acquaint him with the nature and extent of the works and the manner in which they are to be executed. Should any part of the drawings not be clearly legible to the Bidder he shall, before submitting his Bid, obtain clarification in writing from the principal agent. F:_____ V:_____ T:_____	Item		
85	**E18**	**GENERAL PREAMBLES** The Document Preambles will be the "ASAQS Model Preambles for Trades - 2008" and is obtainable from the various Regional Office's of the Department of Public Works and shall be read in conjunction with the Bills of Quantities and be referred to for the full descriptions of work to be done and materials to be used. F:_____ V:_____ T:_____	Item		
86	**E19**	**TRADE NAMES** Wherever a Trade Name for any product has been described in the Bills of Quantities the Bidder's attention is drawn to the fact that any other product of equal quality may be used subject to the written approval of the Principal Agent being obtained prior to the closing date for submission of Bids. F:_____ V:_____ T:_____	Item		
		Carried Forward			R

		Brought Forward			R
87	**E20**	**EXISTING PREMISES** The contractors attention is drawn to the fact that the existing building and surrounding buildings will remain in occupation during the performance of this contract and it is essential that the interruption to the daily activities of be kept to a minimum during the construction activities, to this end, the Contractor must allow for working in co-operation with the Engineer in organising the work in such a way as to cause the minimum disruption to the normal activities of this institution F:_____ V:_____ T:_____	Item		
88	**E21**	**INACCURATE AND DEFECTIVE WORK EXECUTED UNDER PREVIOUS CONTRACT** The contractor shall, after taking possession of the site and before commencing the work, check all levels, liners, profiles and the like and satisfy himself as to the dimensional accuracy of all work executed under the previous contract which may affect his work. Should any inaccurate or defective work be found, the contractor shall immediately notify the principal agent in writing requesting his instructions with regard thereto and afford every facility to those rectifying such inaccurate or defective work. F:_____ V:_____ T:_____	Item		
89	**E22**	**VIEWING THE SITE IN SECURITY AREAS** If the site is situated in a security area and the Bidder must arrange with the Authorities to obtain permission to enter the site for Bidding purposes. F:_____ V:_____ T:_____	Item		
		Carried Forward			R

		Brought Forward		R
90	**E23**	**COMMENCEMENT OF WORKS IN SECURITY AREAS** If the works falls within a security area, the contractor must arrange with the Authorities and give the necessary notices before commencement of the works. Should the contractor fail to make such arrangements, admission to the site may be refused and any additional costs will be for the contractor's account. F:_____ V:_____ T:_____	Item	
91	**E24**	**ENTRANCE PERMITS TO SECURITY AREAS** If the works fall within a security area, the contractor shall obtain entrance permits for his personnel and workmen entering the area and shall comply with all regulations and instructions which may be issued from time to time regarding the protection of persons and property under control of the Authority. F:_____ V:_____ T:_____	Item	
92	**E25**	**SECURITY CHECK OF PERSONNEL** The principal agent may require the contractor to have his personnel and workmen, or a certain number of them, security classified. In the event of the principal agent requesting the removal of a person or persons from the works for security reasons, the contractor shall do so forthwith and shall thereafter ensure that such person or persons are denied access to the works and the site and/or to any document or information relating to the works. F:_____ V:_____ T:_____	Item	
		Carried Forward		R

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93	**E26**	**PROHIBITION ON TAKING PHOTOGRAPHS** In terms of article 119 of the Defence Act, 44 of 1957, it is prohibited to sketch or to take photographs of any military site or installation or any building or civil works thereon or to be in possession of a camera or other apparatus used for taking photographs, except when authorised thereto by or on behalf of the Minister." The same prohibition is also applicable to all Correctional Institutions in terms of article 44.1(e) of the Correctional Services Act 8 of 1959. F:_____ V:_____ T:_____	Item	
94	**E27**	**NATURE AND EXTENT OF WORK** The broad scope of the work comprises repairs, renovation, alterations, external works, construction of new ablutions, etc. necessitated by **Water & Sanitation Programme Only**. F:_____ V:_____ T:_____	Item	
95	**E28**	**PROTECTION OF EXISTING** Every care shall be taken to protect all parts of the building and ground against disfigurement of any kind. The contractor shall be responsible for any damage caused to vehicles, persons or property by his operations, and he will be required to supply and maintain such temporary measures as are required, to prevent such damage. F:_____ V:_____ T:_____	Item	
		Carried Forward		R

		Brought Forward			R
96	**E29**	**ACCESS** The contractor is to allow for all costs associated with sites having restricted access due to location, road conditions, etc. The contractor to note the sites have extremely restricted access and in some instances , restricted access may affect the delivery of materials etc. The contractor to accordingly ensure the most suitable and effective access routes are investigated and implemented to achieve continuity of the works. F:_____ V:_____ T:_____	Item		
97	**E30**	**SAFETY TO THE SITE** All scaffolding, protection, machinery and tools on the site shall be erected, used and/or maintained in accordance of the requirements of the Occupational Health and Safety Act (85/1993) as amended and any regulations thereto. All relevant local authority bylaws shall also be complied with. The contractor to provide suitable hoarding to demarkate the area of the construction works from the other adjacent operational areas. All open excavations and incomplete construction work to be cordined off with danger tape. F:_____ V:_____ T:_____	Item		
98	**E31**	**ASBESTOS CEMENT** All preparatory work, alterations, demolitions, etc. to existing asbestos cement roof sheeting, gutters, rainwater pipes, etc. are to be carried out strictly in accordance with statutory requirements (Occupational Health and Safety Act, 1993 - Asbestos Abatement Regulations, 2020) and all necessary precautions must be taken when working with and disposing of asbestos cement products and the disposing of waste resulting from cleaning operations, etc. Allowance is to be made for costs associated with compliance with these Regulations. F:_____ V:_____ T:_____	Item		
		Carried Forward			R

		Brought Forward			R
99	**E32**	**EXISTING PREMISES OCCUPIED** The Contractor shall carry out the whole of the works with as little mess and noise as possible and with a minimum of disturbance to adjoining building and occupants. He shall provide proper protection and provide, erect and remove when directed, any temporary tarpaulins, temporary fences that may be necessary during the progress of the works, all to the satisfaction of the principal agent. The contractor may have to sequence noisy activities during school hours. In addition, no disruptions will be entertained during examinations. F:_____ V:_____ T:_____	Item	
		Carried to Final Summary Page			R

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KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

PART C2.3 BILL OF QUANTITIES

Item No		Quantity	Rate	Amount

SECTION NO. 2

BILL NO. 1

ALTERATIONS AND DEMOLITIONS (PIT TOILETS)(CPAP WORK GROUP NO. 102 UNLESS OTHERWISE STATED)

The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2008 Edition)

SUPPLEMENTARY PREAMBLES

View site

Before submitting his tender the contractor shall visit the site and satisfy himself as to the nature and extent of the work to be done and the value of the materials contained in the buildings or portions of the buildings to be demolished. No claim for any variations of the contract sum in respect of the nature and extent of the work or of inferior or damaged materials will be entertained

Explosives

No explosives whatsoever may be used for demolition purposes unless otherwise stated

Taking Out and Removal of Asbestos

Taking out and removing asbestos roof, gutters, underlay, fibreglass, downpipes, ect. must be in strict accordance with health and occupational safety regulations and a specialist firm must be contracted to dispose of the material

General

Descriptions of taking out shall be deemed to include carting away from site to a dump ground to be found by the contractor

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The contractor shall carry out the whole of the works with as little mess and noise as possible and with a minimum of disturbance to adjoining premises and their tenants. He shall provide proper protection and provide, erect and remove when directed, any temporary tarpaulins that may be necessary during the progress of the works, all to the satisfaction of the principal agent			
Water supply pipes and other piping that may be encountered and found necessary to disconnect or cut, shall be effectually stopped off or grubbed up and removed, and any new connections that may be necessary shall be made with proper fittings, to the satisfaction of the principal agent			
Doors, fanlights, fittings, frames, linings, etc which are to be re-used shall be thoroughly overhauled before refixing including taking off, easing and rehanging, cramping up, re-wedging as required and making good cramps, dowels, etc, and easing, oiling, adjusting and repairing ironmongery as necessary, replacing any glass damaged in removal or subsequently and stopping up all nail and screw holes with tinted plastic wood to match timber, unless otherwise described. Re-painting or re-varnishing is given separately			
Prices for taking out of doors, windows, etc shall include for removal of all beads, architraves, ironmongery, etc			
With regard to building up of openings in existing walls, cement screeds and pavings, granolithic, tops of walls, etc, shall be levelled and prepared for raising of brickwork			
Making good of finishes shall include making good of the brick and concrete surfaces onto which the new finishes are applied, where necessary			
The contractor will be required to take all dimensions affecting the existing buildings on the site and he will be held solely responsible for the accuracy of all such dimensions where used in the manufacture of new items (doors, windows, fittings, etc)			
Carried Forward			R

				R
	Brought Forward			
	The Contractor to acknowledge that sequencing of the work will be necessary to accommodate the operational aspects of the school. The Contractor to accordingly factor the above requirement in the construction programme and pricing			
	DEMOLITIONS ETC			
	Demolishing and removing			
1	Single storey building with pitched roof 4.4 x 3.6m on plan and 3m high at eaves comprising of concrete surface bed, block external and internal walls,corrugated roof covering on wooden purlins including breaking up and removing foundations, backfilling on completion and levelling site	m2	48	
2	Single storey building with pitched roof 6.5 x 3.6m on plan and 3m high at eaves comprising of concrete surface bed, block external and internal walls,corrugated roof covering on wooden purlins including breaking up and removing foundations, backfilling on completion and levelling site	m2	23	
3	Single storey building with pitched roof 2.5 x 5.2m on plan and 3m high at eaves comprising of concrete surface bed, block external and internal walls,corrugated roof covering on wooden purlins including breaking up and removing foundations, backfilling on completion and levelling site	m2	13	
	DESLUDGING OF EXISTING PITS AND SEPTIC TANKS			
	Desludging of existing pits and septic tanks			
4	Provide the amount of R35,000.00 (Thirty Five Thousand Rand) for the Desludging of Existing Pits and Septic Tanks Including Provision of Proof of Safe Desludging and Disposal Certificate from a Registered Sewerage Disposal Firm.	Item		35,000.00
	Carried Forward			R

	Brought Forward			R	
	TEMPORARY ABLUTION				
5	Rental of temporary chemical mobile toilets including transportation and establishment on site and de-establishment on completion for a period of 8 calendar months. Rental to include weekly cleaning and sanitisation of the temporary chemical mobile toilets and any other prescribed maintenance for the period of eight (8) calendar months	No	10		
	Carried to Final Summary Page			R	

Section No. 2
Bill No. 1
Alterations and Demolitions To Pit Toilets (Provisional)
LDM QUANTITY SURVEYORS

Item No			Quantity	Rate	Amount
	SECTION NO. 3				
	BILL NO. 1				
	TYPE B - TEACHER - 1NO. WC SEAT MALE +1NO. URINAL + 2NO. WC SEATS FEMALE + 1NO.PARAPLEGIC WC - ABLUTION BLOCK (1NO.)				
	The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2008 Edition)				
	EARTHWORKS (PROVISIONAL)(CPAP WORK GROUP NO. 104 UNLESS OTHERWISE STATED)				
	SITE CLEARANCE, ETC.				
	Site clearance				
1	Digging up and removing rubbish, debris, vegetation, hedges, shrubs and trees not exceeding 200mm girth, bush, etc.	m2	110		
2	Stripping average 150mm thick layer of top soil and stockpiling on site.	m2	110		
	EXCAVATION, FILLING, ETC. OTHER THAN BULK				
	Excavation in earth not exceeding 2m deep				
3	Reduced levels under floors. (LI)	m3	5		
4	Trenches, foundation beams, etc. (LI)	m3	3		
5	Holes (latrine pit).	m3	33		
	Carried Forward			R	

				R
	Brought Forward			
	Excavation in earth exceeding 2m but not exceeding 4m deep			
6	Holes (latrine pit).	m3	17	
	Back excavation of vertical sides of excavation in earth for working space including backfilling compacted to 98% Mod. AASHTO density			
7	Not exceeding 1,5m deep, etc. 300mm away from excavated face. (LI)	m2	29	
8	Exceeding 1,5m and not exceeding 3m deep, etc. 300mm away from excavated face. (LI)	m2	17	
	Extra over trench and hole excavations in earth for excavation in			
9	Intermediate material.	m3	10	
10	Hard rock.	m3	10	
	Extra over back excavation in earth for working space for excavation in intermediate material			
11	Not exceeding 1,5m deep, etc. 300mm away from excavated face.	m2	29	
12	Exceeding 1,5m and not exceeding 3m deep, etc. 300mm away from excavated face.	m2	17	
	Extra over back excavation in earth for working space for excavation in hard rock			
13	Not exceeding 1,5m deep, etc. 300mm away from excavated face.	m2	29	
14	Exceeding 1,5m and not exceeding 3m deep, etc. 300mm away from excavated face.	m2	17	
	Extra over all excavations for carting away			
15	Surplus material from excavations and/or stock piles on site, to a dumping site to be located by the contractor	m3	58	
	Carried Forward			R

				R
	Brought Forward			
	Risk of collapse of excavations			
16	Sides of trench and hole excavations not exceeding 1,5m deep. (LI)	m2	29	
17	Sides of trench and hole excavations exceeding 1,5m deep. (LI)	m2	17	
	Keeping excavations free of water			
18	Keeping excavations free of all water other than subterranean water.		Item	
	Earth filling supplied by the contractor under floors, etc.			
19	150mm G5 Material in accordance with SABS 1200 DM compacted to 98% Mod. AASHTO density. (LI)	m3	7	
	Compaction of surfaces			
20	Compaction of ground surface under floors, etc. including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to 98% Mod. AASHTO density. (LI)	m2	45	
	Prescribed density tests on filling			
21	"Modified AASHTO Density" test.	No	2	
22	"Field Density" test including "Optimum Moisture Content" (four readings per test)	No	2	
	Soil Insecticide in accordance with SANS 5859			
23	Under floors, etc. including forming and poisoning shallow furrows against foundation walls, etc., filling in furrows and ramming.	m2	55	
	Carried Forward			R

Brought Forward R

CONCRETE, FORMWORK AND REINFORCEMENT (PROVISIONAL)(CPAP WORK GROUP NO. 110 UNLESS OTHERWISE STATED)

SUPPLEMENTARY PREAMBLES

Cost of tests

The costs of making, storing and testing of concrete test cubes as required under Clause 7 "Tests" of SABS 1200 G shall include the cost of providing cube moulds necessary for the purpose, for testing costs and for submitting reports on the tests to the Principal Agent. The testing shall be undertaken by an independent firm or institution nominated by the contractor to the approval of the Principal Agent. (Test cubes are measured separately)

Formwork

Descriptions of formwork shall be deemed to include use and waste only (except where described as "left in" or "permanent"), for fitting together in the required forms, wedging, plumbing and fixing to true angles and surfaces as necessary to ensure easy release during stripping and for reconditioning as necessary before re-use.

The vertical strutting shall be carried down to such construction as is sufficiently strong to afford the required support without damage and shall remain in position until the newly constructed work is able to support itself.

Carried Forward R

				R
	Brought Forward			
	Formwork to soffits of solid slabs etc. shall be deemed to be to slabs not exceeding 250mm thick unless otherwise described.			
	Formwork to sides of bases, pile caps, ground beams, etc. will only be measured where it is prescribed by the Engineer for design reasons. Formwork necessitated by irregularity or collapse of excavated faces will not be measured and the cost thereof shall be deemed to be included in the allowance for taking the risk of collapse of the sides of the excavations, provision for which is made in "Earthworks".			
	UNREINFORCED CONCRETE CAST AGAINST EXCAVATED SURFACES			
	15MPa Concrete			
24	Surface blinding under surface beds, slabs, etc. (LI)	m3	2	
	REINFORCED CONCRETE			
	25MPa/19mm Concrete			
25	Foundation beams. (LI)	m3	3	
26	Surface beds, etc., including thickening. (LI)	m3	5	
27	Slabs including beams and inverted beams. (LI)	m3	2	
28	Concrete nib, etc. (LI)	m3	1	
29	Pit base. (LI)	m3	6	
	CONCRETE SUNDRIES			
	Sleeves			
30	110mm Diameter pipe and socket cast in concrete formed of 130mm long black pipe uPVC welded to 100mm long uPVC pipe with single socket. (LI)	No	4	
	Carried Forward			R

	Brought Forward			R
	Finishing top surfaces of concrete smooth with a power float			
31	Surface beds, slabs, etc. (LI)	m2	37	
	Test blocks			
32	Making and testing 150 x 150 x 150mm concrete strength test cubes.	No	8	
	FORMWORK (PROVISIONAL)(CPAP WORK GROUP NO. 111 UNLESS OTHERWISE STATED)			
	ROUGH FORMWORK (DEGREE OF ACCURACY III)			
	Rough formwork to sides			
33	Foundation beams (Provisional), etc. (LI)	m2	20	
	ROUGH FORMWORK (DEGREE OF ACCURACY II)			
	Rough formwork to sides			
34	Edges, risers, ends and reveals not exceeding 300mm high or wide. (LI)	m	20	
	Rough formwork to soffits			
35	Slabs, propped up exceeding 1.5m and not exceeding 3.5m high. (LI)	m2	10	
	Rough formwork to sides and soffits			
36	Beams propped up exceeding 1.5m and not exceeding 3.5m high. (LI)	m2	6	
	Boxing out rough formwork to form			
37	110 x 255mm High horizontal projections to sides along bottom edges. (LI)	m	3	
	Carried Forward			R

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	Brought Forward			
	MOVEMENT JOINTS, ETC.			
	Slip joints between horizontal concrete and brick surfaces with two layers of 3 ply malthoid			
38	Not exceeding 300mm wide. (LI)	m	15	
	Expansion joints with bitumen impregnated fibreboard between vertical concrete surfaces			
39	13mm Joints not exceeding 300mm high. (LI)	m	25	
	REINFORCEMENT (PROVISIONAL) (CPAP WORK GROUP NO. 114 UNLESS OTHERWISE STATED)			
	High tensile steel reinforcement to structural concrete work			
40	Bars of varying diameters.	t	1.311	
	PRECAST CONCRETE (CPAP WORK GROUP 112 UNLESS OTHERWISE STATED)			
	Precast concrete cover slab 80mm thick formed of 25Mpa/19mm concrete with class 1 smooth finish on exposed surfaces splayed 25mm at edges with ref. 193 mesh reinforcement and 2no. 15mm diameter polycop pipe sleeves cast in to receive 2no. threaded 10mm diameter galvanised L-shaped lifting handles with 50 x 50 x 5mm holed plates, nuts and lock nuts, including holes to fit 110mm diameter vent pipe, etc. laid on brick walls			
41	Cover slab size 820 x 930mm.	No	7	
42	Cover slab size 825 x 930mm.	No	1	
	Carried Forward			R

	Brought Forward			R	
	MASONRY(CPAP WORK GROUP NO. 116 UNLESS OTHERWISE STATED)				
	SUPPLEMENTARY PREAMBLES				
	BRICKWORK				
	Sizes in descriptions				
	Where sizes in descriptions are given in brick units, "one brick" shall represent the length and "half brick" the width of a brick				
	Hollow walls etc				
	Descriptions of hollow walls shall be deemed to include leaving every fifth perpend of the bottom course of the external skin open as a weep hole.				
	Walls in two skins described as "bagged and sealed" shall be deemed to include having the outer face of the inner skin bagged with 1:6 cement and sand mixture and sealed with two coats "Brixeal" bitumen emulsion waterproofing coating.				
	Face bricks				
	Bricks shall be ordered timeously to obtain uniformity in size and colour				
	Pointing				
	Descriptions of recessed pointing to fair face brickwork and face brickwork shall be deemed to include square recessed, hollow recessed, weathered pointing, etc				
	BRICKWORK IN FOUNDATIONS (PROVISIONAL)				
	Brickwork of NFX (14 MPa nominal compressive strength) clay imperial bricks in cement mortar				
43	One brick wall. (LI)	m2	55		
	Carried Forward			R	

				R
	Brought Forward			
	OPENINGS THROUGH WALLS ETC			
	Breaking out for and forming plain openings through brick walls, including prestressed concrete lintels to suit opening, etc			
44	Opening 340 x 330mm high through one brick wall. (LI)	No	6	
	Brickwork reinforcement			
45	150mm Wide reinforcement built in horizontally.	m	323	
	BRICKWORK IN SUPERSTRUCTURE			
	Brickwork of NFP Bricks in Class II mortar			
46	Half brick wall. (LI)	m2	14	
47	Half brick wall in beamfilling. (LI)	m2	2	
48	One brick wall. (LI)	m2	132	
	BRICKWORK SUNDRIES			
	Bagging of 1:3 cement and sand mixture			
49	On outer face of inner skin of brick walls including any additional labour required in raising wall in two separate skins and working around wire ties and / or brick reinforcing fabric. (LI)	m2	132	
	Brickwork reinforcement			
50	75mm Wide reinforcement built in horizontally. (LI)	m	47	
51	150mm Wide reinforcement built in horizontally. (LI)	m	388	
	Prestressed fabricated lintels			
52	90 x 115mm Lintels in lengths not exceeding 3m. (LI)	m	15	
	Turning pieces			
53	230mm Wide turning piece to lintels, etc. (LI)	m	8	
	Carried Forward			R

				R
	Brought Forward			
	Galvanised wire ties etc			
54	30 x 1.6mm Roof tie 1,6m long with one end built into brickwork and other end fixed to timber. (LI)	No	16	
	Air bricks etc			
55	229 x 152mm Terra-cotta vermin proof air brick. (LI)	No	8	
	FACE BRICKWORK			
	"Corobrik Travertine FBA" or other approved face bricks in stretcher bond with ruled joints and perpends internally and externally			
56	Extra over brickwork for face brickwork. (LI)	m2	132	
57	Extra over brickwork for brick-on-edge header course lintel. (LI)	m	15	
58	Fair cutting and fitting around pipe not exceeding 100mm diameter. (LI)	No	3	
59	Fair cutting and fitting around pipe exceeding 100mm and not exceeding 200mm diameter (LI)	No	4	
	Brick-on-edge header course copings, sills, etc. of "Corobrik Travertine FBA" or other approved face bricks pointed with recessed joints on all exposed faces			
60	220mm Wide sill set sloping and slightly projecting. (LI)	m	2	
	"NUTEC" OR OTHER APPROVED FIBRE-CEMENT WINDOW SILLS			
	Natural grey sills in single lengths bedded in class I mortar including metal fixing lugs etc			
61	150 x 15mm Thick sills set flat and slightly projecting. (LI)	m	2	
	Carried Forward			R

				R
	Brought Forward			
	WATERPROOFING(CPAP WORK GROUP NO. 120 UNLESS OTHERWISE STATED)			
	DAMP-PROOFING OF WALLS AND FLOORS			
	One layer of 375 micron Consol Plastics Brikgrip DPC or other approved embossed damp proof course			
62	In walls under sills, over lintels, etc. (LI)	m2	4	
	One layer 375 'Hyperstatic Orange' DPM with 3mm masonite protection			
63	Vertically between walls. (LI)	m2	55	
	One layer of 250 micron "Consol Plastic Gunplas USB Green" or other approved waterproof sheeting Type C, sealed at laps with "Gunplas Pressure Sensitive Tape"			
64	Under surface beds, slabs, etc. (LI)	m2	37	
	Two coats "ABE Brixeal" or other approved bitumen emulsion waterproof coating			
65	On brick walls. (LI)	m2	86	
	WATERPROOFING TO ROOFS, BASEMENTS, ETC.			
	Five coats "Acrylastic" or other approved fibre reinforced heavy duty maintenance free acrylic waterproofing			
66	Collar around pipe not exceeding 100mm internal diameter. (LI)	No	4	
	Carried Forward			R

				R
	Brought Forward			
	JOINT SEALANTS, ETC.			
	Two-part grey polysulphide sealing compound including backing cord, bond breaker, primer, etc.			
67	13 x 13mm In expansion joints in vertical concrete / brick surfaces including raking out expansion joint filler as necessary. (LI)	m	25	
	ROOF COVERINGS, ETC.(CPAP WORK GROUP NO. 125 UNLESS OTHERWISE STATED)			
	SUPPLEMENTARY PREAMBLES			
	Profiled metal sheeting and accessories			
	Roof sheeting systems are to be manufactured in strict accordance with the supplier's specifications.			
	Fixing of all roof sheeting is to be in accordance with the manufacturer's approved instruction book.			
	The manufacturer shall comply with ISO9002 Quality Management System.			
	PROFILED METAL SHEETING AND ACCESSORIES			
	0.58mm Colorbond IBR profile sheeting, colour one side fixed to timber purlins (elsewhere measured) and fixed strictly in accordance with the manufacturer's instructions			
68	Roof covering with pitch not exceeding 25 degrees.	m2	45	
69	Standard galvanised ridge capping (550mm girth) screwed through sheeting to purlins	m	7	
70	Sondor IBR pattern polyclosures to underside of ridge capping	m	14	
	Carried Forward			R

				R
	Brought Forward			
	ROOF AND WALL INSULATION			
	"Sisalation FR430" Heavy Industrial Grade Aluminum Foil based insulation			
71	Insulation laid taut over purlins and fixed concurrent with roof covering including galvanised steel straining wires.	m2	45	
	CARPENTRY AND JOINERY(CPAP WORK GROUP NO. 126 UNLESS OTHERWISE STATED)			
	PREFABRICATED TIMBER ROOF TRUSSES, ETC			
	NOTE:			
	Timber roof trusses are to comply with SABS Code of Practice 0243. (The design, manufacture and erection of timber trusses, including nail-plated and bolted trusses with lapped members).			
	The following is applicable in respect of roof trusses:			
	Trusses are at maximum 1200mm centres. Roof covering is IBR profiled metal sheeting colour one side on 50 x 76mm purlins. Ceilings are nailed gypsum plasterboard on brandering.			
	The dimensions in the descriptions of the trusses are nominal and actual measurements are to be obtained from site before design or fabrication commences.			
	Design and supply plate nailed timber roof trusses			
72	Design, supply and install roof truss system complete in accordance with the Standard Building Regulations, including cross battens at hips, valleys, etc. fixed to trusses with and including ring shank nails, hurricane clips at exposed sections and at ridges, temporary and permanent bracing, etc. to suit roof area approximate size 45m2 **(on flat floor area inclusive of overhangs)**	No	1	
	Carried Forward			R

				R
	Brought Forward			
73	Allowance for the issue of TR1 and TR2 certificates after completion of entire roof installation, signed by a competent person		Item	
	Wrought softwood			
74	38 x 114mm Wall plates.	m	14	
75	76 x 50mm Purlins.	m	66	
76	76 x 76mm Splayed gutter purlins.	m	14	
	EAVES, VERGES, ETC.			
	Pressed Nutec or other approved fibre cement boards			
77	12 x 225mm Fascia boards including aluminium H-profile fascia joiners fixed with galvanised screws and washers	m	14	
78	10 x 80 x 200mm Barge boards including H-profile jointing strips	m	12	
	DOORS, ETC.			
	Wrought Meranti or similar approved doors			
79	40mm Framed ledged, braced and battened door size 762 x 1932mm high of 40 x 110mm wide top rail and stiles, 20 x 150mm middle ledge, 20 x 225mm bottom ledge and 20 x 110mm braces, hung to steel frame (elsewhere measured) (Refer to Door Schedule D1 on drawing - 2B-2G-1P-TB)	No	3	
80	40mm Framed ledged, braced and battened door size 813 x 2032mm high of 40 x 110mm wide top rail and stiles, 20 x 150mm middle ledge, 20 x 225mm bottom ledge and 20 x 110mm braces, hung to steel frame (elsewhere measured) (Refer to Door Schedule D2 on drawing - 2B-2G-1P-TB)	No	2	
	Carried Forward			R

				R
	Brought Forward			
81	40mm Framed ledged, braced and battened door size 813 x 2032mm high of 40 x 110mm wide top rail and stiles, 20 x 150mm middle ledge, 20 x 225mm bottom ledge and 20 x 110mm braces, hung to steel frame (elsewhere measured) (Refer to Door Schedule D2P on drawing - 2B-2G-1P-TB)	No	1	
	IRONMONGERY(CPAP WORK GROUP NO. 132 UNLESS OTHERWISE STATED)			
	HINGES, BOLTS, ETC.			
82	Solid Art 294 WC or other approved anodised aluminium mortice indicator bolt.	No	3	
	"Union" or other approved			
83	Union 37651 Helping hand indicator bolt.	No	1	
	"Dorma" or other approved			
84	"DRR-SS-012" 102 x 75 x 3mm Stainless steel rising butt hinge	No	12	
85	"Dorma" DBC - SS - 017 Stainless steel adjustable roller bolt	No	1	
	LOCKS			
	"Union" or other approved			
86	" 2247-7855 Commercial Series" Four lever mortice lock	No	2	
	HANDLES			
	"Union" or other approved			
87	"CB862-05CH" Brass Gower lever handles	No	2	
	"Dorma" or other approved			
88	"Dorma" DPH301B 300 x 25mm Stainless steel pull handle with flange fixing.	No	2	
	Carried Forward			R

				R
	Brought Forward			
	SUNDRIES			
	"Union" or other approved			
89	38mm Diameter rubber door stop, plugged and screwed to wall with 50mm long brass screw	No	3	
90	"CZ8731CH" Door stop fixed with counter-sunk bolt into anchor bolt	No	2	
	"Dorma" or other approved			
91	"Dorma" DDS - SS - 017 Stainless steel floor stop.	No	1	
	LETTERS, NAMEPLATES, ETC.			
	Signage			
92	200 x 250mm Pressed aluminium with male, female or paraplegic symbol fixed to brickwork with 6 no. "Hilti" nail anchors.	No	3	
	BATHROOM FITTINGS			
	Toilet roll holders			
93	40 x 3mm Thick steel plate with 2 x 8mm holes and rawl bolts and 2 x 30mm holes to support roller bent to suit 27 diameter x 2mm thick steel pipe with hole for padlock and a 40 x 3mm thick steel plate welded on other end.(See architect drawing No.TRH)	No	3	
	"Kimberly Clark Professional" or other approved			
94	Kimberly Clark Professional SQ2 tiolet tissue dispenser	No	1	
	"Dorma" or other approved			
95	"Dorma" Cistern back rail DGR - SS - 150, plugged	No	1	
96	"Dorma" Side grab rail DGR - SS - 152, plugged	No	1	
97	"Dorma" Flush-valve backrail DGR - SS - 151, plugged	No	1	
	Carried Forward			R

				R
	Brought Forward			
	METALWORK(CPAP WORK GROUP NO. 136 UNLESS OTHERWISE STATED)			
	WELDED GALVANISED STEEL SCREENS, GATES, ETC.			
	Screens and gates			
98	Single gate size 877 x 2250mm high of 40 x 60 x 3mm rectangular tubing with 12mm diameter steel rods at 110mm centre and 40 x 6mm horizontal support flat bars fixed with hinges to steel frame of 45 x 45 x 3mm rectangular tubing fixed to walls with bolts and lugs including padlock plate (Refer to Door Schedule on drawing 2B-2G-1P-TB)	No	3	
	HOT DIPPED GALVANISED MILD STEEL DOOR FRAMES			
	1,2mm Rebated frames suitable for half brick walls			
99	Frame for door 762 x 2032mm high	No	3	
	1,2mm Rebated frames suitable for one brick walls			
100	Frame for door 813 x 2032mm high	No	3	
	GALVANISED STEEL WINDOWS, DOORS, ETC			
	SS industrial type windows			
101	Window type W1, 360 x 518mm high. (Refer to window schedule on drawing 2B-2G-1P-TB)	No	5	
	Carried Forward			R

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	Brought Forward			
	PLASTERING(CPAP WORK GROUP NO. 142 UNLESS OTHERWISE STATED)			
	SCREEDS			
	Screeds steel trowelled, on concrete			
102	Average 50mm thick on floors to falls. (LI)	m2	37	
	INTERNAL PLASTER			
	Cement plaster steel trowelled, on brickwork			
103	On walls. (LI)	m2	162	
104	On narrow widths. (LI)	m2	2	
105	On pit walls. (LI)	m2	110	
	PLUMBING AND DRAINAGE (PROVISIONAL)(CPAP WORK GROUP NO. 148 UNLESS OTHERWISE STATED)			
	PLUMBING			
	NOTE: Prices for sanitary fittings fixed to walls or abutting walls, etc. shall include for sealing against walls with silicone sealing compound. This shall apply to wash hand basins, sinks and drainers, urinals, WC cisterns, wash troughs, shower trays and the like.			
	RAINWATER DISPOSAL			
	uPVC gutters and rainwater pipes			
106	110mm Half-round gutters including fixings	m	14	
107	75mm Diameter uPVC downpipes	m	6	
108	Extra over eaves gutter outlet for 75mm diameter rainwater downpipes	No	2	
	Carried Forward			R

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	Brought Forward			
109	Extra over eaves gutter for stopped ends.	No	4	
110	Extra over rainwater downpipes for shoes	No	2	
111	Extra over rainwater downpipes for bends	No	4	
	SANITARY FITTINGS			
	"Atlas Plastics (Pty) Ltd" or other approved			
112	Atlas Plastics "Aquarius Close Coupled Toilet" (code 570AP) colour Granite with seat, overall size 416 x 690 x 768mm high, with foot of pan grouted to the floor with 1:3 cement mortar (LI)	No	1	
113	Atlas "VIP 200" (code 222AP) pedestal with footpiece complete with seat and lid screwed in precast slab including inlet funnel (code 224AP) riveted to shaft.	No	3	
114	Atlas 507 AP bowl urinal C/W 496 AP waterless urinal fitting, waste, etc complete.	No	1	
115	Atlas Plastics "Christy" (Code 945AP) wash hand basin with splashback, colour Granite, overall size 580 x 410mm wide with 2 tap holes and 40mm waste outlet, plugged and screwed to wall with galvanised screws and brackets (LI)	No	3	
116	Atlas Plastics "30 Litre Wash Trough" (code 366AP) colour Granite (code 101133), overall size 528 x 412mm wide with 40mm waste outlet, plugged and screwed to the wall with galvanised screws and fixing brackets.	No	1	
	"Cobra Watertech" or other approved			
117	15mm Chromium plated 'Star 136-15' stopcock (LI)	No	4	
118	15mm Rough brass hose bib tap as 'Cobra Watertech' Ref. No. 108-15 or other equal and approved including hose union, wall plate elbow, etc. with couplings for copper.	No	3	
119	15mm Chromium plated elbow action pillartap (code 503-21B) (LI)	No	1	
	Carried Forward			R

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	Brought Forward			
	SANITARY PLUMBING			
	Black uPVC UV stabilised pipes			
120	110mm Vent pipes.	m	20	
	Extra over Black uPVC UV stabilised pipes for fittings			
121	Vent cowl formed of 110mm vent valve with top cut off and black shade cloth fixed over end of vent pipe.	No	5	
	uPVC pipes			
122	50mm Pipes (LI)	m	30	
	Extra over uPVC pipes for fittings			
123	50mm Bend (LI)	No	10	
124	50mm Access bend (LI)	No	10	
125	50mm Junction (LI)	No	5	
	TRAPS ETC			
	"Cobra Watertech" or equal and approved			
126	32 x 40mm Butyl rubber P-trap jointed to waste outlet fitting and to 50mm uPVC pipe including clamps (LI)	No	5	
	Carried Forward			R

				R
	Brought Forward			
	WATER SUPPLIES			
	"Polycop" Heavy duty Class 2 polypropylene pipes with brass compression fittings			
127	15mm Pipes (LI)	m	20	
128	22mm Pipes (LI)	m	15	
	Extra over "Polycop" Heavy duty Class 2 polypropylene pipes for brass compression fittings			
129	15mm Fittings (LI)	No	5	
130	22mm Fittings (LI)	No	5	
	GLAZING(CPAP WORK GROUP NO. 150 UNLESS OTHERWISE STATED)			
	GLAZING TO WOOD/STEEL WITH PUTTY			
	6mm Thick obscure safety glass			
131	Panes exceeding 0,1m2 and not exceeding 0.5m2.	m2	1	
	6mm Silvered float glass copper backed mirrors with polished edges holed for and fixed with chromium plated dome capped mirror screws with rubber buffers to plugs in brickwork or concrete			
132	Mirror 300mm x 400mm high	No	3	
	Carried Forward			R

				R
	Brought Forward			
	PAINTWORK(CPAP WORK GROUP NO. 152 UNLESS OTHERWISE STATED)			
	PAINTWORK, ETC. TO NEW WORK			
	"PLASCON" OR OTHER EQUAL AND APPROVED			
	ON INTERNAL FLOATED PLASTER SURFACES			
	Prepare and brush surface to remove all loose contaminants and apply one coat alkali resistant primer, one undercoat and two coats 'PLASCON Wall & All' or other approved emulsion paint for interior use.			
133	Walls. (LI)	m2	113	
	ON FIBRE-CEMENT BOARD SURFACES			
	Prepare and brush surface to remove all loose contaminants and apply one coat alkali resistant primer and two coats superior quality acrylic emulsion paint for exterior use			
134	Fascias and barge boards, including priming metal jointing strips. (LI)	m2	12	
	ON WOOD SURFACES			
	Prepare surfaces and remove all loose material, apply one coat water based primer, one coat alkyd based universal undercoat and two coats superior quality universal enamel paint, on timber doors			
135	On doors. (LI)	m2	24	
	Prepare surfaces and remove all loose material, apply two coats 'ABE Provonite' carbolineum or equal approved anti-corrosive coal tar paint			
136	On roof timbers at eaves and verges. (LI)	m2	8	
	Carried Forward			R

				R
	Brought Forward			
	SPECIALIST FLOOR COATINGS (CPAP WORK GROUP NO. 130) (SUPPLIER TO BE SABS ISO 9000 COMPLIANT)			
	Prepare and clean surface free from laitance, nibs, dust, grease, oil, etc and apply 3 coats 'ABE.cote 337' or equal and approved, all in strict accordance with the manufacturer's printed instructions			
137	On floors (LI)	m2	37	
138	On walls (LI)	m2	51	
	CONCRETE V-DRAIN CHANNELS (ALL TRADES) (PROVISIONAL)			
	CONCRETE V-DRAINS, ETC			
	EARTHWORKS (CPAP WORK GROUP NO. 104 UNLESS OTHERWISE STATED)			
	EXCAVATION OTHER THAN BULK			
	Excavation in earth not exceeding 2m deep			
139	Reduced levels under floors. (LI)	m3	13	
	CARTING AWAY			
	Extra over all excavations for loading, carting and dumping surplus excavated material			
140	Off site to be located by the contractor	m3	13	
	EARTH FILLING, ETC			
	Earth filling supplied by the contractor under floors, etc.			
141	150mm G5 Material in accordance with SABS 1200 DM compacted to 98% Mod. AASHTO density. (LI)	m3	7	
	Carried Forward			R

				R
	Brought Forward			
	COMPACTION			
	Compaction of surfaces			
142	Compaction of ground surfaces under V drain channel, etc., including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to 93% Mod AASHTO density.	m2	44	
	TESTS			
	Prescribed density tests on filling			
143	Modified AASHTO Density test	No	3	
144	"Field Density" test including "Optimum Moisture Content" (four readings per test)	No	3	
	SOIL POISONING			
	Soil insecticide in accordance with SANS 5859			
145	Under floors, etc. including forming and poisoning shallow furrows against foundation walls, etc., filling in furrows and ramming	m2	44	
	CONCRETE, FORMWORK AND REINFORCEMENT (CPAP WORK GROUP NO. 110 UNLESS OTHERWISE STATED)			
	REINFORCED CONCRETE CAST ON/IN FORMWORK			
	20Mpa/19mm Concrete			
146	Surface beds, slabs, etc to falls and currents. (LI)	m3	6	
	Carried Forward			R

				R
	Brought Forward			
	CONCRETE SUNDRIES			
	Finishing top surfaces of concrete with a wood float finish			
147	Concrete channel to falls. (LI)	m2	44	
	Test blocks			
148	Making and testing 150 x 150 x 150mm concrete strength test cubes.	No	1	
	ROUGH FORMWORK (DEGREE OF ACCURACY III) (CPAP WORK GROUP NO. 111 UNLESS OTHERWISE STATED)			
	Rough formwork to sides			
149	Apron slabs, paving and ramps not exceeding 300mm high. (LI)	m	44	
	Expansion joints with 10mm softboard between vertical concrete and brick surfaces			
150	10mm Joints not exceeding 300mm high. (LI)	m	44	
	REINFORCEMENT (CPAP WORK GROUP NO. 114 UNLESS OTHERWISE STATED)			
	Fabric reinforcement			
151	Type 193 fabric reinforcement in concrete surface beds, slabs, etc.	m2	44	
	Carried Forward			R

				R
	Brought Forward			
	WATERPROOFING (CPAP WORK GROUP NO. 120 UNLESS OTHERWISE STATED)			
	JOINT SEALANTS, ETC			
	"ABE Flexothane" or other approved two-part grey polysulphide sealing compound including backing cord, bond breaker, primer, etc			
152	In 10mm joints not exceeding 300mm high. (LI)	m	44	
	WATER TANK SUPPORTS (ALL TRADES) (PROVISIONAL)			
	EARTHWORKS (CPAP WORK GROUP NO. 104 UNLESS OTHERWISE STATED)			
	EXCAVATION OTHER THAN BULK			
	Excavation in earth not exceeding 2m deep			
153	Bases. (LI)	m3	6	
	Extra over trench and hole excavation in earth for excavation in			
154	Hard rock.	m3	1	
	CARTING AWAY			
	Extra over all excavations for loading, carting and dumping surplus excavated material (no allowance made for increase in bulk)			
155	Off site to be located by the contractor.	m3	4	
	EARTH FILLING, ETC			
	Note: All filling whether obtained from the excavations, from stockpiles or by the contractor from an outside source must be selected and approved by the Structural / Civil Engineers			
	Carried Forward			R

	Brought Forward			R
	Filling with material from the excavations compacted to a density of at least 93% Mod. AASHTO density			
156	Backfilling to trenches, holes, etc. (LI)	m3	2	
	KEEPING EXCAVATIONS FREE OF WATER			
	Keeping excavations free of water			
157	Allow for keeping excavations free of water or mud by hand or machinery		Item	
	COMPACTION			
	Compaction of surfaces			
158	Compaction of ground surfaces under floors etc including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to 93% Mod. AASHTO density. (LI)	m2	7	
	TESTS			
	Prescribed density tests on filling			
159	Modified AASHTO Density test.	No	1	
160	"Field Density" test including "Optimum Moisture Content" (four readings per test)	No	1	
	SOIL POISONING			
	Soil insecticide in accordance with SANS 5859			
161	Under floors, etc. including forming and poisoning shallow furrows against foundation walls, etc., filling in furrows and ramming.	m2	13	
	Carried Forward			R

				R
	Brought Forward			
	CONCRETE, FORMWORK AND REINFORCEMENT(CPAP WORK GROUP NO. 110 UNLESS OTHERWISE STATED)			
	UNREINFORCED CONCRETE CAST AGAINST EXCAVATED SURFACES			
	10MPa Concrete			
162	Surface blinding under footings, bases, etc. (LI)	m3	1	
	REINFORCED CONCRETE			
	25MPa/19mm Concrete			
163	Surface beds. (LI)	m3	1	
164	Bases. (LI)	m3	2	
	TEST BLOCKS			
	Test blocks			
165	Prepare a set of six concrete cubes each cube size 150 x 150 x 150mm for strength cubes and deliver to an approved laboratory for testing and pay all charges in connection therewith.	Sets	1.00	
	CONCRETE SUNDRIES			
	Finishing top surfaces of concrete with a wood float			
166	Surface beds, slabs, etc. (LI)	m2	6	
	ROUGH FORMWORK (DEGREE OF ACCURACY III) (CPAP WORK GROUP NO. 111)			
	Rough formwork to sides			
167	Edges, risers, ends and reveals not exceeding 300mm high or wide. (LI)	m	10	
	Carried Forward			R

				R
	Brought Forward			
	Boxing in smooth formwork to form			
168	50mm Horizontal chamfer at corner. (LI)	m	10	
	REINFORCEMENT (CPAP WORK GROUP NO. 114 UNLESS OTHERWISE STATED)			
	Mild steel reinforcement to structural concrete work			
169	10mm Diameter bars.	t	0.400	
	MASONRY(CPAP WORK GROUP NO. 116 UNLESS OTHERWISE STATED)			
	BRICKWORK IN FOUNDATIONS			
	Brickwork of NFX (14 MPa nominal compressive strength) clay imperial bricks in cement mortar			
170	One brick wall. (LI)	m2	8	
	BRICKWORK IN SUPERSTRUCTURE			
	Brickwork of NFP Bricks in Class II mortar			
171	One brick wall. (LI)	m2	4	
	BRICKWORK SUNDRIES			
	Bagging of 1:3 cement and sand mixture			
172	On outer face of inner skin of brick walls including any additional labour required in raising wall in two separate skins and working around wire ties and / or brick reinforcing fabric. (LI)	m2	4	
	Brickwork reinforcement			
173	150mm Wide reinforcement built in horizontally. (LI)	m	46	
	Carried Forward			R

				R
	Brought Forward			
	FACE BRICKWORK			
	"Corobrik Travertine FBA" or other approved face bricks in stretcher bond with ruled joints and perpends internally and externally			
174	Extra over brickwork for face brickwork. (LI)	m2	4	
	PLUMBING AND DRAINAGE (CPAP WORK GROUP NO. 148 UNLESS OTHERWISE STATED)			
	WATER SUPPLIES AND FIRE SERVICES			
	TAPS, VALVES, ETC			
	"Cobra Watertech" or other approved			
175	15mm Rough brass hose bib tap as 'Cobra Watertech' Ref. No. 108-15 or other equal and approved including hose union, wall plate elbow, etc. with couplings for copper.	No	1	
	TANKS, ETC			
	Polyethylene drinking water tanks			
176	5000 Litre low profile circular tank size 2250mm diameter x 1800mm high, with access lid and inlet hole,embedded in pedestal to a minimum of 400mm above ground level and tied down with 2 No. off 4mm galvanised double strap stay wires tied to galvanised mild steel M12 eye bolt of which is to be drilled and fixed to the 4 corners of concrete supporting base.	No	1	
	Carried Forward			R

				R
	Brought Forward			
	SOAK-AWAY (ALL TRADES) (PROVISIONAL)			
	EARTHWORKS (CPAP WORK GROUP NO. 104 UNLESS OTHERWISE STATED)			
	SITE CLEARANCE, ETC.			
	Site clearance			
177	Digging up and removing rubbish, debris, vegetation, hedges, shrubs and trees not exceeding 200mm girth, bush, etc.	m2	11	
178	Stripping average 150mm thick layer of top soil and stockpiling on site.	m2	11	
	EXCAVATION, FILLING, ETC			
	Excavation in earth not exceeding 2m deep			
179	Holes	m3	15	
	Extra over bulk excavations in earth for excavation in			
180	Soft rock	m3	2	
181	Hard rock	m3	2	
	Extra over all excavations for carting away			
182	Surplus material from excavations and/or stock piles on site to a dumping site to be located by the contractor	m3	15	
	Risk of collapse of excavations			
183	Sides of bulk excavations not exceeding 1,5m deep. (LI)	m2	17	
184	Sides of bulk excavations exceeding 1,5m deep. (LI)	m2	7	
	Carried Forward			R

				R
	Brought Forward			
	EARTH FILLING, ETC			
	Earth filling supplied by the contractor (not compacted)			
185	300mm Thick layer of 15mm diameter stone filling on ground for soakaways, etc. (LI)	m3	2	
186	600mm Thick layer of 150mm diameter boulders filling laid on ground for soakaways, etc. (LI)	m3	4	
187	600mm Thick layer of 300mm diameter boulders filling laid in ground for soakaways, etc. (LI)	m3	4	
188	500mm Thick layer of G6 type material filling in soakaways, etc. (LI)	m3	4	
	Keeping excavations free of water			
189	Allow for keeping excavations free of water other than subterranean water		Item	
	PLUMBING AND DRAINAGE (CPAP WORK GROUP NO. 148 UNLESS OTHERWISE STATED)			
	DRAINAGE			
	Class 34 HD uPVC sewer and drain pipes			
190	50mm Perforated pipes laid in herring-bone pattern and including trenches not exceeding 1m deep	m	15	
191	110mm Pipes laid in and including trenches not exceeding 1m deep	m	35	
	Extra over Class 34 HD uPVC sewer and drain pipes for fittings			
192	110mm Bend	No	3	
193	110mm Access bend	No	1	
	Carried Forward			R

				R
	Brought Forward			
194	50mm Reducing junction	No	12	
195	110mm Junction	No	2	
	uPVC Gulleys			
196	110mm Diameter gulley trap jointed to drain, complete with hopper head and grid and the whole set on and encased in unreinforced concrete Class B (1:3:5) carried up 75mm above ground as kerb, dished down to grating and finished on all exposed faces in 1:3 cement render with angles rounded, including necessary excavation and formwork	No	1	
	Testing			
197	Allow for testing the whole of the Soil Drainage to the satisfaction of the Principal Agent and Local Authorities All defective work is to be taken out and replaced at the contractor's expense and the whole re-tested until found satisfactory		Item	
	GRASSING, ETC(CPAP WORK GROUP NO. 104 UNLESS OTHERWISE STATED)			
	Topsoil supplied by the contractor, including spreading and levelling			
198	In plant beds, grassed areas and holes for trees, shrubs, etc. (LI)	m3	1	
	Grassing, ground covers, etc			
199	"Kikuyu" rolls 50mm thick. (LI)	m2	11	
	Carried to Final Summary of Section No. 3			R

Section No. 3
Bill No. 1
Type B - Teacher/Learners - 2WC-F+1WC+1Urinal-M+1P
LDM QUANTITY SURVEYORS

Item No			Quantity	Rate	Amount
	SECTION NO.3				
	BILL NO. 2				
	TYPE E - LEARNERS BOYS - 3NO. WC SEATS + 3NO. URINALS - ABLUTION BLOCK (1NO.)				
	The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2008 Edition)				
	EARTHWORKS (PROVISIONAL)(CPAP WORK GROUP NO. 104 UNLESS OTHERWISE STATED)				
	SITE CLEARANCE, ETC.				
	Site clearance				
1	Digging up and removing rubbish, debris, vegetation, hedges, shrubs and trees not exceeding 200mm girth, bush, etc.	m2	110		
2	Stripping average 150mm thick layer of top soil and stockpiling on site.	m2	110		
	EXCAVATION, FILLING, ETC. OTHER THAN BULK				
	Excavation in earth not exceeding 2m deep				
3	Reduced levels under floors. (LI)	m3	10		
4	Trenches, foundation beams, etc. (LI)	m3	5		
5	Holes (latrine pit).	m3	50		
	Excavation in earth exceeding 2m but not exceeding 4m deep				
6	Holes (latrine pit).	m3	16		
	Carried Forward			R	

				R
	Brought Forward			
	Back excavation of vertical sides of excavation in earth for working space including backfilling compacted to 98% Mod. AASHTO density			
7	Not exceeding 1,5m deep, etc. 300mm away from excavated face. (LI)	m2	33	
8	Exceeding 1,5m and not exceeding 3m deep, etc. 300mm away from excavated face. (LI)	m2	21	
	Extra over trench and hole excavations in earth for excavation in			
9	Intermediate material.	m3	8	
10	Hard rock.	m3	8	
	Extra over back excavation in earth for working space for excavation in intermediate material			
11	Not exceeding 1,5m deep, etc. 300mm away from excavated face.	m2	33	
12	Exceeding 1,5m and not exceeding 3m deep, etc. 300mm away from excavated face.	m2	21	
	Extra over back excavation in earth for working space for excavation in hard rock			
13	Not exceeding 1,5m deep, etc. 300mm away from excavated face.	m2	33	
14	Exceeding 1,5m and not exceeding 3m deep, etc. 300mm away from excavated face.	m2	21	
	Extra over all excavations for carting away			
15	Surplus material from excavations and/or stock piles on site, to a dumping site to be located by the contractor	m3	81	
	Risk of collapse of excavations			
16	Sides of trench and hole excavations not exceeding 1,5m deep. (LI)	m2	33	
	Carried Forward			R

				R
	Brought Forward			
17	Sides of trench and hole excavations exceeding 1,5m deep. (LI)	m2	21	
	Keeping excavations free of water			
18	Keeping excavations free of all water other than subterranean water.		Item	
	FILLING ETC			
	Earth filling supplied by the contractor under floors, etc.			
19	150mm G5 Material in accordance with SABS 1200 DM compacted to 98% Mod. AASHTO density. (LI)	m3	8	
	Compaction of surfaces			
20	Compaction of ground surface under floors, etc. including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to 98% Mod. AASHTO density. (LI)	m2	25	
	Prescribed density tests on filling			
21	"Modified AASHTO Density" test.	No	5	
22	"Field Density" test including "Optimum Moisture Content" (four readings per test)	No	5	
	SOIL POISONING			
	Soil Insecticide in accordance with SANS 5859			
23	Under floors, etc. including forming and poisoning shallow furrows against foundation walls, etc., filling in furrows and ramming.	m2	76	
	Carried Forward			R

Brought Forward		R	

CONCRETE, FORMWORK AND REINFORCEMENT (PROVISIONAL)(CPAP WORK GROUP NO. 110 UNLESS OTHERWISE STATED)

SUPPLEMENTARY PREAMBLES

Cost of tests

The costs of making, storing and testing of concrete test cubes as required under Clause 7 "Tests" of SABS 1200 G shall include the cost of providing cube moulds necessary for the purpose, for testing costs and for submitting reports on the tests to the Principal Agent. The testing shall be undertaken by an independent firm or institution nominated by the contractor to the approval of the Principal Agent. (Test cubes are measured separately)

Formwork

Descriptions of formwork shall be deemed to include use and waste only (except where described as "left in" or "permanent"), for fitting together in the required forms, wedging, plumbing and fixing to true angles and surfaces as necessary to ensure easy release during stripping and for reconditioning as necessary before re-use.

The vertical strutting shall be carried down to such construction as is sufficiently strong to afford the required support without damage and shall remain in position until the newly constructed work is able to support itself.

Carried Forward		R	

				R
	Brought Forward			
	Formwork to soffits of solid slabs etc. shall be deemed to be to slabs not exceeding 250mm thick unless otherwise described.			
	Formwork to sides of bases, pile caps, ground beams, etc. will only be measured where it is prescribed by the Engineer for design reasons. Formwork necessitated by irregularity or collapse of excavated faces will not be measured and the cost thereof shall be deemed to be included in the allowance for taking the risk of collapse of the sides of the excavations, provision for which is made in "Earthworks".			
	UNREINFORCED CONCRETE CAST AGAINST EXCAVATED SURFACES			
	15MPa Concrete			
24	Surface blinding under surface beds, slabs, etc. (LI)	m3	2	
	REINFORCED CONCRETE			
	25MPa/19mm Concrete			
25	Foundation beams. (LI)	m3	2	
26	Surface beds, etc., including thickening. (LI)	m3	4	
27	Slabs including beams and inverted beams. (LI)	m3	6	
28	Concrete nib, etc. (LI)	m3	1	
29	Pit base. (LI)	m3	6	
	CONCRETE SUNDRIES			
	Sleeves			
30	110mm Diameter pipe and socket cast in concrete formed of 130mm long black pipe uPVC welded to 100mm long uPVC pipe with single socket. (LI)	No	3	
	Carried Forward			R

				R
	Brought Forward			
	Finishing top surfaces of concrete smooth with a wood float			
31	Surface beds, slabs, etc. (LI)	m2	25	
	Test blocks			
32	Making and testing 150 x 150 x 150mm concrete strength test cubes.	No	6	
	FORMWORK (PROVISIONAL)(CPAP WORK GROUP NO. 111 UNLESS OTHERWISE STATED)			
	ROUGH FORMWORK (DEGREE OF ACCURACY III)			
	Rough formwork to sides			
33	Foundation beams (Provisional), etc. (LI)	m2	15	
	ROUGH FORMWORK (DEGREE OF ACCURACY II)			
	Rough formwork to sides			
34	Edges, risers, ends and reveals not exceeding 300mm high or wide. (LI)	m	27	
	Rough formwork to soffits			
35	Isolated sections of composite slab propped up exceeding 1,5m and not exceeding 3,5m high. (LI)	m2	18	
	Rough formwork to sides and soffits			
36	Beams propped up exceeding 1.5m and not exceeding 3.5m high. (LI)	m2	25	
	Boxing in rough formwork to form			
37	110 x 200mm High horizontal projections to sides along bottom edges. (LI)	m	14	
	Carried Forward			R

				R
	Brought Forward			
	MOVEMENT JOINTS, ETC.			
	Slip joints between horizontal concrete and brick surfaces with two layers of 3 ply malthoid			
38	Not exceeding 300mm wide. (LI)	m	31	
	Expansion joints with bitumen impregnated fibreboard between vertical concrete surfaces			
39	13mm Joints not exceeding 300mm high. (LI)	m	7	
	REINFORCEMENT (PROVISIONAL) (CPAP WORK GROUP NO. 114UNLESS OTHERWISE STATED)			
	High tensile steel reinforcement to structural concrete work			
40	Bars of varying diameters	t	1.900	
	PRECAST CONCRETE (CPAP WORK GROUP 112 UNLESS OTHERWISE STATED)			
	Precast concrete cover slab 80mm thick formed of 25Mpa/19mm concrete with class 1 smooth finish on exposed surfaces splayed 25mm at edges with ref. 193 mesh reinforcement and 2no. 15mm diameter polycop pipe sleeves cast in to receive 2no. threaded 10mm diameter galvanised L-shaped lifting handles with 50 x 50 x 5mm holed plates, nuts and lock nuts, including holes to fit 110mm diameter vent pipe, etc. laid on brick walls			
41	Cover slab size 990 x 710mm.	No	1	
42	Cover slab size 1100 x 710mm.	No	2	
	Carried Forward			R

	Brought Forward			R	
	MASONRY(CPAP WORK GROUP NO. 116 UNLESS OTHERWISE STATED)				
	SUPPLEMENTARY PREAMBLES				
	BRICKWORK				
	Sizes in descriptions				
	Where sizes in descriptions are given in brick units, "one brick" shall represent the length and "half brick" the width of a brick				
	Hollow walls etc				
	Descriptions of hollow walls shall be deemed to include leaving every fifth perpend of the bottom course of the external skin open as a weep hole.				
	Walls in two skins described as "bagged and sealed" shall be deemed to include having the outer face of the inner skin bagged with 1:6 cement and sand mixture and sealed with two coats "Brixeal" bitumen emulsion waterproofing coating.				
	Face bricks				
	Bricks shall be ordered timeously to obtain uniformity in size and colour				
	Pointing				
	Descriptions of recessed pointing to fair face brickwork and face brickwork shall be deemed to include square recessed, hollow recessed, weathered pointing, etc				
	BRICKWORK IN FOUNDATIONS (PROVISIONAL)				
	Brickwork of NFX (14 MPa nominal compressive strength) clay imperial bricks in cement mortar				
43	Half brick wall. (LI)	m2	22		
	Carried Forward			R	

				R
	Brought Forward			
44	One brick wall. (LI)	m2	45	
	OPENINGS THROUGH WALLS ETC			
	Breaking out for and forming plain openings through brick walls, including prestressed concrete lintels to suit opening, etc			
45	Opening 340 x 330mm high through one brick wall. (LI)	No	2	
	Brickwork reinforcement			
46	75mm Wide reinforcement built in horizontally. (LI)	m	59	
47	150mm Wide reinforcement built in horizontally. (LI)	m	120	
	BRICKWORK IN SUPERSTRUCTURE			
	Brickwork of NFP Bricks in Class II mortar			
48	Piers. (LI)	m3	1	
49	Half brick wall. (LI)	m2	14	
50	Half brick wall in beamfilling. (LI)	m2	2	
51	One brick wall. (LI)	m2	53	
	BRICKWORK SUNDRIES			
	Bagging of 1:3 cement and sand mixture			
52	On outer face of inner skin of brick walls including any additional labour required in raising wall in two separate skins and working around wire ties and / or brick reinforcing fabric. (LI)	m2	53	
	Brickwork reinforcement			
53	75mm Wide reinforcement built in horizontally. (LI)	m	37	
54	150mm Wide reinforcement built in horizontally. (LI)	m	156	
	Carried Forward			R

				R
	Brought Forward			
	Prestressed fabricated lintels			
55	90 x 115mm Lintels in lengths not exceeding 3m. (LI)	m	15	
	Turning pieces			
56	230mm Wide turning piece to lintels, etc. (LI)	m	15	
	Galvanised wire ties etc			
57	30 x 1.6mm Roof tie 1,6m long with one end built into brickwork and other end fixed to timber. (LI)	No	16	
	Air bricks etc			
58	229 x 152mm Terra-cotta vermin proof air brick. (LI)	No	8	
	FACE BRICKWORK			
	"Corobrik Travertine FBA" or equal and other approved face bricks in stretcher bond with ruled joints and perpends internally and externally			
59	Extra over brickwork for face brickwork. (LI)	m2	53	
60	Extra over brickwork for brick-on-edge header course lintel. (LI)	m	15	
61	Extra over brickwork for face brick piers. (LI)	m3	1	
62	Fair cutting and fitting around pipe not exceeding 100mm diameter. (LI)	No	2	
63	Fair cutting and fitting around pipe exceeding 100mm and not exceeding 200mm diameter (LI)	No	6	
	Brick-on-edge header course copings, sills, etc. of "Corobrik Travertine FBA" or other equal and approved face bricks pointed with recessed joints on all exposed faces			
64	220mm Wide sill set sloping and slightly projecting. (LI)	m	2	
	Carried Forward			R

				R
	Brought Forward			
	"NUTEC" OR OTHER APPROVED FIBRE-CEMENT WINDOW SILLS			
	Natural grey sills in single lengths bedded in class I mortar including metal fixing lugs etc			
65	150 x 15mm Thick sills set flat and slightly projecting. (LI)	m	2	
	WATERPROOFING(CPAP WORK GROUP NO. 120 UNLESS OTHERWISE STATED)			
	DAMP-PROOFING OF WALLS AND FLOORS			
	One layer of 375 micron Consol Plastics Brikgrip DPC or other equal and approved embossed damp proof course			
66	In walls under sills, over lintels, etc	m2	4	
	One layer 375 'Hyperstatic Orange' DPM with 3mm masonite protection			
67	Vertically between walls	m2	67	
	One layer of 250 micron "Consol Plastic Gunplas USB Green" or other equal and approved waterproof sheeting Type C, sealed at laps with "Gunplas Pressure Sensitive Tape"			
68	Under surface beds, slabs, etc.	m2	25	
	Two coats "ABE Brixeal" or other equal and approved bitumen emulsion waterproof coating			
69	On brick walls	m2	53	
	Carried Forward			R

	Brought Forward			R	
	WATERPROOFING TO ROOFS, BASEMENTS, ETC.				
	Five coats "Acrylastic" or other equal and approved fibre reinforced heavy duty maintenance free acrylic waterproofing				
70	Collar around pipe not exceeding 100mm internal diameter.	No	3		
	JOINT SEALANTS, ETC.				
	Two-part grey polysulphide sealing compound including backing cord, bond breaker, primer, etc.				
71	13 x 13mm In expansion joints in vertical concrete / brick surfaces including raking out expansion joint filler as necessary.	m	38		
	Carried Forward			R	

				R
	Brought Forward			
	ROOF COVERINGS, ETC.(CPAP WORK GROUP NO. 125 UNLESS OTHERWISE STATED)			
	SUPPLEMENTARY PREAMBLES			
	Profiled metal sheeting and accessories			
	Roof sheeting systems are to be manufactured in strict accordance with the supplier's specifications.			
	Fixing of all roof sheeting is to be in accordance with the manufacturer's approved instruction book.			
	The manufacturer shall comply with ISO9002 Quality Management System.			
	PROFILED METAL SHEETING AND ACCESSORIES			
	0.58mm Colorbond IBR profile sheeting, colour one side fixed to timber purlins (elsewhere measured) and fixed strictly in accordance with the manufacturer's instructions			
72	Roof covering with pitch not exceeding 25 degrees.	m2	36	
73	Standard galvanised ridge capping (550mm girth) screwed through sheeting to purlins	m	7	
74	Sondor IBR pattern polyclosures to underside of ridge capping	m	14	
	ROOF AND WALL INSULATION			
	"Sisalation FR430" Heavy Industrial Grade Aluminum Foil based insulation			
75	Insulation laid taut over purlins and fixed concurrent with roof covering including galvanised steel straining wires	m2	36	
	Carried Forward			R

				R
	Brought Forward			
	CARPENTRY AND JOINERY(CPAP WORK GROUP NO. 126 UNLESS OTHERWISE STATED)			
	PREFABRICATED TIMBER ROOF TRUSSES, ETC			
	NOTE:			
	Timber roof trusses are to comply with SABS Code of Practice 0243. (The design, manufacture and erection of timber trusses, including nail-plated and bolted trusses with lapped members).			
	The following is applicable in respect of roof trusses:			
	Trusses are at maximum 1200mm centres. Roof covering is IBR profiled metal sheeting colour one side on 50 x 76mm purlins. Ceilings are nailed gypsum plasterboard on brandering.			
	The dimensions in the descriptions of the trusses are nominal and actual measurements are to be obtained from site before design or fabrication commences.			
	Design and supply plate nailed timber roof trusses			
76	Design, supply and install roof truss system complete in accordance with the Standard Building Regulations, including cross battens at hips, valleys, etc. fixed to trusses with and including ring shank nails, hurricane clips at exposed sections and at ridges, temporary and permanent bracing, etc. to suit roof area approximate size **36m2 (on flat floor area inclusive of overhangs)**		Item	
77	Allowance for the issue of TR1 and TR2 certificates after completion of roof installation, signed by a competent person		Item	
	Wrought softwood			
78	38 x 114mm Wall plates.	m	14	
79	76 x 50mm Purlins	m	46	
	Carried Forward			R

				R
	Brought Forward			
80	76 x 76mm Splayed gutter purlins.	m	14	
	EAVES, VERGES, ETC.			
	Nutec fibre-cement or other equal and approved			
81	12 x 225mm Fascia boards including galvanised steel H-profile jointing strips	m	14	
82	10 x 80 x 200mm Barge boards including H-profile jointing strips.	m	12	
	DOORS, ETC.			
	Wrought Meranti or similar approved doors			
83	40mm Framed ledged, braced and battened purpose made door size 762 x 1932mm high of 40 x 110mm wide top rail and stiles, 20 x 150mm middle ledge, 20 x 225mm bottom ledge and 20 x 110mm braces, hung 100mm from finished floor level (Refer to (Refer to Door Schedule D1 on drawing - 6B-TB)	No	3	
84	40mm Framed ledged, braced and battened door size 813 x 2032mm high of 40 x 110mm wide top rail and stiles, 20 x 150mm middle ledge, 20 x 225mm bottom ledge and 20 x 110mm braces, hung to steel frame (elsewhere measured) (Refer to Door Schedule D2 on drawing - 6B-TB)	No	1	
	IRONMONGERY(CPAP WORK GROUP NO. 132 UNLESS OTHERWISE STATED)			
	HINGES, BOLTS, ETC.			
85	Solid Art 294 WC or other equal and approved anodised aluminium mortice indicator bolt	No	3	
	"Dorma" or other approved			
86	"DRR-SS-012" 102 x 75 x 3mm Stainless steel rising butt hinge	No	8	
	Carried Forward			R

				R
	Brought Forward			
	LOCKS			
	"Union" or other approved			
87	" 2247-7855 Commercial Series" Four lever mortice lock	No	1	
	HANDLES			
	"Union" or other approved			
88	"CB862-05CH" Brass Gower lever handles	No	1	
	SUNDRIES			
	"Union" or other approved			
89	"CZ8731CH" Door stop fixed with counter-sunk bolt into anchor bolt	No	1	
90	38mm Diameter rubber door stop, plugged and screwed to floor with 50mm long brass screw	No	3	
	LETTERS, NAMEPLATES, ETC.			
	Signage			
91	200 x 250mm Pressed aluminium with male or female symbol fixed to brickwork with 6 no. "Hilti" nail anchors.	No	1	
	BATHROOM FITTINGS			
	Toilet roll holders			
92	40 x 3mm Thick steel plate with 2 x 8mm holes and rawl bolts and 2 x 30mm holes to support roller bent to suit 27 diameter x 2mm thick steel pipe with hole for padlock and a 40 x 3mm thick steel plate welded on other end.(See architect drawing No.TRH)	No	3	
	Carried Forward			R

				R
	Brought Forward			
	METALWORK(CPAP WORK GROUP NO. 136 UNLESS OTHERWISE STATED)			
	WELDED GALVANISED STEEL SCREENS, GATES, ETC.			
	Screens and gates			
93	Single gate size 877 x 2250mm high of 40 x 60 x 3mm rectangular tubing with 12mm diameter steel rods at 110mm centre and 40 x 6mm horizontal support flat bars fixed with hinges to steel frame of 45 x 45 x 3mm rectangular tubing fixed to walls with bolts and lugs including padlock plate (Refer to Gate Detail on drawing - 6B-TB)	No	1	
	HOT DIPPED GALVANISED MILD STEEL DOOR FRAMES			
	1,2mm Rebated frames suitable for half brick walls			
94	Frame for door 762 x 1932mm high.	No	3	
	1,2mm Rebated frames suitable for one brick walls			
95	Frame for door 813 x 2032mm high	No	1	
	GALVANISED STEEL WINDOWS, DOORS, ETC			
	SS industrial type steel windows			
96	Window type W1, 1100 x 550mm high. (Refer to window schedule on drawing - 6B-TB)	No	2	
97	Window type W2, 360 x 518mm high. (Refer to window schedule on drawing 6B-TB)	No	3	
	Carried Forward			R

				R
	Brought Forward			
	PLASTERING(CPAP WORK GROUP NO. 142 UNLESS OTHERWISE STATED)			
	SCREEDS			
	Screeds steel trowelled, on concrete			
98	Average 50mm thick on floors to falls. (LI)	m2	25	
	INTERNAL PLASTER			
	Cement plaster steel trowelled, on brickwork			
99	On walls. (LI)	m2	83	
100	On narrow widths. (LI)	m2	3	
101	On pit walls. (LI)	m2	134	
	PLUMBING AND DRAINAGE (PROVISIONAL)(CPAP WORK GROUP NO. 148 UNLESS OTHERWISE STATED)			
	PLUMBING			
	NOTE: Prices for sanitary fittings fixed to walls or abutting walls, etc. shall include for sealing against walls with silicone sealing compound. This shall apply to wash hand basins, sinks and drainers, urinals, WC cisterns, wash troughs, shower trays and the like.			
	RAINWATER DISPOSAL			
	uPVC gutters and rainwater pipes			
102	110mm Half-round gutters including fixings	m	14	
103	75mm Diameter uPVC downpipes	m	7	
104	Extra over eaves gutter outlet for 75mm diameter rainwater downpipes	No	2	
	Carried Forward			R

				R
	Brought Forward			
105	Extra over eaves gutter for stopped ends.	No	4	
106	Extra over rainwater downpipes for shoes	No	2	
107	Extra over rainwater downpipes for bends	No	4	
	SANITARY FITTINGS			
	"Atlas Plastics (Pty) Ltd" or other equal and approved			
108	Atlas "VIP 200" (code 222AP) pedestal with footpiece complete with seat and lid screwed in precast slab including inlet funnel(code 224AP) riveted to shaft.	No	3	
109	Atlas 507 AP bowl urinal C/W 496 AP waterless urinal fitting, waste, etc complete.	No	3	
110	Atlas Plastics "Christy" (Code 945AP) wash hand basin with splashback, colour Granite, overall size 580 x 410mm wide with 2 tap holes and 40mm waste outlet, plugged and screwed to wall with galvanised screws and brackets (LI)	No	2	
111	Atlas Plastics "30 Litre Wash Trough" (code 366AP) colour Granite (code 101133), overall size 528 x 412mm wide with 40mm waste outlet, plugged and screwed to the wall with galvanised screws and fixing brackets.	No	1	
	"Cobra Watertech" or other approved			
112	15mm Chromium plated 'Star 136-15' stopcock (LI)	No	3	
113	15mm Rough brass hose bib tap as 'Cobra Watertech' Ref. No. 108-15 or other equal and approved including hose union, wall plate elbow, etc. with couplings for copper.	No	3	
	SANITARY PLUMBING			
	Black uPVC UV stabilised pipes			
114	110mm Vent pipes.	m	12	
	Carried Forward			R

				R
	Brought Forward			
	Extra over Black uPVC UV stabilised pipes for fittings			
115	Vent cowl formed of 110mm vent valve with top cut off and black shade cloth fixed over end of vent pipe.	No	3	
	uPVC pipes			
116	50mm Pipes (LI)	m	30	
	Extra over uPVC pipes for fittings			
117	50mm Bend (LI)	No	10	
118	50mm Access bend (LI)	No	10	
119	50mm Junction (LI)	No	5	
	TRAPS ETC			
	"Cobra Watertech" or equal and approved			
120	32 x 40mm Butyl rubber P-trap jointed to waste outlet fitting and to 50mm uPVC pipe including clamps (LI)	No	6	
	WATER SUPPLIES			
	"Polycop" Heavy duty Class 2 polypropylene pipes with brass compression fittings			
121	15mm Pipes (LI)	m	20	
122	22mm Pipes (LI)	m	15	
	Extra over "Polycop" Heavy duty Class 2 polypropylene pipes for brass compression fittings			
123	15mm Fittings (LI)	No	5	
124	22mm Fittings (LI)	No	5	
	Carried Forward			R

				R
	Brought Forward			
	GLAZING(CPAP WORK GROUP NO. 150 UNLESS OTHERWISE STATED)			
	GLAZING TO WOOD/STEEL WITH PUTTY			
	6mm Thick obscure safety glass			
125	Panes exceeding 0,1m2 and not exceeding 0.5m2	m2	1	
	MIRRORS, ETC.			
	6mm Silvered float glass copper backed mirrors with polished edges holed for and fixed with chromium plated dome capped mirror screws with rubber buffers to plugs in brickwork or concrete			
126	Mirror 300 x 400mm high	No	2	
	PAINTWORK(CPAP WORK GROUP NO. 152 UNLESS OTHERWISE STATED)			
	PAINTWORK, ETC. TO NEW WORK			
	"PLASCON" OR OTHER EQUAL AND APPROVED			
	ON INTERNAL FLOATED PLASTER SURFACES			
	Prepare and brush surface to remove all loose contaminants and apply one coat alkali resistant primer, one undercoat and two coats 'PLASCON Wall & All' or other approved emulsion paint for interior use.			
127	Walls. (LI)	m2	54	
	Carried Forward			R

				R
	Brought Forward			
	ON FIBRE-CEMENT BOARD SURFACES			
	Prepare and brush surface to remove all loose contaminants and apply one coat alkali resistant primer and two coats superior quality acrylic emulsion paint for exterior use			
128	Fascias and barge boards, including priming metal jointing strips. (LI)	m2	7	
	ON WOOD SURFACES			
	Prepare surfaces and remove all loose material, apply one coat water based primer, one coat alkyd based universal undercoat and two coats superior quality universal enamel paint, on timber doors			
129	On doors. (LI)	m2	16	
	Prepare surfaces and remove all loose material, apply two coats 'ABE Provonite' carbolineum			
130	Roof timbers at eaves and verges. (LI)	m2	12	
	SPECIALIST FLOOR COATINGS (CPAP WORK GROUP NO. 130) (SUPPLIER TO BE SABS ISO 9000 COMPLIANT)			
	Prepare and clean surface free from laitance, nibs, dust, grease, oil, etc and apply 3 coats 'ABE.cote 337' or equal and approved, all in strict accordance with the manufacturer's printed instructions			
131	On floors (LI)	m2	25	
132	On walls (LI)	m2	37	
	Carried Forward			R

				R
	Brought Forward			
	CONCRETE V DRAIN CHANNEL (ALL TRADES) (PROVISIONAL)			
	CONCRETE V- DRAINS			
	EARTHWORKS(CPAP WORK GROUP NO. 104 UNLESS OTHERWISE STATED)			
	EXCAVATION OTHER THAN BULK			
	Excavation in earth not exceeding 2m deep			
133	Reduced levels under floors. (LI)	m3	8	
	CARTING AWAY			
	Extra over all excavations for loading, carting and dumping surplus excavated material			
134	Off site to be located by the contractor	m3	8	
	EARTH FILLING, ETC			
	Earth filling supplied by the contractor under floors, etc.			
135	150mm G5 Material in accordance with SABS 1200 DM compacted to 98% Mod. AASHTO density. (LI)	m3	5	
	COMPACTION			
	Compaction of surfaces			
136	Compaction of ground surfaces under floors etc including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to 95% Mod. AASHTO density. (LI)	m2	31	
	Carried Forward			R

				R
	Brought Forward			
	TESTS			
	Prescribed density tests on filling			
137	Modified AASHTO Density test	No	3	
138	"Field Density" test including "Optimum Moisture Content" (four readings per test)	No	3	
	SOIL POISONING			
	Soil insecticide in accordance with SANS 5859			
139	Under floors, etc. including forming and poisoning shallow furrows against foundation walls, etc., filling in furrows and ramming	m2	31	
	CONCRETE, FORMWORK AND REINFORCEMENT (CPAP WORK GROUP NO. 110 UNLESS OTHERWISE STATED)			
	REINFORCED CONCRETE CAST ON/IN FORMWORK			
	20Mpa/19mm Concrete			
140	Surface beds, slabs, etc to falls and currents. (LI)	m3	3	
	CONCRETE SUNDRIES			
	Finishing top surfaces of concrete with a wood float finish			
141	Concrete channel to falls. (LI)	m2	31	
	Test blocks			
142	Making and testing 150 x 150 x 150mm concrete strength test cubes.	No	1	
	Carried Forward			R

				R
	Brought Forward			
	ROUGH FORMWORK (DEGREE OF ACCURACY II) (CPAP WORK GROUP NO. 111 UNLESS OTHERWISE STATED)			
	Rough formwork to sides			
143	Apron slabs, paving and ramps not exceeding 300mm high. (LI)	m	31	
	Expansion joints with 10mm softboard between vertical concrete and brick surfaces			
144	10mm Joints not exceeding 300mm high. (LI)	m	31	
	REINFORCEMENT (CPAP WORK GROUP NO. 114UNLESS OTHERWISE STATED)			
	Fabric reinforcement			
145	Type 193 fabric reinforcement in concrete surface beds, slabs, etc	m2	31	
	WATERPROOFING (CPAP WORK GROUP NO. 120 UNLESS OTHERWISE STATED)			
	JOINT SEALANTS, ETC			
	"ABE Flexothane" or other equal and approved two-part grey polysulphide sealing compound including backing cord, bond breaker, primer, etc			
146	In 10mm joints not exceeding 300mm high. (LI)	m	31	
	Carried Forward			R

				R
	Brought Forward			
	WATER TANK SUPPORTS (ALL TRADES) (PROVISIONAL)			
	EARTHWORKS (CPAP WORK GROUP NO. 104 UNLESS OTHERWISE STATED)			
	EXCAVATION OTHER THAN BULK			
	Excavation in earth not exceeding 2m deep			
147	Bases. (LI)	m3	6	
	Extra over trench and hole excavation in earth for excavation in			
148	Hard rock.	m3	1	
	CARTING AWAY			
	Extra over all excavations for loading, carting and dumping surplus excavated material (no allowance made for increase in bulk)			
149	Off site to be located by the contractor.	m3	4	
	EARTH FILLING, ETC			
	Note: All filling whether obtained from the excavations, from stockpiles or by the contractor from an outside source must be selected and approved by the Structural / Civil Engineers			
	Filling with material from the excavations compacted to a density of at least 93% Mod. AASHTO density			
150	Backfilling to trenches, holes, etc. (LI)	m3	2	
	KEEPING EXCAVATIONS FREE OF WATER			
	Keeping excavations free of water			
151	Allow for keeping excavations free of water or mud by hand or machinery		Item	
	Carried Forward			R

				R
	Brought Forward			
	COMPACTION			
	Compaction of surfaces			
152	Compaction of ground surfaces under floors etc including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to 93% Mod. AASHTO density. (LI)	m2	7	
	TESTS			
	Prescribed density tests on filling			
153	Modified AASHTO Density test.	No	1	
154	"Field Density" test including "Optimum Moisture Content" (four readings per test)	No	1	
	SOIL POISONING			
	Soil insecticide in accordance with SANS 5859			
155	Under floors, etc. including forming and poisoning shallow furrows against foundation walls, etc., filling in furrows and ramming.	m2	13	
	Carried Forward			R

				R
	Brought Forward			
	CONCRETE, FORMWORK AND REINFORCEMENT(CPAP WORK GROUP NO. 110 UNLESS OTHERWISE STATED)			
	UNREINFORCED CONCRETE CAST AGAINST EXCAVATED SURFACES			
	10MPa Concrete			
156	Surface blinding under footings, bases, etc. (LI)	m3	1	
	REINFORCED CONCRETE			
	25MPa/19mm Concrete			
157	Surface beds. (LI)	m3	1	
158	Bases. (LI)	m3	2	
	TEST BLOCKS			
	Test blocks			
159	Prepare a set of six concrete cubes each cube size 150 x 150 x 150mm for strength cubes and deliver to an approved laboratory for testing and pay all charges in connection therewith.	Sets	1.00	
	CONCRETE SUNDRIES			
	Finishing top surfaces of concrete with a wood float			
160	Surface beds, slabs, etc. (LI)	m2	6	
	ROUGH FORMWORK (DEGREE OF ACCURACY III) (CPAP WORK GROUP NO. 111)			
	Rough formwork to sides			
161	Edges, risers, ends and reveals not exceeding 300mm high or wide. (LI)	m	10	
	Carried Forward			R

				R
	Brought Forward			
	Boxing in smooth formwork to form			
162	50mm Horizontal chamfer at corner. (LI)	m	10	
	REINFORCEMENT (CPAP WORK GROUP NO. 114 UNLESS OTHERWISE STATED)			
	Mild steel reinforcement to structural concrete work			
163	10mm Diameter bars.	t	0.400	
	MASONRY(CPAP WORK GROUP NO. 116 UNLESS OTHERWISE STATED)			
	BRICKWORK IN FOUNDATIONS			
	Brickwork of NFX (14 MPa nominal compressive strength) clay imperial bricks in cement mortar			
164	One brick wall. (LI)	m2	8	
	BRICKWORK IN SUPERSTRUCTURE			
	Brickwork of NFP Bricks in Class II mortar			
165	One brick wall. (LI)	m2	4	
	BRICKWORK SUNDRIES			
	Bagging of 1:3 cement and sand mixture			
166	On outer face of inner skin of brick walls including any additional labour required in raising wall in two separate skins and working around wire ties and / or brick reinforcing fabric. (LI)	m2	4	
	Brickwork reinforcement			
167	150mm Wide reinforcement built in horizontally. (LI)	m	46	
	Carried Forward			R

				R
	Brought Forward			
	FACE BRICKWORK			
	"Corobrik Travertine FBA" or other approved face bricks in stretcher bond with ruled joints and perpends internally and externally			
168	Extra over brickwork for face brickwork. (LI)	m2	4	
	PLUMBING AND DRAINAGE (CPAP WORK GROUP NO. 148 UNLESS OTHERWISE STATED)			
	WATER SUPPLIES AND FIRE SERVICES			
	TAPS, VALVES, ETC			
	"Cobra Watertech" or other approved			
169	15mm Rough brass hose bib tap as 'Cobra Watertech' Ref. No. 108-15 or other equal and approved including hose union, wall plate elbow, etc. with couplings for copper.	No	1	
	TANKS, ETC			
	Polyethylene drinking water tanks			
170	5000 Litre low profile circular tank size 2250mm diameter x 1800mm high, with access lid and inlet hole,embedded in pedestal to a minimum of 400mm above ground level and tied down with 2 No. off 4mm galvanised double strap stay wires tied to galvanised mild steel M12 eye bolt of which is to be drilled and fixed to the 4 corners of concrete supporting base.	No	1	
	Carried Forward			R

				R
	Brought Forward			
	SOAK-AWAY (ALL TRADES) (PROVISIONAL)			
	EARTHWORKS (CPAP WORK GROUP NO. 104 UNLESS OTHERWISE STATED)			
	SITE CLEARANCE, ETC.			
	Site clearance			
171	Digging up and removing rubbish, debris, vegetation, hedges, shrubs and trees not exceeding 200mm girth, bush, etc.	m2	11	
172	Stripping average 150mm thick layer of top soil and stockpiling on site.	m2	11	
	EXCAVATION, FILLING, ETC			
	Excavation in earth not exceeding 2m deep			
173	Holes	m3	15	
	Extra over bulk excavations in earth for excavation in			
174	Soft rock	m3	2	
175	Hard rock	m3	2	
	Extra over all excavations for carting away			
176	Surplus material from excavations and/or stock piles on site to a dumping site to be located by the contractor	m3	15	
	Risk of collapse of excavations			
177	Sides of bulk excavations not exceeding 1,5m deep. (LI)	m2	17	
178	Sides of bulk excavations exceeding 1,5m deep. (LI)	m2	7	
	Carried Forward			R

				R
	Brought Forward			
	EARTH FILLING, ETC			
	Earth filling supplied by the contractor (not compacted)			
179	300mm Thick layer of 15mm diameter stone filling on ground for soakaways, etc. (LI)	m3	2	
180	600mm Thick layer of 150mm diameter boulders filling laid on ground for soakaways, etc. (LI)	m3	4	
181	600mm Thick layer of 300mm diameter boulders filling laid in ground for soakaways, etc. (LI)	m3	4	
182	500mm Thick layer of G6 type material filling in soakaways, etc. (LI)	m3	4	
	Keeping excavations free of water			
183	Allow for keeping excavations free of water other than subterranean water		Item	
	PLUMBING AND DRAINAGE (CPAP WORK GROUP NO. 148 UNLESS OTHERWISE STATED)			
	DRAINAGE			
	Class 34 HD uPVC sewer and drain pipes			
184	50mm Perforated pipes laid in herring-bone pattern and including trenches not exceeding 1m deep	m	15	
185	110mm Pipes laid in and including trenches not exceeding 1m deep	m	35	
	Extra over Class 34 HD uPVC sewer and drain pipes for fittings			
186	110mm Bend	No	3	
187	110mm Access bend	No	1	
	Carried Forward			R

				R
	Brought Forward			
188	50mm Reducing junction	No	12	
189	110mm Junction	No	2	
	uPVC Gulleys			
190	110mm Diameter gulley trap jointed to drain, complete with hopper head and grid and the whole set on and encased in unreinforced concrete Class B (1:3:5) carried up 75mm above ground as kerb, dished down to grating and finished on all exposed faces in 1:3 cement render with angles rounded, including necessary excavation and formwork	No	1	
	Testing			
191	Allow for testing the whole of the Soil Drainage to the satisfaction of the Principal Agent and Local Authorities All defective work is to be taken out and replaced at the contractor's expense and the whole re-tested until found satisfactory		Item	
	GRASSING, ETC(CPAP WORK GROUP NO. 104 UNLESS OTHERWISE STATED)			
	Topsoil supplied by the contractor, including spreading and levelling			
192	In plant beds, grassed areas and holes for trees, shrubs, etc. (LI)	m3	1	
	Grassing, ground covers, etc			
193	"Kikuyu" rolls 50mm thick. (LI)	m2	11	
	Carried to Final Summary of Section No. 3			R

Section No. 3
Bill No. 2
Type E - Learners Boys - 3WC + 3Urinals Ablution
LDM QUANTITY SURVEYORS

Item No			Quantity	Rate	Amount
	SECTION NO.3				
	BILL NO.3				
	TYPE F - LEARNERS GIRLS - 6NO. WC SEATS - ABLUTION BLOCK (1NO.)				
	The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2008 Edition)				
	EARTHWORKS (PROVISIONAL)(CPAP WORK GROUP NO. 104 UNLESS OTHERWISE STATED)				
	SITE CLEARANCE, ETC.				
	Site clearance				
1	Digging up and removing rubbish, debris, vegetation, hedges, shrubs and trees not exceeding 200mm girth, bush, etc.	m2	130		
2	Stripping average 150mm thick layer of top soil and stockpiling on site.	m2	130		
	EXCAVATION, FILLING, ETC. OTHER THAN BULK				
	Excavation in earth not exceeding 2m deep				
3	Reduced levels under floors. (LI)	m3	10		
4	Trenches, foundation beams, etc. (LI)	m3	5		
5	Holes (latrine pit).	m3	50		
	Excavation in earth exceeding 2m but not exceeding 4m deep				
6	Holes (latrine pit).	m3	16		
	Carried Forward			R	

				R
	Brought Forward			
	Back excavation of vertical sides of excavation in earth for working space including backfilling compacted to 98% Mod. AASHTO density			
7	Not exceeding 1,5m deep, etc. 300mm away from excavated face. (LI)	m2	33	
8	Exceeding 1,5m and not exceeding 3m deep, etc. 300mm away from excavated face. (LI)	m2	21	
	Extra over trench and hole excavations in earth for excavation in			
9	Intermediate material.	m3	8	
10	Hard rock.	m3	8	
	Extra over back excavation in earth for working space for excavation in intermediate material			
11	Not exceeding 1,5m deep, etc. 300mm away from excavated face.	m2	33	
12	Exceeding 1,5m and not exceeding 3m deep, etc. 300mm away from excavated face.	m2	21	
	Extra over back excavation in earth for working space for excavation in hard rock			
13	Not exceeding 1,5m deep, etc. 300mm away from excavated face.	m2	33	
14	Exceeding 1,5m and not exceeding 3m deep, etc. 300mm away from excavated face.	m2	21	
	Extra over all excavations for carting away			
15	Surplus material from excavations and/or stock piles on site, to a dumping site to be located by the contractor	m3	81	
	Risk of collapse of excavations			
16	Sides of trench and hole excavations not exceeding 1,5m deep. (LI)	m2	33	
	Carried Forward			R

				R
	Brought Forward			
17	Sides of trench and hole excavations exceeding 1,5m deep. (LI)	m2	21	
	Keeping excavations free of water			
18	Keeping excavations free of all water other than subterranean water.		Item	
	FILLING ETC			
	Earth filling supplied by the contractor under floors, etc.			
19	150mm G5 Material in accordance with SABS 1200 DM compacted to 98% Mod. AASHTO density. (LI)	m3	6	
	Compaction of surfaces			
20	Compaction of ground surface under floors, etc. including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to 98% Mod. AASHTO density. (LI)	m2	37	
	Prescribed density tests on filling			
21	"Modified AASHTO Density" test.	No	5	
22	"Field Density" test including "Optimum Moisture Content" (four readings per test)	No	5	
	SOIL POISONING			
	Soil Insecticide in accordance with SANS 5859			
23	Under floors, etc. including forming and poisoning shallow furrows against foundation walls, etc., filling in furrows and ramming.	m2	37	
	Carried Forward			R

Brought Forward R

CONCRETE, FORMWORK AND REINFORCEMENT (PROVISIONAL)(CPAP WORK GROUP NO. 110 UNLESS OTHERWISE STATED)

SUPPLEMENTARY PREAMBLES

Cost of tests

The costs of making, storing and testing of concrete test cubes as required under Clause 7 "Tests" of SABS 1200 G shall include the cost of providing cube moulds necessary for the purpose, for testing costs and for submitting reports on the tests to the Principal Agent. The testing shall be undertaken by an independent firm or institution nominated by the contractor to the approval of the Principal Agent. (Test cubes are measured separately)

Formwork

Descriptions of formwork shall be deemed to include use and waste only (except where described as "left in" or "permanent"), for fitting together in the required forms, wedging, plumbing and fixing to true angles and surfaces as necessary to ensure easy release during stripping and for reconditioning as necessary before re-use.

The vertical strutting shall be carried down to such construction as is sufficiently strong to afford the required support without damage and shall remain in position until the newly constructed work is able to support itself.

Carried Forward R

				R	
	Brought Forward				
	Formwork to soffits of solid slabs etc. shall be deemed to be to slabs not exceeding 250mm thick unless otherwise described.				
	Formwork to sides of bases, pile caps, ground beams, etc. will only be measured where it is prescribed by the Engineer for design reasons. Formwork necessitated by irregularity or collapse of excavated faces will not be measured and the cost thereof shall be deemed to be included in the allowance for taking the risk of collapse of the sides of the excavations, provision for which is made in "Earthworks".				
	UNREINFORCED CONCRETE CAST AGAINST EXCAVATED SURFACES				
	15MPa Concrete				
24	Surface blinding under surface beds, slabs, etc. (LI)	m3	2		
	REINFORCED CONCRETE				
	25MPa/19mm Concrete				
25	Foundation beams (LI)	m3	2		
26	Surface beds, etc., including thickening (LI)	m3	4		
27	Slabs including beams and inverted beams. (LI)	m3	6		
28	Concrete nib, etc. (LI)	m3	1		
29	Pit base (LI)	m3	6		
	CONCRETE SUNDRIES				
	Sleeves				
30	110mm Diameter pipe and socket cast in concrete formed of 130mm long black pipe uPVC welded to 100mm long uPVC pipe with single socket. (LI)	No	6		
	Carried Forward			R	

				R
	Brought Forward			
	Finishing top surfaces of concrete smooth with a wood float			
31	Surface beds, slabs, etc. (LI)	m2	37	
	Test blocks			
32	Making and testing 150 x 150 x 150mm concrete strength test cubes.	No	6	
	FORMWORK (PROVISIONAL)(CPAP WORK GROUP NO. 111 UNLESS OTHERWISE STATED)			
	ROUGH FORMWORK (DEGREE OF ACCURACY III)			
	Rough formwork to sides			
33	Foundation beams (Provisional), etc. (LI)	m2	15	
	ROUGH FORMWORK (DEGREE OF ACCURACY II)			
	Rough formwork to sides			
34	Edges, risers, ends and reveals not exceeding 300mm high or wide. (LI)	m	27	
	Rough formwork to soffits			
35	Slabs, propped up exceeding 1.5m and not exceeding 3.5m high. (LI)	m2	30	
	Rough formwork to sides and soffits			
36	Beams propped up exceeding 1.5m and not exceeding 3.5m high. (LI)	m2	20	
	Boxing in rough formwork to form			
37	110 x 200mm High horizontal projections to sides along bottom edges. (LI)	m	14	
	Carried Forward			R

				R
	Brought Forward			
	MOVEMENT JOINTS, ETC.			
	Slip joints between horizontal concrete and brick surfaces with two layers of 3 ply malthoid			
38	Not exceeding 300mm wide. (LI)	m	31	
	Expansion joints with bitumen impregnated fibreboard between vertical concrete surfaces			
39	13mm Joints not exceeding 300mm high. (LI)	m	7	
	REINFORCEMENT (PROVISIONAL) (CPAP WORK GROUP NO. 114 UNLESS OTHERWISE STATED)			
	High tensile steel reinforcement to structural concrete work			
40	Bars of varying diameters	t	1.900	
	PRECAST CONCRETE (CPAP WORK GROUP 112 UNLESS OTHERWISE STATED)			
	Precast concrete cover slab 80mm thick formed of 25Mpa/19mm concrete with class 1 smooth finish on exposed surfaces splayed 25mm at edges with ref. 193 mesh reinforcement and 2no. 15mm diameter polycop pipe sleeves cast in to receive 2no. threaded 10mm diameter galvanised L-shaped lifting handles with 50 x 50 x 5mm holed plates, nuts and lock nuts, including holes to fit 110mm diameter vent pipe, etc. laid on brick walls			
41	Cover slab size 990 x 710mm.	No	4	
42	Cover slab size 1100 x 710mm.	No	2	
	Carried Forward			R

	Brought Forward			R
	MASONRY(CPAP WORK GROUP NO. 116 UNLESS OTHERWISE STATED)			
	SUPPLEMENTARY PREAMBLES			
	BRICKWORK			
	Sizes in descriptions			
	Where sizes in descriptions are given in brick units, "one brick" shall represent the length and "half brick" the width of a brick			
	Hollow walls etc			
	Descriptions of hollow walls shall be deemed to include leaving every fifth perpend of the bottom course of the external skin open as a weep hole.			
	Walls in two skins described as "bagged and sealed" shall be deemed to include having the outer face of the inner skin bagged with 1:6 cement and sand mixture and sealed with two coats "Brixeal" bitumen emulsion waterproofing coating.			
	Face bricks			
	Bricks shall be ordered timeously to obtain uniformity in size and colour			
	Pointing			
	Descriptions of recessed pointing to fair face brickwork and face brickwork shall be deemed to include square recessed, hollow recessed, weathered pointing, etc			
	BRICKWORK IN FOUNDATIONS (PROVISIONAL)			
	Brickwork of NFX (14 MPa nominal compressive strength) clay imperial bricks in cement mortar			
43	One brick wall. (LI)	m2	45	
	Carried Forward			R

				R
	Brought Forward			
	OPENINGS THROUGH WALLS ETC			
	Breaking out for and forming plain openings through brick walls, including prestressed concrete lintels to suit opening, etc			
44	Opening 340 x 330mm high through one brick wall. (LI)	No	3	
	Brickwork reinforcement			
45	150mm Wide reinforcement built in horizontally. (LI)	m	265	
	BRICKWORK IN SUPERSTRUCTURE			
	Brickwork of NFP Bricks in Class II mortar			
46	Half brick wall. (LI)	m2	28	
47	Half brick wall in beamfilling. (LI)	m2	2	
48	One brick wall. (LI)	m2	74	
	BRICKWORK SUNDRIES			
	Bagging of 1:3 cement and sand mixture			
49	On outer face of inner skin of brick walls including any additional labour required in raising wall in two separate skins and working around wire ties and / or brick reinforcing fabric. (LI)	m2	74	
	Brickwork reinforcement			
50	75mm Wide reinforcement built in horizontally. (LI)	m	88	
51	150mm Wide reinforcement built in horizontally. (LI)	m	218	
	Prestressed fabricated lintels			
52	90 x 115mm Lintels in lengths not exceeding 3m. (LI)	m	18	
	Turning pieces			
53	230mm Wide turning piece to lintels, etc. (LI)	m	10	
	Carried Forward			R

				R
	Brought Forward			
	Galvanised wire ties etc			
54	30 x 1.6mm Roof tie 1,6m long with one end built into brickwork and other end fixed to timber. (LI)	No	24	
	Air bricks etc			
55	229 x 152mm Terra-cotta vermin proof air brick. (LI)	No	8	
	FACE BRICKWORK			
	"Corobrik Travertine FBA" or equal and other approved face bricks in stretcher bond with ruled joints and perpends internally and externally			
56	Extra over brickwork for face brickwork. (LI)	m2	74	
57	Extra over brickwork for brick-on-edge header course lintel. (LI)	m	18	
58	Fair cutting and fitting around pipe not exceeding 100mm diameter. (LI)	No	4	
59	Fair cutting and fitting around pipe exceeding 100mm and not exceeding 200mm diameter (LI)	No	6	
	Brick-on-edge header course copings, sills, etc. of "CorobrikTravertine FBA" or other equal and approved face bricks pointed with recessed joints on all exposed faces			
60	220mm Wide sill set sloping and slightly projecting. (LI)	m	4	
	"NUTEC" OR OTHER APPROVED FIBRE-CEMENT WINDOW SILLS			
	Natural grey sills in single lengths bedded in class I mortar including metal fixing lugs etc			
61	150 x 15mm Thick sills set flat and slightly projecting. (LI)	m	4	
	Carried Forward			R

				R
	Brought Forward			
	WATERPROOFING(CPAP WORK GROUP NO. 120 UNLESS OTHERWISE STATED)			
	DAMP-PROOFING OF WALLS AND FLOORS			
	One layer of 375 micron Consol Plastics Brikgrip DPC or other equal and approved embossed damp proof course			
62	In walls under sills, over lintels, etc. (LI)	m2	7	
	One layer 375 'Hyperstatic Orange' DPM with 3mm masonite protection			
63	Vertically between walls. (LI)	m2	45	
	One layer of 250 micron "Consol Plastic Gunplas USB Green" or other equal and approved waterproof sheeting Type C, sealed at laps with "Gunplas Pressure Sensitive Tape"			
64	Under surface beds, slabs, etc. (LI)	m2	37	
	Two coats "ABE Brixeal" or other equal and approved bitumen emulsion waterproof coating			
65	On brick walls. (LI)	m2	74	
	WATERPROOFING TO ROOFS, BASEMENTS, ETC.			
	Five coats "Acrylastic" or other equal and approved fibre reinforced heavy duty maintenance free acrylic waterproofing			
66	Collar around pipe not exceeding 100mm internal diameter. (LI)	No	6	
	Carried Forward			R

				R
	Brought Forward			
	JOINT SEALANTS, ETC.			
	Two-part grey polysulphide sealing compound including backing cord, bond breaker, primer, etc.			
67	13 x 13mm In expansion joints in vertical concrete / brick surfaces including raking out expansion joint filler as necessary. (LI)	m	7	
	ROOF COVERINGS, ETC.(CPAP WORK GROUP NO. 125 UNLESS OTHERWISE STATED)			
	SUPPLEMENTARY PREAMBLES			
	Profiled metal sheeting and accessories			
	Roof sheeting systems are to be manufactured in strict accordance with the supplier's specifications.			
	Fixing of all roof sheeting is to be in accordance with the manufacturer's approved instruction book.			
	The manufacturer shall comply with ISO9002 Quality Management System.			
	PROFILED METAL SHEETING AND ACCESSORIES			
	0.58mm Colorbond IBR profile sheeting, colour one side fixed to timber purlins (elsewhere measured) and fixed strictly in accordance with the manufacturer's instructions			
68	Roof covering with pitch not exceeding 25 degrees.	m2	43	
69	Standard galvanised ridge capping (550mm girth) screwed through sheeting to purlins	m	7	
70	Sondor IBR pattern polyclosures to underside of ridge capping	m	14	
	Carried Forward			R

	Brought Forward				R
	ROOF AND WALL INSULATION				
	"Sisalation FR430" Heavy Industrial Grade Aluminum Foil based insulation				
71	Insulation laid taut over purlins and fixed concurrent with roof covering including galvanised steel straining wires	m2	43		
	CARPENTRY AND JOINERY(CPAP WORK GROUP NO. 126 UNLESS OTHERWISE STATED)				
	PREFABRICATED TIMBER ROOF TRUSSES, ETC				
	NOTE:				
	Timber roof trusses are to comply with SABS Code of Practice 0243. (The design, manufacture and erection of timber trusses, including nail-plated and bolted trusses with lapped members).				
	The following is applicable in respect of roof trusses:				
	Trusses are at maximum 1200mm centres. Roof covering is IBR profiled metal sheeting colour one side on 50 x 76mm purlins. Ceilings are nailed gypsum plasterboard on brandering.				
	The dimensions in the descriptions of the trusses are nominal and actual measurements are to be obtained from site before design or fabrication commences.				
	Design and supply plate nailed timber roof trusses				
72	Design, supply and install roof truss system complete in accordance with the Standard Building Regulations, including cross battens at hips, valleys, etc. fixed to trusses with and including ring shank nails, hurricane clips at exposed sections and at ridges, temporary and permanent bracing, etc. to suit roof area approximate **size 43m2 (on flat floor area inclusive of overhangs)**		Item		
	Carried Forward				R

				R
	Brought Forward			
73	Allowance for the issue of TR1 and TR2 certificates after completion of roof installation, signed by a competent person		Item	
	Wrought softwood			
74	38 x 114mm Wall plates.	m	14	
75	76 x 50mm Purlins	m	70	
76	76 x 76mm Splayed gutter purlins.	m	14	
	EAVES, VERGES, ETC.			
	Pressed Nutec or other approved fibre cement boards			
77	12 x 225mm Fascia boards including galvanised steel H-profile jointing strips	m	14	
78	10 x 80 x 200mm Barge boards including H-profile jointing strips.	m	13	
	DOORS, ETC.			
	Wrought Meranti or similar approved doors			
79	40mm Framed ledged, braced and battened door size 762 x 1932mm high of 40 x 110mm wide top rail and stiles, 20 x 150mm middle ledge, 20 x 225mm bottom ledge and 20 x 110mm braces, hung to steel frame (elsewhere measured) (Refer to Door Schedule D1 on drawing - 6G-TB)	No	6	
80	40mm Framed ledged, braced and battened door size 813 x 2032mm high of 40 x 110mm wide top rail and stiles, 20 x 150mm middle ledge, 20 x 225mm bottom ledge and 20 x 110mm braces, hung to steel frame (elsewhere measured) (Refer to Door Schedule D2 on drawing - 6G-TB)	No	1	
	Carried Forward			R

				R
	Brought Forward			
	IRONMONGERY(CPAP WORK GROUP NO. 132 UNLESS OTHERWISE STATED)			
	HINGES, BOLTS, ETC.			
81	Solid Art 294 WC or other equal and approved anodised aluminium mortice indicator bolt	No	6	
	"Dorma" or other approved			
82	"DRR-SS-012" 102 x 75 x 3mm Stainless steel rising butt hinge	No	14	
	LOCKS			
	"Union" or other approved			
83	" 2247-7855 Commercial Series" Four lever mortice lock	No	1	
	HANDLES			
	"Union" or other approved			
84	"CB862-05CH" Brass Gower lever handles	No	1	
	SUNDRIES			
	"Union" or other approved			
85	"CZ8731CH" Door stop fixed with counter-sunk bolt into anchor bolt	No	1	
86	38mm Diameter rubber door stop, plugged and screwed to floor with 50mm long brass screw	No	6	
	LETTERS, NAMEPLATES, ETC.			
	Signage			
87	200 x 250mm Pressed aluminium with male or female symbol fixed to brickwork with 6 no. "Hilti" nail anchors.	No	2	
	Carried Forward			R

				R
	Brought Forward			
	BATHROOM FITTINGS			
	Toilet roll holders			
88	40 x 3mm Thick steel plate with 2 x 8mm holes and rawl bolts and 2 x 30mm holes to support roller bent to suit 27 diameter x 2mm thick steel pipe with hole for padlock and a 40 x 3mm thick steel plate welded on other end.(See architect drawing No.TRH)	No	6	
	METALWORK(CPAP WORK GROUP NO. 136 UNLESS OTHERWISE STATED)			
	WELDED GALVANISED STEEL SCREENS, GATES, ETC.			
	Screens and gates			
89	Single gate size 877 x 2250mm high of 40 x 60 x 3mm rectangular tubing with 12mm diameter steel rods at 110mm centre and 40 x 6mm horizontal support flat bars fixed with hinges to steel frame of 45 x 45 x 3mm rectangular tubing fixed to walls with bolts and lugs including padlock plate (Refer to Gate Detail on drawing - 6G-TB)	No	1	
	HOT DIPPED GALVANISED MILD STEEL DOOR FRAMES			
	1,2mm Rebated frames suitable for half brick walls			
90	Frame for door 762 x 1932mm high.	No	6	
	1,2mm Rebated frames suitable for one brick walls			
91	Frame for door 813 x 2032mm high	No	1	
	Carried Forward			R

				R
	Brought Forward			
	GALVANISED STEEL WINDOWS, DOORS, ETC			
	SS industrial type windows			
92	Window type W1, 1100 x 550mm high. (Refer to window schedule on drawing - 6G-TB)	No	2	
93	Window type W2, 360 x 518mm high. (Refer to window schedule on drawing 6G-TB)	No	6	
	PLASTERING(CPAP WORK GROUP NO. 142 UNLESS OTHERWISE STATED)			
	SCREEDS			
	Screeds steel trowelled, on concrete			
94	Average 50mm thick on floors to falls. (LI)	m2	37	
	INTERNAL PLASTER			
	Cement plaster steel trowelled, on brickwork			
95	On walls. (LI)	m2	132	
96	On narrow widths. (LI)	m2	8	
97	On pit walls. (LI)	m2	90	
	PLUMBING AND DRAINAGE (PROVISIONAL)(CPAP WORK GROUP NO. 148 UNLESS OTHERWISE STATED)			
	PLUMBING			
	NOTE: Prices for sanitary fittings fixed to walls or abutting walls, etc. shall include for sealing against walls with silicone sealing compound. This shall apply to wash hand basins, sinks and drainers, urinals, WC cisterns, wash troughs, shower trays and the like.			
	Carried Forward			R

				R
	Brought Forward			
	RAINWATER DISPOSAL			
	uPVC gutters and rainwater pipes			
98	110mm Half-round gutters including fixings	m	14	
99	75mm Diameter uPVC downpipes	m	8	
100	Extra over eaves gutter outlet for 75mm diameter rainwater downpipes	No	2	
101	Extra over eaves gutter for stopped ends.	No	4	
102	Extra over rainwater downpipes for shoes	No	2	
103	Extra over rainwater downpipes for bends	No	4	
	SANITARY FITTINGS			
	"Atlas Plastics (Pty) Ltd" or other equal and approved			
104	Atlas "VIP 200" (code 222AP) pedestal with footpiece complete with seat and lid screwed in precast slab including inlet funnel (code 224AP) riveted to shaft.	No	6	
105	Atlas Plastics "Christy" (Code 945AP) wash hand basin with splashback, colour Granite, overall size 580 x 410mm wide with 2 tap holes and 40mm waste outlet, plugged and screwed to wall with galvanised screws and brackets (LI)	No	4	
106	Atlas Plastics "30 Litre Wash Trough" (code 366AP) colour Granite (code 101133), overall size 528 x 412mm wide with 40mm waste outlet, plugged and screwed to the wall with galvanised screws and fixing brackets.	No	1	
	"Cobra Watertech" or other approved			
107	15mm Chromium plated 'Star 136-15' stopcock (LI)	No	5	
	Carried Forward			R

				R
	Brought Forward			
108	15mm Rough brass hose bib tap as 'Cobra Watertech' Ref. No. 108-15 or other equal and approved including hose union, wall plate elbow, etc. with couplings for copper.	No	5	
	SANITARY PLUMBING			
	Black uPVC UV stabilised pipes			
109	110mm Vent pipes.	m	21	
	Extra over Black uPVC UV stabilised pipes for fittings			
110	Vent cowl formed of 110mm vent valve with top cut off and black shade cloth fixed over end of vent pipe.	No	6	
	uPVC pipes			
111	50mm Pipes (LI)	m	30	
	Extra over uPVC pipes for fittings			
112	50mm Bend (LI)	No	10	
113	50mm Access bend (LI)	No	10	
114	50mm Junction (LI)	No	5	
	TRAPS ETC			
	"Cobra Watertech" or equal and approved			
115	32 x 40mm Butyl rubber P-trap jointed to waste outlet fitting and to 50mm uPVC pipe including clamps (LI)	No	5	
	WATER SUPPLIES			
	"Polycop" Heavy duty Class 2 polypropylene pipes with brass compression fittings			
116	15mm Pipes (LI)	m	20	
117	22mm Pipes (LI)	m	15	
	Carried Forward			R

				R
	Brought Forward			
	Extra over "Polycop" Heavy duty Class 2 polypropylene pipes for brass compression fittings			
118	15mm Fittings (LI)	No	5	
119	22mm Fittings (LI)	No	5	
	GLAZING(CPAP WORK GROUP NO. 150 UNLESS OTHERWISE STATED)			
	GLAZING TO WOOD/STEEL WITH PUTTY			
	6mm Thick obscure safety glass			
120	Panes exceeding 0,1m2 and not exceeding 0.5m2	m2	2	
	MIRRORS, ETC.			
	6mm Silvered float glass copper backed mirrors with polished edges holed for and fixed with chromium plated dome capped mirror screws with rubber buffers to plugs in brickwork or concrete			
121	Mirror 300 x 400mm high	No	4	
	PAINTWORK(CPAP WORK GROUP NO. 152 UNLESS OTHERWISE STATED)			
	PAINTWORK, ETC. TO NEW WORK			
	"PLASCON" OR OTHER EQUAL AND APPROVED			
	ON INTERNAL FLOATED PLASTER SURFACES			
	Prepare and brush surface to remove all loose contaminants and apply one coat alkali resistant primer, one undercoat and two coats 'PLASCON Wall & All' or other approved emulsion paint for interior use.			
122	Walls. (LI)	m2	140	
	Carried Forward			R

				R
	Brought Forward			
	ON FIBRE-CEMENT BOARD SURFACES			
	Prepare and brush surface to remove all loose contaminants and apply one coat alkali resistant primer and two coats superior quality acrylic emulsion paint for exterior use			
123	Fascias and barge boards, including priming metal jointing strips. (LI)	m2	12	
	ON WOOD SURFACES			
	Prepare surfaces and remove all loose material, apply one coat water based primer, one coat alkyd based universal undercoat and two coats superior quality universal enamel paint, on timber doors			
124	On doors. (LI)	m2	28	
	Prepare surfaces and remove all loose material, apply two coats 'ABE Provonite' carbolineum			
125	Roof timbers at eaves and verges. (LI)	m2	8	
	SPECIALIST FLOOR COATINGS (CPAP WORK GROUP NO. 130) (SUPPLIER TO BE SABS ISO 9000 COMPLIANT)			
	Prepare and clean surface free from laitance, nibs, dust, grease, oil, etc and apply 3 coats 'ABE.cote 337' or equal and approved, all in strict accordance with the manufacturer's printed instructions			
126	On floors (LI)	m2	37	
127	On walls (LI)	m2	5	
	Carried Forward			R

	Brought Forward			R
	CONCRETE V DRAIN CHANNEL (ALL TRADES) (PROVISIONAL)			
	CONCRETE V- DRAINS			
	EARTHWORKS (CPAP WORK GROUP NO. 104 UNLESS OTHERWISE STATED)			
	EXCAVATION OTHER THAN BULK			
	Excavation in earth not exceeding 2m deep			
128	Reduced levels under floors. (LI)	m3	10	
	CARTING AWAY			
	Extra over all excavations for loading, carting and dumping surplus excavated material			
129	Off site to be located by the contractor	m3	10	
	EARTH FILLING, ETC			
	Earth filling supplied by the contractor under floors, etc.			
130	150mm G5 Material in accordance with SABS 1200 DM compacted to 98% Mod. AASHTO density. (LI)	m3	6	
	COMPACTION			
	Compaction of surfaces			
131	Compaction of ground surfaces under floors etc including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to 95% Mod. AASHTO density. (LI)	m2	41	
	Carried Forward			R

				R
	Brought Forward			
	TESTS			
	Prescribed density tests on filling			
132	Modified AASHTO Density test	No	3	
133	"Field Density" test including "Optimum Moisture Content" (four readings per test)	No	3	
	SOIL POISONING			
	Soil insecticide in accordance with SANS 5859			
134	Under floors, etc., including forming and poisoning shallow furrows against foundation walls, etc., filling in furrows and ramming	m2	41	
	CONCRETE, FORMWORK AND REINFORCEMENT (CPAP WORK GROUP NO. 110 UNLESS OTHERWISE STATED)			
	REINFORCED CONCRETE CAST ON/IN FORMWORK			
	20Mpa/19mm Concrete			
135	Surface beds, slabs, etc., to falls and currents. (LI)	m3	4	
	CONCRETE SUNDRIES			
	Finishing top surfaces of concrete with a wood float finish			
136	Concrete channel to falls. (LI)	m2	41	
	ROUGH FORMWORK (DEGREE OF ACCURACY II) (CPAP WORK GROUP NO. 111 UNLESS OTHERWISE STATED)			
	Rough formwork to sides			
137	Apron slabs, paving and ramps not exceeding 300mm high. (LI)	m	41	
	Carried Forward			R

				R
	Brought Forward			
	Expansion joints with 10mm softboard between vertical concrete and brick surfaces			
138	10mm Joints not exceeding 300mm high. (LI)	m	41	
	REINFORCEMENT (PROVISIONAL) (CPAP WORK GROUP NO. 114)			
	Fabric reinforcement			
139	Type 193 fabric reinforcement in concrete surface beds, slabs, etc	m2	41	
	WATERPROOFING (CPAP WORK GROUP NO. 120 UNLESS OTHERWISE STATED)			
	Joint sealants, etc			
	"ABE Flexothane" or other equal and approved two-part grey polysulphide sealing compound including backing cord, bond breaker, primer, etc			
140	In 10mm joints not exceeding 300mm high. (LI)	m	41	
	WATER TANK SUPPORTS (ALL TRADES) (PROVISIONAL)			
	EARTHWORKS (CPAP WORK GROUP NO. 104 UNLESS OTHERWISE STATED)			
	EXCAVATION OTHER THAN BULK			
	Excavation in earth not exceeding 2m deep			
141	Bases. (LI)	m3	6	
	Extra over trench and hole excavation in earth for excavation in			
142	Hard rock.	m3	1	
	Carried Forward			R

				R
	Brought Forward			
	CARTING AWAY			
	Extra over all excavations for loading, carting and dumping surplus excavated material (no allowance made for increase in bulk)			
143	Off site to be located by the contractor.	m3	4	
	EARTH FILLING, ETC			
	Note: All filing whether obtained from the excavations, from stockpiles or by the contractor from an outside source must be selected and approved by the Structural / Civil Engineers			
	Filling with material from the excavations compacted to a density of at least 93% Mod. AASHTO density			
144	Backfilling to trenches, holes, etc. (LI)	m3	2	
	KEEPING EXCAVATIONS FREE OF WATER			
	Keeping excavations free of water			
145	Allow for keeping excavations free of water or mud by hand or machinery		Item	
	COMPACTION			
	Compaction of surfaces			
146	Compaction of ground surfaces under floors etc including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to 93% Mod. AASHTO density. (LI)	m2	7	
	TESTS			
	Prescribed density tests on filling			
147	Modified AASHTO Density test.	No	1	
	Carried Forward			R

				R
	Brought Forward			
148	"Field Density" test including "Optimum Moisture Content" (four readings per test).	No	1	
	SOIL POISONING			
	Soil insecticide in accordance with SANS 5859			
149	Under floors, etc. including forming and poisoning shallow furrows against foundation walls, etc., filling in furrows and ramming.	m2	13	
	CONCRETE, FORMWORK AND REINFORCEMENT (CPAP WORK GROUP NO. 110 UNLESS OTHERWISE STATED)			
	UNREINFORCED CONCRETE CAST AGAINST EXCAVATED SURFACES			
	10MPa Concrete			
150	Surface blinding under footings, bases, etc. (LI)	m3	1	
	REINFORCED CONCRETE			
	25MPa/19mm Concrete			
151	Surface beds. (LI)	m3	1	
152	Bases. (LI)	m3	2	
	TEST BLOCKS			
	Test blocks			
153	Prepare a set of six concrete cubes each cube size 150 x 150 x 150mm for strength cubes and deliver to an approved laboratory for testing and pay all charges in connection therewith.	Sets	1.00	
	Carried Forward			R

				R
	Brought Forward			
	CONCRETE SUNDRIES			
	Finishing top surfaces of concrete with a wood float			
154	Surface beds, slabs, etc. (LI)	m2	6	
	ROUGH FORMWORK (DEGREE OF ACCURACY III) (CPAP WORK GROUP NO. 111 UNLESS OTHERWISE STATED)			
	Rough formwork to sides			
155	Edges, risers, ends and reveals not exceeding 300mm high or wide. (LI)	m	10	
	Boxing in smooth formwork to form			
156	50mm Horizontal chamfer at corner. (LI)	m	10	
	REINFORCEMENT (CPAP WORK GROUP NO. 114 UNLESS OTHERWISE STATED)			
	Mild steel reinforcement to structural concrete work			
157	10mm Diameter bars.	t	0.400	
	MASONRY(CPAP WORK GROUP NO. 116 UNLESS OTHERWISE STATED)			
	BRICKWORK IN FOUNDATIONS			
	Brickwork of NFX (14 MPa nominal compressive strength) clay imperial bricks in cement mortar			
158	One brick wall. (LI)	m2	8	
	BRICKWORK IN SUPERSTRUCTURE			
	Brickwork of NFP Bricks in Class II mortar			
159	One brick wall. (LI)	m2	4	
	Carried Forward			R

				R
	Brought Forward			
	BRICKWORK SUNDRIES			
	Bagging of 1:3 cement and sand mixture			
160	On outer face of inner skin of brick walls including any additional labour required in raising wall in two separate skins and working around wire ties and / or brick reinforcing fabric. (LI)	m2	4	
	Brickwork reinforcement			
161	150mm Wide reinforcement built in horizontally.	m	46	
	FACE BRICKWORK			
	"Corobrik Travertine FBA" or other approved face bricks in stretcher bond with ruled joints and perpends internally and externally			
162	Extra over brickwork for face brickwork. (LI)	m2	4	
	PLUMBING AND DRAINAGE (CPAP WORK GROUP NO. 148 UNLESS OTHERWISE STATED)			
	WATER SUPPLIES AND FIRE SERVICES			
	TAPS, VALVES, ETC			
	"Cobra Watertech" or other approved			
163	15mm Rough brass hose bib tap as 'Cobra Watertech' Ref. No. 108-15 or other equal and approved including hose union, wall plate elbow, etc. with couplings for copper.	No	1	
	Carried Forward			R

	Brought Forward			R
	TANKS, ETC			
	Polyethylene drinking water tanks			
164	5000 Litre low profile circular tank size 2250mm diameter x 1800mm high, with access lid and inlet hole,embedded in pedestal to a minimum of 400mm above ground level and tied down with 2 No. off 4mm galvanised double strap stay wires tied to galvanised mild steel M12 eye bolt of which is to be drilled and fixed to the 4 corners of concrete supporting base.	No	1	
	Carried to Final Summary of Section No. 3			R

Section No. 3
Bill No. 3
Type F - Learner Girls - 6WC Seats Ablution
LDM QUANTITY SURVEYORS

SECTION SUMMARY - NEW BUILDINGS

Bill No		Page No	Amount
1	Type B - Teacher/Learners - 2WC-F+1WC+1Urinal-M+1Paraplegic	60	
2	Type E - Learners Boys - 3WC + 3Urinals Ablution	93	
3	Type F - Learner Girls - 6WC Seats Ablution	122	

Carried to Final Summary Page R

Section No. 3
LDM QUANTITY SURVEYORS

Item No			Quantity	Rate	Amount
	SECTION NO. 4				
	BILL NO. 1				
	V- DRAINS (ALL TRADES) (PROVISIONAL)				
	The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2008 Edition)				
	EARTHWORKS (CPAP WORK GROUP NO. 104 UNLESS OTHERWISE STATED)				
	SITE CLEARANCE ETC				
	Site clearance				
1	Digging up and removing rubbish, debris, vegetation, hedges, shrubs and trees not exceeding 200mm girth, bush, etc	m2	165		
	EXCAVATION OTHER THAN BULK				
	Excavation in earth not exceeding 2m deep				
2	Reduced levels under floors. (LI)	m3	46		
	CARTING AWAY				
	Extra over all excavations for loading, carting and dumping surplus excavated material				
3	Off site to be located by the contractor	m3	46		
	Carried Forward			R	

				R
	Brought Forward			
	FILLING ETC			
	Earth filling supplied by the contractor under floors, etc.			
4	150mm G5 Material in accordance with SABS 1200 DM compacted to 98% Mod. AASHTO density. (LI)	m3	25	
	COMPACTION			
	Compaction of surfaces			
5	Compaction of ground surfaces under floors etc including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to 95% Mod. AASHTO density. (LI)	m2	165	
	TESTS			
	Prescribed density tests on filling			
6	Modified AASHTO Density test	No	1	
7	"Field Density" test including "Optimum Moisture Content" (four readings per test).	No	1	
	SOIL POISONING			
	Soil insecticide in accordance to SANS 5859			
8	Under floors, etc. including forming and poisoning shallow furrows against foundation walls, etc., filling in furrows and ramming	m2	165	
	Carried Forward			R

				R
	Brought Forward			
	CONCRETE, FORMWORK AND REINFORCEMENT (CPAP WORK GROUP NO. 110 UNLESS OTHERWISE STATED)			
	REINFORCED CONCRETE CAST ON/IN FORMWORK			
	20MPa/19mm Concrete			
9	Surface beds, slabs, etc to falls and currents. (LI)	m3	21	
	CONCRETE SUNDRIES			
	Finishing top surfaces of concrete with a wood float finish			
10	Concrete channel to falls. (LI)	m2	165	
	Test blocks			
11	Prepare a set of six concrete cubes each cube size 150 x 150 x 150mm for strength cubes and deliver to an approved laboratory for testing and pay all charges in connection therewith	Sets	2	
	ROUGH FORMWORK (DEGREE OF ACCURACY II) (CPAP WORK GROUP NO. 111 UNLESS OTHERWISE STATED)			
	Rough formwork to sides			
12	V drains, paving and ramps not exceeding 300mm high. (LI)	m	165	
	MOVEMENT JOINTS, ETC.			
	Expansion joints with 10mm softboard between vertical concrete and brick surfaces			
13	10mm Joints not exceeding 300mm high. (LI)	m	248	
	Carried Forward			R

				R
	Brought Forward			
	REINFORCEMENT (CPAP WORK GROUP NO. 114 UNLESS OTHERWISE STATED)			
	Fabric reinforcement			
14	Type 193 fabric reinforcement in concrete surface beds, slabs, etc	m2	165	
	WATERPROOFING (CPAP WORK GROUP NO. 120 UNLESS OTHERWISE STATED)			
	DAMP-PROOFING OF WALLS AND FLOORS			
	One layer of 250 micron "Consol Plastic Gunplas USB Green" or other approved waterproof sheeting Type C, sealed at laps with "Gunplas Pressure Sensitive Tape"			
15	Under surface beds, slabs, etc. (LI)	m2	165	
	JOINT SEALANTS, ETC			
	"ABE Flexothane" or equal approved two-part grey polysulphide sealing compound including backing cord, bond breaker, primer, etc			
16	In 10mm joints not exceeding 300mm high. (LI)	m	248	
	Carried to Final Summary of Section No. 4			R

Section No. 4
Bill No. 1
V - Drains (Provisional)
LDM QUANTITY SURVEYORS

Item No			Quantity	Rate	Amount
	SECTION NO. 4				
	BILL NO. 2				
	OPEN WALKWAYS (ALL TRADES)(PROVISIONAL)				
	The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2008 Edition)				
	EARTHWORKS (CPAP WORK GROUP NO. 104 UNLESS OTHERWISE STATED)				
	EXCAVATION OTHER THAN BULK				
	Excavation in earth not exceeding 2m deep				
1	Reduce levels under floors. (LI)	m3	29		
2	Trenches. (LI)	m3	13		
	CARTING AWAY				
	Extra over all excavations for carting way				
3	Surplus material from excavations and/or stocked piles on site to a dumping site to be located by the contractor	m3	42		
	KEEPING EXCAVATIONS FREE OF WATER				
	Keeping excavations free of water				
4	Allow for keeping excavations free of water or mud by hand or machinery		Item		
	Carried Forward			R	

				R
	Brought Forward			
	FILLING ETC			
	Earth filling supplied by the contractor under floors, etc.			
5	150mm G5 Material in accordance with SABS 1200 DM compacted to 98% Mod. AASHTO density. (LI)	m3	12	
	COMPACTION			
	Compaction of surfaces			
6	Compaction of ground surfaces under floors etc including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to 93% Mod. AASHTO density. (LI)	m2	169	
	TESTS			
	Prescribed density tests on filling			
7	Modified AASHTO Density test	No	1	
8	"Field Density" test including "Optimum Moisture Content" (four readings per test).	No	1	
	SOIL POISONING			
	Soil insecticide in accordance to SANS 5859			
9	Under concrete walkways, etc	m2	169	
	CONCRETE, FORMWORK AND REINFORCEMENT (CPAP WORK GROUP NO. 110 UNLESS OTHERWISE STATED)			
	REINFORCED CONCRETE CAST ON/IN FORMWORK			
	20Mpa/19mm Concrete			
10	Foundation beams. (LI)	m3	13	
	Carried Forward			R

				R
	Brought Forward			
11	Surface beds, cast in panels. (LI)	m3	17	
	CONCRETE SUNDRIES			
	Finishing top surfaces of concrete with a broomed non-slip finish			
12	Surface beds, slabs, etc. (LI)	m2	169	
	Test blocks			
13	Prepare a set of six concrete cubes each cube size 150 x 150 x 150mm for strength cubes and deliver to an approved laboratory for testing and pay all charges in connection therewith	Sets	3.0	
	MOVEMENT JOINTS, ETC.			
	Expansion joints with 10mm softboard between vertical concrete surfaces			
14	10mm Joints not exceeding 300mm high. (LI)	m	169	
	ROUGH FORMWORK (DEGREE OF ACCURACY II) (CPAP WORK GROUP NO. 111 UNLESS OTHERWISE STATED)			
	Rough formwork to sides			
15	Aprons slabs, paving, walkways and ramps. (LI)	m	154	
	REINFORCEMENT(CPAP WORK GROUP NO. 114 UNLESS OTHERWISE STATED)			
	Fabric reinforcement			
16	Type 193 fabric reinforcement in concrete surface bed, slabs, etc	m2	169	
	Carried Forward			R

	Brought Forward			R
	WATERPROOFING (CPAP WORK GROUP NO. 120 UNLESS OTHERWISE STATED)			
	DAMP-PROOFING OF WALLS AND FLOORS			
	One layer of 250 micron "Consol Plastic Gunplas USB Green" or other approved waterproof sheeting Type C, sealed at laps with "Gunplas Pressure Sensitive Tape"			
17	Under surface beds, slabs, etc. (LI)	m2	169	
	Joint Sealants, etc			
	"ABE Flexothane" or other equally approved two-part grey polysulphide sealing compound including backing cord, bond breaking, primer, etc			
18	In 10mm joints not exceeding 300mm high. (LI)	m	169	
	Carried to Final Summary of Section No. 4			R

Section No. 4
Bill No. 2
Open Walkways (Provisional)
LDM QUANTITY SURVEYORS

Item No			Quantity	Rate	Amount
	SECTION NO. 4				
	BILL NO. 3				
	WATER TANK SUPPORTS (ALL TRADES) (PROVISIONAL)				
	The Tenderer is referred to the relevant Clauses in the separate document Model Preambles for Trades (2008 Edition)				
	EARTHWORKS (CPAP WORK GROUP NO. 104 UNLESS OTHERWISE STATED)				
	EXCAVATION OTHER THAN BULK				
	Excavation in earth not exceeding 2m deep				
1	Bases. (LI)	m3	16		
	Extra over trench and hole excavation in earth for excavation in				
2	Hard rock	m3	2		
	CARTING AWAY				
	Extra over all excavations for loading, carting and dumping surplus excavated material (no allowance made for increase in bulk)				
3	Off site to be located by the contractor	m3	8		
	Carried Forward			R	

				R
	Brought Forward			
	EARTH FILLING, ETC			
	Note: All filling whether obtained from the excavations, from stockpiles or by the contractor from an outside source must be selected and approved by the Structural / Civil Engineers			
	Filling with material from the excavations compacted to a density of at least 93% Mod. AASHTO density			
4	Backfilling to trenches, holes, etc. (LI)	m3	8	
	KEEPING EXCAVATIONS FREE OF WATER			
	Keeping excavations free of water			
5	Allow for keeping excavations free of water or mud by hand or machinery		Item	
	COMPACTION			
	Compaction of surfaces			
6	Compaction of ground surfaces under floors etc including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to 93% Mod. AASHTO density. (LI)	m2	14	
	TESTS			
	Prescribed density tests on filling			
7	Modified AASHTO Density test	No	2	
8	"Field Density" test including "Optimum Moisture Content" (four readings per test)	No	2	
	Carried Forward			R

				R
	Brought Forward			
	SOIL POISONING			
	Soil insecticide in accordance to SANS 5859			
9	Under floors, etc., including forming and poisoning shallow furrows against foundation walls, etc., filling in furrows and ramming	m2	26	
	CONCRETE, FORMWORK AND REINFORCEMENT(CPAP WORK GROUP NO. 110 UNLESS OTHERWISE STATED)			
	UNREINFORCED CONCRETE CAST AGAINST EXCAVATED SURFACES			
	10MPa Concrete			
10	Surface blinding under footings, bases, etc. (LI)	m3	2	
	REINFORCED CONCRETE CAST AGAINST/ON FORMWORK			
	25MPa/19mm Concrete			
11	Surface beds. (LI)	m3	2	
12	Bases. (LI)	m3	4	
	CONCRETE SUNDRIES			
	Finishing top surfaces of concrete with a wood float			
13	Surface beds, slabs, etc. (LI)	m2	12	
	Test blocks			
14	Prepare a set of six concrete cubes each cube size 150 x 150 x 150mm for strength cubes and deliver to an approved laboratory for testing and pay all charges in connection therewith	Sets	1.00	
	Carried Forward			R

				R
	Brought Forward			
	ROUGH FORMWORK (DEGREE OF ACCURACY III) (CPAP WORK GROUP NO. 111 UNLESS OTHERWISE STATED)			
	Rough formwork to sides			
15	Edges, risers, ends and reveals not exceeding 300mm high or wide. (LI)	m	20	
	Boxing in smooth formwork to form			
16	50mm Horizontal chamfer at corner. (LI)	m	20	
	REINFORCEMENT (CPAP WORK GROUP NO. 114 UNLESS OTHERWISE STATED)			
	Mild steel reinforcement to structural concrete work			
17	10mm Diameter bars	t	0.176	
	MASONRY(CPAP WORK GROUP NO. 116 UNLESS OTHERWISE STATED)			
	BRICKWORK IN FOUNDATIONS			
	Brickwork of NFX (14 MPa nominal compressive strength) clay imperial bricks in cement mortar			
18	One brick wall. (LI)	m2	16	
	BRICKWORK IN SUPERSTRUCTURE			
	Brickwork of NFP Bricks in Class II mortar			
19	One brick wall. (LI)	m2	8	
	Carried Forward			R

				R
	Brought Forward			
	BRICKWORK SUNDRIES			
	Bagging of 1:3 cement and sand mixture			
20	On outer face of inner skin of brick walls including any additional labour required in raising wall in two separate skins and working around wire ties and / or brick reinforcing fabric. (LI)	m2	8	
	Brickwork reinforcement			
21	150mm Wide reinforcement built in horizontally. (LI)	m	92	
	FACE BRICKWORK			
	"Corobrik Travertine FBA" or equal approved face bricks in stretcher bond with ruled joints and perpends internally and externally			
22	Extra over brickwork for face brickwork. (LI)	m2	8	
	PLUMBING AND DRAINAGE (CPAP WORK GROUP NO. 148 UNLESS OTHERWISE STATED)			
	WATER SUPPLIES AND FIRE SERVICES			
	TAPS, VALVES, ETC			
	"Cobra Watertech" or other approved			
23	15mm Rough brass hose bib tap as 'Cobra Watertech' Ref. No. 108-15 or other equal and approved including hose union, wall plate elbow, etc. with couplings for copper.	No	2	
	Carried Forward			R

	Brought Forward			R
	TANKS, ETC			
	Polyethylene drinking water tanks			
24	5000 Litre low profile circular tank size 2250mm diameter x 1800mm high, with access lid and inlet hole,embedded in pedestal to a minimum of 400mm above ground level and tied down with 2 No. off 4mm galvanised double strap stay wires tied to galvanised mild steel M12 eye bolt of which is to be drilled and fixed to the 4 corners of concrete supporting base.	No	2	
	Carried to Final Summary of Section No. 4			R

Section No. 4
Bill No. 3
Water Tanks (Provisional)
LDM QUANTITY SURVEYORS

SECTION SUMMARY - EXTERNAL WORKS (PROVISIONAL)

Bill No		Page No	Amount
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Section No. 4
LDM QUANTITY SURVEYORS

Item No		Quantity	Rate	Amount

SECTION NO. 5

BILL NO. 1

BOREHOLE INSTALLATION (PROVISIONAL)

SUPPLEMENTARY PREAMBLES

PREAMBLE

A desk top study and a geophysical investigation has been carried out at each school site earmarked for the installation of a borehole and a site drawing will be issued to the Contractor at site handover indicating the most feasible position for the proposed new borehole.

This 'Performance Specification' details the minimum deliverables expected from the Contractor which will lead to the successful installation of the boreholes.

1. DRILLING OF BOREHOLE(S)

Generally rotary air percussion drilling with the application of foam will be required. Some boreholes may require mud flush/rotary or symetrix drilling where drilling targets are specified within unconsolidated geological formations. The assumed drilling method will be specified. For the purpose of this project it is assumed that all drilling will take place within consolidated rock and that normal percussion will be required. Depth of drilling and installation of steel casing within the upper weathered formation will vary and it is assumed that the drilling average will be about 120m; for the purpose of this project it is assumed that weathering occur to an average depth of 25m. Steel casing will be required along this upper zone and all steel casing supplied must conform to SABS 719 and SABS62, (177mm x 4mm).

All drilling work needs to be carried out as per SANS 10299-2: Part 2: The Design, Construction and Drilling of Boreholes under the full time on site supervision of a Geohydrologist.

Carried Forward R

Brought Forward		R
The following will be required for the project: i. Prepare all Health and Safety documentation to carry out the work as per the current Occupational Health and Safety Standards; ii. Need to be registered with the Borehole Water Association of South Africa (BWA) and Groundwater Association of KwaZulu-Natal (GAKZN); iii. Establishment and de-establishment of a single "Air Percussion" drilling rig per school. All costs to include transportation, accommodation, subsistence, etc; iv. Provide costs for setting up at each school; v. Provide cost for drilling 216mm diameter holes down to approximately 25m per borehole (depths will vary), thereafter, 165mm diameter holes down to 120m; vi. Costs in 1(v) should include for the installation of casing down to 25m; vii. Provide costs for symetrix percussion drilling 203mm diameter down to 80m, include a cost for casing shoe and ringbit (In sandy areas only); viii. Provide a cost for developing the borehole(s) and carrying out a blow yield test; ix. Provide a cost for a sanitary seal and capping of the borehole(s); x. Penetration rates need to be recorded for each metre drilled; xi. The borehole "chip" samples need to be bagged per metre and kept. A "chip tray" should be priced for per borehole; xii. A detailed drillers log needs to be provided on completion of the borehole(s); and xiii. All surplus rock material needs to be removed off site.		
2. PUMP TESTING OF BOREHOLE(S) All work needs to be carried out as per SANS 10299. The following will be required for the project: i. Prepare all Health and Safety documentation to carry out the work as per the current Occupational Health and Safety		
Carried Forward		R

Brought Forward R

Standards;

ii. Need to be registered with the Borehole Water Association of South Africa (BWA) and Groundwater Association of KwaZulu-Natal (GAKZN);

iii. Establishment and de-establishment of a single pump testing team per school. All costs to include, transportation, accommodation, subsistence, etc;

iv. Provide costs for setting up at each school;

v. Assume pump testing will be between 0.25ℓ/s and 5.0ℓ/s;

vi. Provide costs for pump installation and removal down to approximately 100m;

vii. Provide costs for 4No. x 1hr step drawdown test per borehole to determine a pumping rate for the constant discharge test;

viii. Provide costs for a 12hr and 24 hr constant discharge test per borehole;

ix. Provide costs for monitoring recovery of step test and constant discharge test;

x. Provide costs for groundwater sampling of borehole(s). A 2ℓ water sample will need to be submitted to a SANAS Accredited laboratory for testing i.e. 1.5ℓ bottle for chemistry and 0.5ℓ amber glass bottle for microbiological analysis. The sampling bottles need to be sterile. Cost for laboratory analysis to be included. SANS 241-2015 testing.

xi. Prepare a pump testing data log/report and submit to the appointed hydrogeologist to analyse. (Note this is only the fieldwork component, no interpretation of data).

3. PUMP INSTALLATION FOR BOREHOLE(S)

All work needs to be carried out as per SANS 10299. The following will be required for the project:

i. Prepare all Health and Safety documentation to carry out the work as per the current Occupational Health and Safety Standards;

ii. Need to be registered with the Borehole Water Association of South Africa (BWA) and Groundwater Association of KwaZulu-Natal (GAKZN);

Carried Forward R

Brought Forward R

iii. Supply and install a submersible pump pumping up to 2.0ℓ/s;
iv. Supply and install a 0.55kw up to 1.5kw 220volt motor. The motor selected will be depending on the requirement per school;
v. All electrical and plumbing associated with the submersible pump to SANS (SABS) specifications and as indicated in SANS 10299;
vi. All specifications in 3(v) should include joint kit, base plate and fittings, class 10 HDPE pipe, submersible cable, piping, control box, safety rope, electrical connections, etc;
vii. Supply and install a manhole ring, cover and lockable galvanised lid;
viii. Supply and install a 3m high galvanised tank stand and a 5000 litre tank with a concrete plinth base;
ix. Supply and install all above ground piping to the tank stand and from tank stand to a single discharge point approximately 50m away, including trenching and backfilling;
x. Supply and install a tap to connect to the tank stand to as indicated in 3(ix);
xi. Provide all labour to install the above; and
xii. Provide compliance certificates for all work.

Borehole Installation

Tenderers are to note that the sum included the amount column for this section of the Bill of Quantities, should be the total of all priced items in the Borehole Installation, Bill of Quantities as attached hereafter.

1 Borehole Installation (transferred from page 55 of 61 on the Borehole BOQ) Item

Carried to Final Summary Page R

Section No. 5
Bill No. 1
Borehole Installation (Provisional)
LDM QUANTITY SURVEYORS

DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME

WIMS NO.: 060602

MTHAMBALALA SECONDARY SCHOOL-DRILLING OF NEW BOREHOLE, TEST PUMPING, EQUIPPING OF BOREHOLE AND INSTALLATION OF ELEVATED TANK

SCHOOL NAME :	**MTHAMBALALA SECONDARY SCHOOL**
CLUSTER NO. :	**N/A**
WIMS NO. :	**060602**
BOREHOLE SUBCONTRACTOR NAME :	
BOREHOLE SUBCONTRACTOR GAKZN / BWA AFFILIATION NUMBER :	
CONTACT PERSON :	
CONTACT NUMBER :	
EMAIL :	
TOTAL AMOUNT BIDDED (VAT excl.) :	

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1 INTRODUCTION AND BACKGROUND

The Department of Education is in the process of upgrading the existing water and sanitation facilities at 362 schools in the KwaZulu-Natal Province. These schools have been prioritised for the construction of a borehole to supplement their water demands.

Mthambalala Secondary School requires one such borehole. The scope of work and detailed BOQ with the applicable options follows. Site specifications depend on recent site assessments, old and available hydrogeological reports and needs to be confirmed per school.

The following supplies a general overview of the Drilling/Rehabilitation, Test Pumping and Equipping of the Borehole as well as the ancillary works required for the installation of an Elevated Tank to serve the Mthambalala Secondary School. A schedule of the anticipated Bill of Quantities and Appendices is supplied at the back of this document.

1.1 Other General Information

1.1.1 Terrain

1.1.1.1	Topography.	
	Flat surface, plain	Yes
	Gently rolling	Yes
	Moderately rolling	Yes
	Hilly	Yes
	Mountainous	Yes - limited
1.1.1.2	Vehicle accessibility	
	Dry weather conditions	Fair
	Wet weather conditions	Poor
	Four- or six-wheel drive required in wet conditions	Yes
1.1.1.3	Access to be established Nature of access:	Yes
	Light bush clearing	Yes
	Heavy bush clearing	Yes
	Rudimentary road building	Yes
	Dismantling of bore head superstructure for rehabilitation	yes

of existing boreholes

1.1.2 Facilities Available

1.1.2.1	Camping site / depot.	no
1.1.2.2	Water supply	limited
1.1.2.3	Power supply	no
1.1.2.3	Ablution facilities	no
1.1.2.4	Housing / accommodation	no

2 DRILLING SCOPE OF WORK

2.1 General

2.1.1	Drilling of a new borehole(s) for exploration, monitoring, production assessment and management purposes.	yes
	Estimated number	Unspecified
2.1.1.1	Type of drilling method considered suitable (depending on site geology to be confirmed)	
	Rotary air percussion with foam	Yes
	Odex/ Symetrix	Yes
	Mud Flush	yes
2.1.2	Rehabilitation of existing boreholes:	
	Estimated number (as per desktop survey)	Unspecified
2.1.2.1	Type of drilling method considered suitable for rehab:	
	Rotary air percussion with foam	Yes
	Cable tool (jumper) percussion	yes

2.2 Drilling Conditions

2.2.1 Geology

Unconsolidated sediments (e.g. loose sand, gravel and/or boulders)

Consolidated sediments (e.g. sandstone, mudstone, siltstone, shale, tillite)

Igneous rocks (e.g. granite, diabase, dolerite) Metamorphic rocks (e.g. gneiss, gabbro, norite, marble, schist)

Highly abrasive rocks (e.g. quartzite)

Carbonate rocks (e.g. dolomite, limestone, chert)

2.2.2 Expected rock conditions

Hard

Moderately hard

Soft

Weathered

Fractured

Weathered and fractured

Cavities

2.2.3 Expected drilling conditions

Good to excellent

Fair to poor

Difficult to very difficult

2.3 Standard Specifications for Borehole Drilling

2.3.1 Purpose and Scope

Simply stated, the purpose of this activity is to establish a means to access and tap groundwater resources. This is most often provided by the drilling of a borehole. It is not sufficient for this facility to represent just another hole in the ground. It is vital that the borehole be constructed and completed to certain minimum standards in order to secure the long-term viability and serviceability of the installation. This component of the project is served jointly by the Hydrogeological Consultant and the Drilling Contractor. It is therefore expected of these parties to function as a team within the framework of their individual briefs as set out in their respective contract agreements with the Implementing Authority.

2.3.2 Approach and Responsibility

In general, it is required that the drilling of any borehole be approached with due diligence and care on the part of the appointed drilling contractor(s). Specifically, it is required that the drilling of each borehole be approached in a cost effective manner to establish a water supply.

In some instances boreholes may be drilled for exploration and/or resource monitoring purposes. Under normal circumstances, the pre-drilling of a 165 mm diameter exploration borehole is drilled and the borehole is reamed to larger diameters for construction purposes where find necessary. In leached/cavernous carbonate rock areas drilling normally commences with larger diameters, to limit reaming of boreholes and allow for telescope borehole construction.

The Drilling Contractor(s) will function under the direct supervision of the Hydrogeological Consultant. This by no means implies that the Drilling Contractor(s) is absolved from any responsibility. All drilling activities will, therefore, be approached through communication and discussion between the Hydrogeological Consultant and the contractor(s) with a view to developing the most suitable and mutually acceptable finished product serving the best interests of the project. The fact that the Drilling Contractor is also appointed for the skills which he can offer the project and is often able to provide, from experience, practical approaches and solutions to specific problems must be recognised and accepted by the Hydrogeological Consultant.

Failure by the contractor(s) to timeously render advice and input where required will be regarded as a dereliction of duty. This responsibility extends to informing the Hydrogeological Consultant of serious reservations regarding any aspect of the work. The contractor(s) will also be required to maintain the aesthetic appearance of the site during drilling operations, including keeping the site neat, tidy and free of litter. More importantly, the contractor must ensure that safety standards are met and that the work site is kept free, as far as is possible, from vehicular and pedestrian traffic and from interested bystanders and onlookers not involved with the project.

In essence, the final responsibility for the finished water supply borehole and all actions and activities leading up thereto must be carried jointly by the Hydrogeological Consultant of the Executive Agency and the appointed Drilling Contractor(s).

2.3.3 Techniques

The most common method employed for the sinking of a water supply borehole is that of rotary air percussion drilling employing a down-the-hole (DTH) hammer. This drilling technique is ideally suited to hard rock formations and therefore finds wide application in most of the geological environments encountered in South Africa.

Other techniques which will be applied depending on site-specific circumstances include: (1) Odex drilling (2) cable tool percussion drilling and (3) Mud flush drilling. Method (1) represent technically more sophisticated techniques, which find specific application in loose and unconsolidated materials. Method (2) employs the familiar jumper rig, its most useful application being the cleaning and rehabilitation of existing boreholes. Method (3) is specific to primary unconsolidated type aquifers.

In light of the above, the preferred drilling technique to be employed on community water supply projects is that of rotary air percussion unless otherwise required as per the site specific conditions.

2.3.4 Equipment and Materials

The equipment made available by the Drilling Contractor must be in good working order. It must also be maintained in good condition for the duration of the project. In order to achieve this, time should be set aside each week for the routine service and preventative maintenance of all equipment. The drilling equipment must include a full air/foam pumping system. At the start of the project, the gauge diameter of the button drill bits to be employed with the rotary air percussion drilling technique must conform closely to their manufactured gauge and must also possess all of their tungsten carbide buttons.

The Hydrogeological Consultant will discuss with the Drilling Contractor the retirement of a bit due to excessive wear or damage incurred during the course of the project. Further, it is imperative that the equipment be of a suitable size and capacity to deal, on occasion, with: (1) deep boreholes (up to 300 m), (2) larger than average borehole diameters (up to 305 mm), (3) large quantities of groundwater and (4) potentially onerous drilling conditions. Since this capability is provided in large measure by the air compressor, it is considered that a compressor having a capacity of at least 2400 kPa (24 bar) and a volume of at least 750 cfm is appropriate for most water borehole drilling applications and conditions using the rotary air percussion technique. In order to maintain the straightness of a borehole, the Hydrogeological Consultant may insist that the Drilling Contractor employ at least an overshot sleeve (drill collar) fitted to the pneumatic DTH hammer.

Further precautions to ensure this aspect might include the use of a stabiliser rod immediately behind the bit/hammer/overshot combination. All materials to be used on the project should be new and meet project specifications. This applies particularly to steel casing, which shall be: (1) of the seam-welded type, (2) round, (3) straight, (4) of uniform wall thickness and (5) have bevelled edges. Second-hand material such as steel casing recovered from an earlier borehole can be used provided that it has been refurbished to an acceptable condition (refer to subsection 5.6f). The Hydrogeological Consultant will have the right to reject, with motivation, any material (including casing) which is deemed inappropriate, substandard or otherwise unsuitable for the project.

2.3.5 Workmanship and Performance

The standard of workmanship of the Drilling Contractor will be subject to close scrutiny by the Hydrogeological Consultant. Many aspects thereof are of a subjective nature and not readily quantifiable. Every attempt must, therefore, be made to render this beyond possible criticism.

Judgment of the performance of the Drilling Contractor in the execution of assigned work is similarly of a subjective nature. Although it cannot be expected of the contractor to complete a specified number of boreholes in a given time period, it is reasonable to expect that "favourable progress" be made under normal circumstances and drilling conditions. An indication of what might be regarded as "favourable progress" is considered to fall in the range of 50 to 100 m of drilling advancement per day taking into consideration inter-hole moves and set-up time. Performance being related to efficiency and efficiency in turn being a function of, amongst other factors, the number of mechanical equipment breakdowns suffered by the contractor, it will be in the best interests of the contractor to set aside time for the routine preventative maintenance of equipment. If the contractor is inclined to work a 6 or 7-day week, it is preferred that maintenance activities be scheduled for the weekends. Such schedule must be communicated to the Hydrogeological Consultant. This party may insist that the Drilling Contractor does not start with the drilling of a borehole over a weekend. Although work-in-progress may be completed, the contractor shall under no circumstances vacate a site before the Hydrogeological Consultant has inspected the completed works and sanctioned the move to the next borehole.

2.3.6 Borehole Construction

The extremely diverse nature of subsurface conditions, sometimes over very short distances, renders it virtually impossible to address this aspect in great or specific detail. This factor also rules out standardisation in this regard. It is possible, however, to address certain basic borehole construction practices which will contribute to final acceptance of the successfully finished product.

2.3.6.1 Drilling Diameter

Drilling diameters will be 152 mm (6"), 165 mm (6,5"), 203 mm (8"), 254 mm (10") and 305 mm (12") for rotary air percussion drilling. Odex drilling diameters will be 194 mm, 219 mm or 273 mm OD. Any variations must be acceptable to the Engineer.

The minimum final cased diameter of a successful community water supply borehole shall not be less than 152 mm ID nominal.

The contractor will be remunerated for drilling per linear metre of depth at the rate bidded for each relevant drilling diameter employed as set out in the Schedule of Rates.

2.3.6.2 Steel Casing

Note: All steel casing supplied must conforms to SABS 719 and SABS 62.

Steel casing may either be used in a temporary manner or form a permanent part of the borehole infrastructure. Its temporary use is indicated in instances where, for example, the borehole is unsuccessful or the need for it to remain in place becomes redundant. Under these circumstances it is also referred to as a pre-collar, surface casing, starter casing, outer casing or soil casing generally to be removed (recovered) on completion of drilling. The removal of temporary/starter casing to a depth of 5 m will not be a payable item under recovery of steel casing. It will be left in place where the Hydrogeological Consultant is of the opinion that the unsuccessful borehole should be secured to serve a long-term groundwater monitoring purpose. In such instances, additional provision must be made to protect the borehole against actions, which may compromise this function.

More commonly, however, this casing constitutes the final casing with which a successful borehole is equipped/constructed. Its proper installation, therefore, is mandatory. It is installed from surface through unstable, unconsolidated or fractured materials usually occurring in the near surface. Under these circumstances, the function of steel casing includes one or more of: (1) supporting unstable materials against collapse into the borehole during drilling, (2) facilitating the installation or removal of other casing, (3) minimizing the erosion and widening of the unstable upper portions of the borehole sidewall caused by the return flow established during drilling and/or the passage of drilling equipment/tools and (4) facilitating the placement of a sanitary seal and/or gravel pack or formation stabilizer. The casing must conform to the required specifications.

In order to ensure as far as is possible that the annular space between this casing and the borehole sidewall remains open for the later emplacement of a sanitary seal, the circumferential entrance to this space must be temporarily plugged. Hessian sacking packed around and lightly tamped into the surface entrance to this annular space can be used for this purpose. In instances where steel casing needs to be driven through unstable horizons (generally at greater depths in a borehole), it will also be required that such casing be fitted with a casing shoe to protect the "mouth" of the casing from damage (subsection 5-6.c). Irrespective of the casing used to facilitate the drilling of the borehole, the final cased diameter of the finished product must be sufficient for the borehole to easily accept a borehole pump. Since the outside diameter of the latter is generally in the order of 1 00 mm, it is required that the final cased diameter of the borehole be not less than 152 mm (6 in.) nominal where steel casing is used.

The Drilling Contractor will be remunerated for steel casing per linear metre thereof supplied, delivered and installed at the rate bidded for each relevant casing diameter as set out in the Schedule of Rates.

2.3.6.3 Casing Shoe

This item is fitted (welded) to the bottom end (foot) of a casing string in order to protect the "mouth" of the casing from damage due to forcing the casing through unstable horizons. Its use is therefore only warranted (indeed mandatory) in instances where such conditions reveal themselves to require securement through the emplacement of casing.

The Drilling Contractor will be remunerated for each casing shoe supplied and used at the rate bidded for each relevant shoe diameter as set out in the Schedule of Rates.

2.3.6.4 uPVC Casing

Also referred to as thermoplastic casing, the material generally comprises PVC (polyvinyl chloride) which, when treated to withstand ultraviolet radiation, is known as uPVC casing. Its application in the construction of community water supply boreholes is rather specific, being used mainly in instances where security against the collapse of a borehole sidewall is required and where steel casing does not already offer such security. In such instances, the casing is inserted the entire length of the borehole and will certainly be perforated for some portion of its length.

The diameter of this casing will also necessarily be smaller than that of the steel casing used which, in most instances, will have a nominal diameter of 165 mm. In order not to compromise too severely on the minimum nominal diameter requirement of 152 mm for successfully completed community water supply boreholes (subsection 5-6.b), the inside diameter of the uPVC casing shall not be less than 127 mm with a wall thickness of 6 mm. It is also common practice to leave the steel casing in place in order to provide protection for the uPVC casing. The decision to use uPVC casing in the final construction of a borehole shall be made by the Hydrogeological Consultant.

The Drilling Contractor will be remunerated for uPVC casing per linear metre thereof supplied and installed at the rate bidded for each relevant casing diameter as set out in the Schedule of Rates.

2.3.6.5 Perforated Casing

Also referred to as slotted casing, this is used in instances where a casing string inserted into a borehole will extend across a water-bearing horizon. The perforations or slots will allow the groundwater to enter the borehole. Perforations can be made in a number of ways ranging from prefabricated machine- or plasma-cut slots to hacksaw, angle grinder or oxyacetylene torch-cut slots made in the field. The latter type of slots are seldom satisfactory since it is difficult to produce perforations which are: (1) of uniform size, (2) clean, open and free of restrictions and (3) small enough to control the ingress of finer material into the borehole. It is therefore preferred that perforated casing used in the construction of community water supply boreholes be of a prefabricated type. As a general guideline, slots should be: (1) 300 mm in length, (2) 3 to 4 mm wide, (3) positioned in bands around the circumference of the casing, (4) spaced equally in each band, (5) each circumferential band of slots separated by 100 mm of plain pipe, (6) every second band of slots aligned with one another, and (7) a 300 mm section of plain pipe left at both ends of the casing. This slot pattern is illustrated in Drawing 4 (Section 6). Bearing in mind that the number of slots forming each circumferential band depends not only on the casing diameter but also impact on the strength of the casing, it is suggested that the guidelines presented in Table 5-1 be adhered to in this regard.

Table 2-1: Recommended number of slots per circumferential band for various steel casing diameters and associated percentage open area provided

NORMAL CASING DIAMETER	NUMBER OF SLOTS PER CIRCUMFERENTIAL BAND	PERCENTAGE OPEN AREA
152mm	6	3,0%
165 mm	8	3,7%
203 mm	10	3,7%

Also presented in this table is the approximate open area provided by the above slot pattern applied to each of the given casing diameters. In certain instances, however, it may be required to use more sophisticated and expensive slotted casing. Also known as screens, these include: (1) continuously wound wedge wire screens, (2) louvered screens or bridge-slotted screens and (3) screens pre-coated with gravel. The decision to use such screens shall again be made by the Hydrogeological Consultant after providing motivation to and gaining acceptance from the Implementing Authority.

The Drilling Contractor will be remunerated for perforated casing per linear metre thereof supplied and installed at the rate bidded for each relevant casing diameter as set out in the Schedule of Rates.

2.3.6.6 Recovery of Steel Casing

The contractor shall make every effort to recover, only on instruction of the Hydrogeological Consultant, steel casing from unsuccessful or abandoned boreholes. This casing can also be refurbished to an acceptable condition for re¬use.

The Drilling Contractor will be remunerated for the recovery of steel casing per linear metre thereof salvaged from a borehole as per the rate bidded in the Schedule of Rates. The removal of temporary/ starter casing to a depth of 5 m not be a payable item to the contractors.

Payment for the proper refurbishment of such casing shall be made on a time basis against bidded standing time rates subject to verification and certification of the amount/duration of this work by the Hydrogeological Consultant.

2.3.6.7 Borehole Straightness

The straightness (alignment) of a borehole is defined by the degree to which it deviates along its length from an imaginary centre line drawn through the borehole. This is readily determined by passing a "dummy" or "dolly" through the borehole. The equipment comprises a rigid hollow steel pipe having an outside diameter which is smaller by not more than 20 mm than the inside diameter of the final casing. Caution should be exercised when conducting a straightness test in an uncased or partially cased borehole since irregularities in the borehole sidewall may cause the "dummy" to become jammed. Since the casing string is normally constructed from six-metre lengths, it is required that the "dummy" itself have a length of at least six metres in order to adequately "straddle" casing joints. This equipment must form part of the standard equipment supplied by the Drilling Contractor. It must also be readily available since the Hydrogeological Consultant may request a straightness test at any stage during drilling. The "dummy", suspended from a flexible steel rope (normally the hoist line with which most drilling rigs are equipped), is slowly lowered down the borehole.

The borehole will be considered straight if the "dummy" passes down the entire length of the borehole and can be withdrawn without it binding or becoming stuck in the borehole. The straightness test must be performed by the Drilling Contractor in the presence of the Hydrogeological Consultant and its success (or failure) recorded by this party.

A borehole which fails a straightness test will be deemed lost (subsection 5-6.1) and it will be required of the Drilling Contractor to drill a replacement borehole at own expense. In the event that a straightness test is made before completion of the borehole, then the contractor will be required to cease operations and facilitate access to the borehole for the duration of such activity.

The contractor will recover the cost of production loss (incurred for the duration that drilling activities are interrupted) against the rate bidded for standing time in the Schedule of Rates. It will be the responsibility of the Hydrogeological Consultant to verify and certify any claim by the Drilling Contractor in this regard.

2.3.6.8 Borehole Verticality

This represents the plumb ness of the borehole as measured by the deviation of the centre of the borehole from the vertical at any depth within the bore. The deviation must not exceed two thirds of the borehole diameter (casing inside diameter) per 30 m of depth. Although the SABS 045-1974 standard code of practice for testing water boreholes (including for verticality) has been withdrawn, the nature and form of the apparatus to be used for this purpose remains valid. Drawing 5 in Section 6 of this document illustrates the equipment.

The equipment comprises a tripod (shear legs), a plumb-bob and a flexible wire line. The plumb-bob must be fitted with a centre-mounted spindle at one end and a centralising device on its circumference. The tripod is erected over the borehole such that its apex is above the centre of the borehole. The wire line is passed through a small pulley mounted at the apex. The plumb-bob, suspended from the wire line, must hang vertically from the pulley such that the wire line passes exactly through the centre of the borehole when the plumb-bob is centrally positioned within the mouth of the casing (tolerance 3 mm). The vertical distance from the pulley to the top of the casing must be measured accurately (tolerance 0,01 m). This distance must not be less than 2,4 m. The plumb-bob is then lowered in equal increments (generally 3 m) down the borehole. The deviation of the wire line measured in millimetres from the centre of the casing must be determined at each depth increment and the measurements recorded on a data sheet. This procedure must be continued for the entire length of the borehole. The measured deviation of the wire line from the centre of the mouth of the casing at each depth increment indicates the drift (Ø) of the plumb-bob. The measured deviation is used together with a deflection factor (Df) to calculate the actual deflection (Da) of the borehole from the vertical at each depth increment according to the equation:

$$Da = Ø\,(d + h)/h$$

where Ø = the measured drift (in millimetres) of the wire line at a given plumb-bob depth,

d = depth of plumb-bob below casing collar (in metres) for each drift (Ø) measurement,

h = vertical distance between the casing collar and the pulley (at the tripod apex) over which the wire line passes (in metres), and

(d + h)/h represents the deflection factor (Df).

The wire line deviation measurement is most accurately performed if a revolving template with a graduated radial slot is mounted directly over the collar of the casing. The slot is graduated in millimetres outwards from the centre of the template. The template is revolved until the wire line passing through the slot hangs free and straight in the slot and its deviation from the centre read off on the graduated slot.

The verticality test must be performed by the Hydrogeological Consultant in the presence of the Drilling Contractor. The consultant will therefore be required to provide the necessary equipment for conducting a verticality test. A borehole which fails a verticality test will be deemed lost (subsection 5-6.ℓ) and it will be required of the contractor to drill a replacement borehole at own expense. In the event that a verticality test is made before completion of the borehole, then the Drilling Contractor will be required to cease operations and facilitate access to the borehole for the duration of such activity.

The contractor will recover the cost of production loss (incurred for the duration that drilling activities are interrupted) against the rate bidded for standing time in the Schedule of Rates. It will be the responsibility of the Hydrogeological Consultant to verify and certify any claim by the Drilling Contractor in this regard.

2.3.6.9 Backfilling

This entails filling the annular space between the borehole sidewall and the outside of the casing with suitable material. The purpose of annular backfilling includes: (1) the provision of a base on which to found a sanitary seal and (2) the provision of support for the sidewalls of the borehole and the casing. In instances where casing has been seated at a comparatively shallow depth in fresh material below a weathered near-surface horizon, all of the drill cuttings removed from the borehole whilst drilling represents suitable material for this purpose. Annular backfilling with this material is not advisable in instances where this is not the case, such as for example where the casing extends to a substantial depth and comprises slotted/perforated sections or where the water-bearing horizon is shallow and open to the borehole via slotted/perforated casing. In these instances, it will be required to insert a formation stabiliser into the annulus. The backfilling must extend to within approximately 5 m of the ground surface.

The Drilling Contractor will be remunerated for backfilling against the standing time rate (which shall include the supply and insertion of material required therefore) bidded for in the Schedule of Rates.

2.3.6.10 Formation Stabiliser

This comprises material which is placed in the annulus between the borehole sidewall and perforated/slotted sections of casing to stabilise the formation against collapse and ingress into the borehole. The drill cuttings and spoils removed from the borehole is not suitable material for this purpose. The stabiliser must comprise material which is: (1) well sorted, (2) well rounded, (3) low in calcareous content, and (4) graded such that the smallest grain size is larger than the casing perforations/slots. The stabiliser material can either be placed by hand or through a tremie pipe. Excessive bridging of stabiliser material in the annulus can be prevented: (1) through the use of centralisers on the casing or (2) by washing it in with clean water. The formation stabiliser should extend some 10 m above the top of the uppermost perforated/slotted section of casing before the borehole is developed.

The Drilling Contractor will be remunerated for formation stabiliser per 20 litre container supplied and installed at the rate bidded for in the Schedule of Rates.

2.3.6.11 Concrete Collar

The Drilling Contractor will construct a shallow circular concrete collar around each successfully completed borehole. This collar shall have the dimensions set out in Drawing 6 (Section 6) yielding a volume approaching 0,08 m3. The concrete mixture shall consist of water, Portland cement, stone aggregate (10 mm) and river sand. Quantities of these materials sufficient to make 0,1 m3 of concrete with the required strength of some 30 MPa after 28 days are: (1) 20 litre of water, (2) 42 kg (0,8 bag) of Portland cement, (3) 0,07 m3 of stone aggregate, and (4) 0,07 m3 of river sand. A similar collar may need to be constructed, on request off the Hydrogeological Consultant, over unsuccessful or abandoned boreholes.

The contractor will be remunerated for a concrete collar per unit constructed at the rate provided in the Schedule of Rates, which rate shall include for the transport, supply, mixing and placement of all the materials required.

2.3.6.12 Unsuccessful and Abandoned Boreholes

A borehole will be declared unsuccessful at the discretion of the Hydrogeological Consultant. The latter may also, at any time during the course of the work, order the abandonment of a borehole in progress.

In such instances, the Hydrogeological Consultant must instruct the Drilling Contractor on further actions to be taken. These may include either: (1) the salvage of any casing from the borehole and (2) the plugging of the borehole or (3) the securement of the borehole for long-term monitoring purposes, in which case it will be provided with a sanitary seal (subsection 5-6.n), concrete collar (5-6.k), protection (5-6.q) and marking (5-6.r).

Plugging (or finishing) of an unsuccessful or abandoned borehole is aimed at removing any danger or hazard such boreholes may present to the environment, e.g. as a conduit for the inflow or surface water into the groundwater regime or as a danger to traffic (whether human, stock or vehicular) in the immediate vicinity thereof. This is achieved by shovelling the drill cuttings and other suitable natural material back into the unsuccessful borehole. In order to prevent this material from "hanging" in the borehole, it might be required to periodically wash it in with clean water during the infilling process. Once the infill material extends to the ground surface, it must be compacted by tamping it down manually and any subsidence topped up with fresh backfill material. The compacting and topping up activities should be repeated until assurance can be had that all reasonable precaution has been taken to prevent future subsidence. It will also be required to cast a concrete collar over the infilled borehole (subsection 5-6.m).

The Drilling Contractor will be remunerated for an unsuccessful or abandoned borehole on the basis of bidded rates in the Schedule of Rates for such of the following items as are relevant: (1) drilling per linear metre of depth for each relevant drilling diameter employed, (2) steel casing per linear metre thereof recovered excluding starter casing to a depth of 5 metres, (3) backfilling, (4) a sanitary seal, (5) borehole protection, and (6) borehole marking. Payment for any casing left behind in an unsuccessful or abandoned borehole will only be made, on the same basis as described in (2) above, on written certification by the Hydrogeological Consultant that the contractor has made every reasonable recovery attempt in this regard.

2.3.6.13 Lost Boreholes

A borehole will be declared lost by the Hydrogeological Consultant in the event that it can not be completed satisfactorily due to factors such as: (1) the irrecoverable loss of drilling equipment, materials or tools therein, (2) accident to plant or heavy machinery, (3) failure to pass a straightness test, and (4) failure to pass a verticality test. A decision in this regard must be made after consultation with the Drilling Contractor, who will have the considered option to either attempt remediation of the situation to the satisfaction of the Hydrogeological Consultant or, alternatively, declare the situation irretrievable. No payment shall be made for any work done, materials used or time spent by the Drilling Contractor on a lost borehole. The cost of any materials recovered in a damaged state from a lost borehole will be borne by the contractor.

A borehole which is declared lost shall be replaced with a new borehole to be constructed by the Drilling Contractor in the vicinity of the lost borehole and at a position indicated by the Hydrogeological Consultant. Payment for a new borehole constructed under these circumstances shall be made on the same basis as for any other successfully completed borehole. Materials recovered in good condition may, however, be re-used by the contractor.

2.3.6.14 Sanitary Seal

The purpose of a sanitary seal is to prevent the ingress of potentially contaminated surface water into the borehole via the annular space between the borehole sidewall and the outside of the casing. It is required, therefore, that every successful community water supply borehole be provided with a sanitary seal. The seal must consist of Portland cement mixed to slurry with bentonite and water, which is free of oil and other organic matter. The bentonite and water should be thoroughly mixed in the ratio of 2 kg bentonite to 25 litre water prior to adding and mixing in 50 kg (one bag) cement. The final grout seal must extend to a depth of at least 5 m below ground surface. The seal is preferably placed at the beginning of the drilling process after a 5 m deep 305 mm hole has been drilled and cased with 254 mm ID steel casing (type 1 sanitary seal) or with a 215 mm ID steel casing (type 2 sanitary seal. After placing the casing and centring the hole, an amount of bentonite, cement and water grout, adequate to fill the entire annulus between the casing and the wall of the borehole, is tremied into the casing. The slurry can be gravity-fed into the annulus through a small diameter tube (tremie pipe) extending to the depth of emplacement. The tremie pipe should be withdrawn slowly as the slurry fills up the annulus.

Care should be taken not to leave voids in the sanitary seal. These may result from: (1) channelling caused by casing which is not centred in the borehole, (2) an improperly mixed slurry which contains lumps and (3) an annular space which is too small to assure a uniform thickness of seal.

The Drilling Contractor will be remunerated for a sanitary seal per linear metre thereof against the rate bidded in the Schedule of Rates. This rate will include for the supply, delivery, mixing and installation of all material for type 1 and type 2 sanitary seals.

2.3.6.15 Borehole Development

This activity entails flushing all loose material from the borehole upon the completion of drilling. This material might comprise one or more of: (1) drill cuttings resting on the bottom, (2) loose material forming insecure portions of the borehole sidewall, (3) clayey material "plastered" to the borehole sidewall during the drilling process, and (4) fine material which has collected behind screened portions of the borehole. The removal of this potentially "clogging" material often leads to an improvement in the yield of the borehole. The most common borehole development technique used simply entails repeatedly running the drill bit up and down in sequential passes across portions of the borehole with the compressed air turned open. The length of each pass will be dictated by the length of the drill rods used by the contractor. The process is normally performed from the bottom up, one drill rod being removed from the drill string upon development of the preceding (lower) section.

The borehole will be deemed sufficiently developed when very little or no material is brought to the surface in the return flow from the borehole as evidenced by collecting a portion of this flow in a bucket placed at the bore head during development. Other methods, which may be employed, for borehole development includes: (1) surge plunging using a surge block and (2) jetting using a purpose-built jetting tool. This activity must be concluded with the collection of a one-litre representative water sample obtained from the return flow during development.

The Drilling Contractor will be remunerated for borehole development on a time basis against the work time rate bidded in the Schedule of Rates. It will be the responsibility of the Hydrogeological Consultant to verify and certify any claim by the contractor in this regard.

2.3.6.16 Borehole Disinfection

Also known as sterilisation, the purpose hereof is to disinfect the borehole and its contents of any bacteria, and particularly coliform bacteria, introduced into the borehole during drilling operations. Sterilisation is most readily accomplished by introducing chlorine (or chlorine-yielding compounds) into the borehole. On completion of development the borehole shall be disinfected with a solution of 0.5 kg of HTH mixed in 250 litres of water.

The Drilling Contractor will be remunerated for borehole disinfection per single application at the cost (which shall include for all materials supplied and used and the time spent) bidded for one such application as set out in the Schedule of Rates.

2.3.6.17 Borehole Protection

This entails sealing the borehole from the introduction of foreign material directly through the casing. It is often achieved by means of a lockable cap fitted to the borehole collar. Experience suggests, however, that a 3 to 4 mm thick steel plate (lid) welded onto the borehole collar ensures better security. Of course, it will later be required of the Testing Contractor to remove this plate in order to gain access to the borehole for testing purposes. In order to provide the Hydrogeological Consultant with ready access to the borehole for water level measuring purposes, it is required that a small hole be drilled in the lid. This hole must be furnished with a tamper-proof plug such as a "dead-end" threaded into a water pipe connector welded on the hole. The final diameter of the hole providing access to the borehole must be sufficient to allow a "normal" diameter probe to pass through it. It is considered that a diameter of at least 10 mm and not more than 20 mm is suitable for this purpose.

The Drilling Contractor will be remunerated for borehole protection per single installation at the cost (which shall include for all materials supplied and used and the time spent) bidded for one such installation as set out in the Schedule of Rates.

2.3.6.18 Borehole Marking (in the field)

For all Community Water Supply and Sanitation projects, the borehole identifying number will be provided by the Directorate Water Regulation and Use, sub-directorate Geohydrology of the regional KwaZulu Natal DWS, or else by the Implementing Authority. It is the responsibility of the Hydrogeological Consultant to ensure that the correct number is provided to the contractor for this purpose. The consultant will be responsible for securing a batch of numbers and pass these on to the Contractor as is deemed fit and appropriate.

The activity itself represents marking the borehole by: (1) script-welding its assigned and unique identifying number onto the lid of the borehole and (2) planting a concrete block with dimensions of 200 mm x 200 mm x 200 mm in the ground with a pole (see specifications in drawing) bearing the number of the borehole at a distance of five metres to the north of the borehole.

The Drilling Contractor will be remunerated for borehole marking per single application at the cost (which shall include for all materials supplied and used and the time spent) bidded for one such application as set out in the Schedule of Rates.

2.3.6.19 Site Finishing

The activities associated with this task must include the repair of construction scars on the work site resulting from drilling activities, as well as the general clean-up of the site of waste materials, debris and oil spills.

The latter must be suitably disposed of in an environmentally friendly manner. The Drilling Contractor will be remunerated for site finishing per single application at the cost (which shall include for the time spent) bidded for one such application as set out in the Schedule of Rates.

2.3.7 Data Recording and Reporting

It is imperative that a detailed and accurate record of all information arising from the borehole drilling activity be recorded with care and diligence. Much of this information can be collected by the Drilling Contractor. It must be recorded on a driller's log such as is provided in Section 6. This must be kept current and available for inspection at request of the Hydrogeological Consultant. The contractor will include the cost of these activities as a single sum per borehole in the Schedule of Rates. It will be the responsibility of the Hydrogeological Consultant to verify receipt of this information prior to certifying a claim by the Drilling Contractor in this regard. The following items of information represent the minimum number of parameters, which must be monitored and recorded by the contractor.

2.3.7.1 Penetration Rate

This represents the time taken, as measured with a stopwatch, to advance the borehole a specific depth (generally one metre). In broad terms, the harder the rock formation the slower the penetration rate and vice versa. Since the hardness (or softness) of a rock formation is a characteristic which can be associated with specific rock types, an accurate record of penetration rates serves as an additional means of identifying changes in rock type with depth. Although a slow penetration rate may be of hydrogeological significance, it can also be caused by worn equipment or difficult drilling conditions such as are presented by loose, unstable material. The measured penetration rate must, therefore, not include time spent overcoming technical problems or remedying mechanical breakdowns encountered during drilling.

2.3.7.2 Formation Sampling and Description

This entails a brief description of the visual appearance of the rock formation being drilled. It is performed by inspection of the rock chips (also known as drill cuttings) brought to the surface during drilling. A spadeful of chips should be collected at the mouth of the borehole for each metre drilled.

The "samples" should be placed as sequential piles in ordered rows at a cleared and visible location away from the immediate area of activity and traffic around the borehole being drilled. If instructed by the Hydrogeologist a fist full of each sample should be bagged in individual plastic bags labelled with the borehole number and sample depth. These samples should be kept at a pre-arranged location for description at a later stage. The samples should be described by a suitably qualified geotechnician/earth scientist according to the guidelines set out by the South African Institute for Engineering Geologists (SAIEG, 1995). The driller's description must include, as a minimum, a note on the colour of the formation, the relative size of the drill cuttings and, if possible, an identification of the possible rock type.

2.3.7.3 Water Strike Depth

This information relates to the depth at which any water, including seepage, is encountered in a borehole during drilling. It is possible for water to be encountered at more than one depth as drilling advances. The depth(s) at which water is encountered must be determined to an accuracy of one metre and recorded. It is also necessary to record the nature of the formation associated with the water strike(s). This may, for example, be represented by a single fracture of fissure, a system of such features or a noticeably softer or more weathered horizon.

2.3.7.4 Blow Yield

Water which is encountered in a borehole being drilled by the rotary air percussion method is blown out of the borehole during drilling. The amount of water being blown from the borehole provides an indication of the possible yield of the borehole. The blow yield must not be guesstimated, even though a fair visual estimate based on experience can often be provided by the Drilling Contractor. Also, since water may be encountered at more than depth, it is necessary to measure and record the blow yield immediately following each water strike. These measurements should be repeated as drilling continues until constancy is revealed by at least four consecutive measurements each representing a further metre of drilling.

The accurate measurement of the blow yield does not require the use of sophisticated equipment. The most acceptable and preferred means of measurement is provided by the use of a 90° V-notch weir, details of which are provided in Drawing 8, Section 6. The use of a 90° V-notch weir entails channelling all of the water being blown from the borehole through such a weir, which has been placed level in the channel (or ditch) leading the return water flow away from the borehole being drilled. The height of water flowing over the notch is translated into a flow rate or yield as indicated in Table 5-2. It is imperative that the height of water flowing over the weir is not measured within the notch itself but at and from a position in the weir upstream and to the side of the notch and which corresponds exactly in height to the inverted apex of the notch.

Table 2-2: Tabulation of height vs flow rate data for a 90° V-notch weir

HEIGHT (mm)	FLOW RATE (l/s)	FLOW RATE (l/s) FOR				
		HEIGHT + 2 mm	HEIGHT + 4 mm	HEIGHT + 5 mm	HEIGHT + 6 mm	HEIGHT + 8 mm
10	0,01			0,04		
20	0,08			0,15		
30	0,23			0,04		
40	0,47	0,53	0,60		0,67	0,74
50	0,80	0,88	0,97		1,06	1,16
60	1,26	1,36	1,47		1,59	1,71
70	1,84	1,97	2,11		2,25	2,40
80	2,55	2,71	2,88		3,05	3,23
90	3,41	3,60	3,80		4,00	4,21
100	4,42	4,64	4,87		5,10	5,34
110	5,59	5,85	6,11		6,38	6,65
120	6,94	7,22	7,,52		7,83	8,14
130	8,46	8,79	9,12		9,46	9,81
140	10,17	10,53	10,90		11,28	11,67
150	12,07	12,47	12,88		13,30	13,73
160	14,17	14,61	15,07		15,53	16,00
170	16,48	16,96	17,46		17,96	18,48
180	19,00	19,53	20,07		20,62	21,18
190	21,75	22,32	22,91		23,50	24,11
200	24,72	25,34	25,97		26,61	27,26
210	27,92	28,59	29,26		29,95	30,65
220	31,36	32,08	32,80		33,54	34,28
230	35,04	35,81	36,58		37,37	38,17
240	38,97	39,79	40,62		41,45	42,30

Another common but less preferred method in use is the "drum-and-stopwatch" technique. This requires only that all of the water blown from the borehole be channelled to a point where the concentrated flow can be collected in an open-ended drum of known volume (generally 20 litres) and the time taken to fill the container measured with a stopwatch for accuracy. Dividing the full volume of the drum (in litres) by the time taken (in seconds) to fill the drum gives the blow yield in litres per second *(l/s)*. It is cautioned, however, that this method is only effective and reliable for yields of less than approximately 2 l/s.

2.3.7.5 Groundwater Rest Level

This parameter represents the depth, as measured from surface, to the level of standing water in the borehole. This measurement can be made with the use of any liquid level indicating device, the most common of which is an electrical contact meter (dipmeter). The groundwater level measurement must be accurate to the nearest 0,01 metre (one centimetre). The measurement reference point, which may either be the ground level or the collar of the borehole, should be identified against the measured depth value. The latter reference point will generally be represented by the top of the casing with which the borehole has been equipped. In these instances, it will also be necessary to measure the height by which the casing extends above ground level. If the borehole is drilled and completed on the same day, then a groundwater level measurement must be taken immediately before leaving the site.

If drilling and borehole construction extends over two or more days, then such measurements must also be taken before daily drilling activities commence, provided that water, including seepage water, has been encountered in the borehole. A groundwater level measurement must be referenced to the date on which it is made and, if more than one such measurement is made per day, then also the time of each such measurement must be recorded.

2.3.8 Down-the-hole Loss of Equipment

Drilling equipment, materials or tools may be lost down a borehole during drilling operations. Since this can often result in the irretrievable loss of a borehole, substantial efforts are generally employed by the Drilling Contractor to recover such material. This activity is also referred to as fishing. The Hydrogeological Consultant will afford the contractor every opportunity and reasonable time to fish for lost equipment. The Drilling Contractor must, in turn, keep the Hydrogeological Consultant informed of progress and the likelihood of success in this regard. The contractor will have no claim against any other party for any losses incurred in this regard. Further, the fate of a borehole which cannot be continued or completed due to the presence of lost equipment, materials or tools therein will finally be decided by the Hydrogeological Consultant. It may either be declared successful or lost.

2.3.8.1 Borehole declared Successful

Circumstances under which a borehole may be declared successful include: (1) the borehole has encountered significant water or is drilled for resource monitoring purposes, (2) pumping equipment can be installed to an acceptable depth in the borehole and (3) the lost equipment does not pose a threat to the present and future quality of the groundwater. In the event that a borehole is declared successful despite the irrecoverable loss of drilling equipment, materials or tools therein, then the exact nature and position of the equipment lost in the borehole must be recorded and appear in relevant project documentation. The Drilling Contractor will be remunerated for a borehole declared successful under these circumstances on the same basis as for any other successfully completed borehole.

2.3.8.2 Borehole declared Lost

Although the circumstances under which a borehole will be declared lost are varied and diverse, the criteria which should apply include: (1) the borehole has not yet encountered water irrespective of the depth reached, (2) the borehole has not yet encountered water even though the geological and hydrogeological indications are positive, (3) the borehole has encountered water but in too small a quantity to warrant the installation of pumping equipment, yet the geological and hydrogeological indications are positive that more water can be obtained, and (4) the borehole has encountered a significant quantity of water but the lost equipment prevents the installation of pumping equipment to an acceptable depth. In the event that a borehole is declared lost under these circumstances, then the criteria set out in subsection 5-6.1 for further actions, payment, etc, shall apply.

2.3.9 Down-the-hole Borehole Measurements

This activity is more commonly referred to as borehole logging. The measurements are carried out by manually or mechanically lowering tools or instruments of various technical sophistication down a borehole. Borehole logging is useful in instances where:

(1) surface geophysical data need to be calibrated against subsurface information,

(2) geological information for a borehole is absent or suspect,

(3) borehole construction information is absent or suspect, and

(4) information is required for the proper and effective stimulation by various means of borehole yields.

Although down-the-hole borehole measurements may be made at any time during the construction of a borehole, they are generally performed on completion thereof. In the event that such measurements need to be made before completion of the borehole, then the Drilling Contractor will be required to cease operations and facilitate access to the borehole for the duration of such activity. The contractor will be able to recover the cost of production loss (incurred for the duration that drilling activities are interrupted) against the rate specified for standing time in the Schedule of Rates, any claim in this regard to be verified and certified by the Hydrogeological Consultant.

The nature of the information to be gathered dictates the technique(s) to be used and the time required to complete these measurements. Basic information such as the depth of the borehole and the amount of steel casing installed therein is readily and cheaply determined by means of straightforward and uncomplicated instruments. Geophysical and geological information, on the other hand, requires the more costly application of specialized borehole logging instrumentation including the use of video cameras. It is required that the more sophisticated of these investigations: (1) be motivated to and authorised by the Implementing Authority prior to their execution and (2) be applied judiciously at the discretion of the Hydrogeological Consultant.

2.3.9.1 Borehole Construction Information

This includes information such as: (1) the depth and diameter(s) of the borehole, (2) the depth and diameter(s) of casing installed in the borehole and (3) the integrity of the casing. This information can be used to verify/check the documented construction details of a borehole. The depth of a borehole can be determined simply by plumbing with a weighted line. A calliper tool can be used to determine borehole and casing diameters and the length and integrity of the casing string. The length of steel casing can also be determined more simply with a sensor operating on electromagnetic principles.

2.3.9.2 Geological Information

This covers aspects such as identifying: (1) the nature of different rock formations occurring at various depths within a borehole on the basis of their geophysical (geo-electrical) properties and (2) the presence and size of fractures and/or fissures intersected by a borehole. This information can be used to: (1) calibrate surface geophysical data obtained from similar geological environments, (2) determine the optimum depth at which a borehole pump should be installed in a borehole and (3) direct the application of borehole yield stimulation activities such as hydro fracturing.

2.3.9.3 Hydrogeological Information

This includes information such as (1) the porosity of rock formations and (2) the rate of groundwater movement. These measurements generally require the use of more sophisticated and costly instrumentation.

2.3.9.4 Hydrochemical Information

This covers aspects such as the variation of groundwater quality with depth in a borehole. These measurements again require the use of generally more sophisticated instrumentation. Not quite in the same vein as these measurements, yet of probably greater importance, is the representative water sample obtained from a borehole during its development.

The water sample must be submitted to a laboratory as soon as is reasonably possible for chemical analysis of: (1) the electrical conductivity, (2) the nitrate concentration and (3) the fluoride concentration. These results will provide an early indication of whether the groundwater quality is acceptable or not and, if not, whether test pumping is warranted.

2.3.10 Rehabilitation of Existing Boreholes

The scope of this work may vary from the basic cleaning out and redevelopment of an existing borehole to the recovery of casing, the reaming and subsequent reinstallation of casing. As far as it is possible, the nature of the rehabilitation required in each individual instance should be identified prior to undertaking this activity since this will indicate which equipment will most suitably complete the task. This is illustrated in the following examples. The straight-forward cleaning out and redevelopment of an existing borehole can readily be accomplished using a rotary air percussion drilling rig. On the other hand, the recovery of casing and the removal of unnatural material from a borehole are more readily accomplished using a cable tool (jumper) drilling rig.

It is particularly helpful to both the Hydrogeological Consultant and the Drilling Contractor undertaking the rehabilitation to know as much about the original construction (e.g. depth, diameter, length and type of casing, geology, etc) of the borehole as possible. This is impossible in instances where original records are lost, deficient, vague or poorly documented/archived. It will be required in such cases to obtain as much information as can reasonably be gleaned from an in situ inspection of the borehole. This might include such basic measurements as plumbing the current depth of the borehole and establishing, by means of a casing detector, the length of casing (steel) installed, to carrying out various of the more sophisticated down-the-hole borehole measurements and observations.

The rehabilitation of an existing borehole should preferably be carried out under the supervision of the Hydrogeological Consultant. In any event, the execution of such work will be subject to the same degree of data collection and record keeping as is required of a new borehole.

The Drilling Contractor will be remunerated for this service on the basis of the rates bidded in the Schedule of Rates. It will be expected of the contractor to have assessed the potential technical risks involved with such work and, as a consequence, the contractor shall have no claim against any other party for the loss of equipment, materials or tools incurred in the course of such work.

2.3.11 Final Acceptance

The Hydrogeological Consultant shall accept a successfully finished community water supply or monitoring borehole by certifying the Drilling Contractor's invoice for such borehole as true and correct for payment by the Implementing Authority. At this stage, the Hydrogeological Consultant will have established that all aspects pertaining to the work and the final product meet, at least, those of the various criteria and requirements set out above which have been imposed.

3 TEST PUMPING SCOPE OF WORK

3.1 General

3.1.1	Testing of new boreholes for community water supply, resource and assessment, resource monitoring and management purposes.	yes
	Estimated Number of Boreholes	To confirm
3.1.2	Type of testing method to be applied	
	Calibration testing	Yes
	Stepped discharge testing	Yes
	Constant discharge testing	Yes
	Recovery testing	Yes
	Slug Testing	No
3.1.3	Type of pump considered appropriate	
	Positive displacement	Yes
	Line-shaft turbine	Yes
	Submersible	No
3.1.4	Testing of existing boreholes	
	Estimated total number	TBC (30)
	Estimated number equipped	Unspecified
	Removal of existing equipment required	Yes
	Re-installation of existing equipment required	Yes
3.1.5	Salient Information	
	Smallest borehole inside diameter (mm)	165
	Smallest cased inside diameter (mm)	152
	Estimated maximum pump setting installation depth (m)	120
	Estimated maximum depth to water level (m)	90
	Estimated maximum discharge line length (m)	500

Estimated yield range (l/s)	0.2 to 20
Estimated specialised testing yield range	20 to 40
Estimated maximum duration of constant discharge test (hr)	72
Tests with observation boreholes	yes

3.2 Test Pumping Specification

3.2.1 Application and Status

These Project Specifications describe the Works to be executed by the Contractor under the Contract and set out the requirements for the Works as well as the minimum standards to be achieved by the Contractor.

These Project Specifications are supplementary to the Standard Specifications for Test Pumping of Boreholes (hereinafter referred to as the "Standard Specifications") and set out variations, additions and omissions to the Standard Specifications and as such, shall be construed and interpreted in conjunction with such Standard Specifications.

These Project Specifications set out the variations, additions and omissions which shall be applicable in the Contract to the Standard Specifications and should there be any discrepancy, conflict or inconsistency between any part of the Standard Specifications and any part of these Project Specifications, the provisions of these Project Specifications shall take precedence and prevail in the Contract.

3.2.2 Interpretation

Wherever reference is made within the Standard Specifications and/or these Project Specifications to the "Geohydrological Consultant" and/or the "geohydrologist" and/or the "Consultant", it shall be deemed to mean the "Engineer" as defined in the Conditions of Contract.

Wherever reference (if any) is made within the Standard Specifications and/or these Project Specifications to the "Implementing Agent", the "Department of Water and Sanitation", "DWS" or any party not being the "Employer", the Contractor, the Engineer, the Geohydrological Consultant or the Consultant, it shall be deemed to mean the Employer.

3.2.3 Purpose and Scope

The Contract is for the test pumping of water supply boreholes for Department of Education purposes and all Works associated therewith in accordance with:

(1) the Information Provided to Bidder as per Section 1 of this document,

(2) any further detailed instructions as may be ordered by the Employer or the Hydrogeological Consultant.

The borehole test pumping services are required ffrom the date of award and no specific quantity of work has been identified. The Contract is based on a Schedule of Rates with payment to be made on the basis of measured quantities and the Bidded rates.

The Scope of Work to be actually executed by the Contractor will be as decided by the Engineer in consultation with the Employer, as provided for in the Conditions of Contract. The work to be carried out during the currency of the contract may be given as separate batches (referred to in the Conditions of Contract as "Works Segments"). Each Works Segment to be executed by the Contractor will, from time to time during the currency of the Contract, be detailed in a written instruction by the Consulting Hydrogeologist as provided for in the Conditions of Contract.

3.2.4 Test Pumping Equipment and Materials

The Contractor shall provide all labour, transport, plant, tools, materials and appurtenances, and shall perform all work necessary to satisfactorily complete the Works in accordance with the Standard Specifications.

The Contractor shall furnish all the particulars requested in this document. The capacity shall be sufficient to cope with the work as specified for the project. It shall be kept at all times in full working order and good repair. The Hydrogeological Consultant and or the Client will have the right to inspect the equipment to be used prior to the commencement of the Works. If the Hydrogeological Consultant and / or Employer considers that the plant in use on the site of the Works is in any way inefficient or inadequate in capacity, he shall have the right to instruct the Contractor to put such equipment in order within seven days or, alternatively, to remove such plant and replace it with other plant or equipment which he considers necessary to meet the requirements of the Contract.

In the event of breach by the Contractor of this requirement, the Hydrogeological Consultant reserves the right to recommend to the Client to terminate the Contract in accordance with the Conditions of Contract.

Equipment brought onto the site may not be removed there from without the written permission of the Hydrogeological Consultant. It will be the responsibility of the Contractor to arrive on site with all staff, equipment, materials and chemicals required to complete the work without interruption.

Where existing equipped boreholes are to be tested, the Contractor must provide suitable plant to enable the installed pumping equipment to be removed and reinstalled. This includes the removal and reinstallation of hand pumps, wind pumps and motorised pumps and may also include the recovery of existing pumping equipment that was previously dropped into a borehole.

3.2.5 Data Recording and Reporting

In addition to a site diary stating daily activities, borehole and pump test data as well as installed borehole equipment is to be recorded on the relevant forms included in Section 6 of the Contract Documents.

3.2.6 Measurement and Payment

The Contractor appointed under this contract is considered to be an expert in his field and is expected to organise and carry out the required duties in an expert manner. Problems encountered during test pumping will be overcome entirely within the framework of these Specifications and the Schedule of Rates, and no claims for extra payments will be entertained for problems foreshadowed in the Specification or due to limitations imposed by this Specification.

The measurement of and payment for all materials and work provided by the Contractor in the course of the project will be according to the criteria as set out and are applicable in respect of such as are variously specified in the Standard Specifications and hereunder:

3.2.6.1 Standing Time

This will cover periods when the test pumping rig and crew or, if more than one rig and crew are fielded, when all rigs and crews are idle waiting for decisions by the Consultant where those decisions or whose presence is required before the commencement or continuation of the work. Under no circumstances will standing time be payable for any delays other than those incurred by the Hydrogeological Consultant's decisions.

Except only for abnormal weather conditions as provided for in Sub-Clause 47.(2) of the Conditions of Contract, no standing time will be payable due to inclement weather or prevention of access to a site by the Contractor or Hydrogeological Consultant due to inclement weather. Further, no standing time will be payable to the Contractor in respect of any periods where the Contractor is not engaged in the execution of the Works as a result of the Consultant having failed to issue an instruction to commence with the works of any Works Segment and there being no other Contract Works on which the Contractor is required to carry out work.

3.2.6.2 Inter-hole Moves

Payment for inter-hole moves up to a distance of ten kilometres shall be made at the unit rate Bidded for in the Schedule of Rates. Inter-hole moves in excess of ten kilometres shall be remunerated for the first ten kilometres at the Bidded unit rate and, for each full kilometre thereafter, at the rate per kilometre Bidded in the Schedule of Rates.

3.2.6.3 6-6-3. Removal of Existing Pumping Equipment

This rate shall cover the removal of existing pumping equipment in a borehole to be tested. Payment for removal up to an installed depth of 50 m shall be made at the unit rate Bidded for in the Schedule of Rates. Installed depths in excess of 50 m shall be remunerated for the first 50 m at the Bidded unit rate and, for each full metre thereafter, at the rate per metre Bidded in the Schedule of Rates.

3.2.6.4 Re-installation of Existing Pumping Equipment

This rate shall cover the re-installation of existing pumping equipment in a borehole following test pumping of the borehole. Payment for installation up to a depth of 50 m shall be made at the unit rate Bidded for in the Schedule of Rates. Re-installation depths in excess of 50 m shall be remunerated for the first 50 m at the Bidded unit rate and, for each full metre thereafter, at the rate per metre Bidded in the Schedule of Rates. The existing pumping equipment shall be reinstalled and left in working condition as it was found before removal unless the Contractor is instructed otherwise by the Hydrogeological Consultant.

3.3 Standard Specifications for the Test Pumping of Boreholes

3.3.1 Purpose and Scope

The efficient operation and utilisation of a borehole requires insight into and an awareness of its productivity and that of the groundwater resource from which it draws water. Such insight and awareness is provided by borehole testing.

This activity, which is also known as test pumping, provides a means of identifying potential constraints on the performance of a borehole and on the exploitation of the groundwater resource. The recognition and understanding of these constraints promotes the proper, judicious and optimum exploitation of the groundwater resource. Ignorance and disregard of these constraints can lead, at best, to the uneconomical operation of the borehole and, at worst, to over-exploitation of the resource.

The Test Pumping Contractor (Test pumping Contractor) may be required to test either:

(1) newly drilled boreholes which have not yet been equipped, (2) existing "older" boreholes which may or may not already be equipped with pumping installations, or (3) a mixture of the aforementioned.

Test pumping serves two primary objectives. The first of these is an assessment of the productive capacity (yield potential) of the borehole. The second objective addresses the productivity of the groundwater resource. These objectives are met by various types of borehole tests performed separately and often sequentially. These are identified as:

(1) the calibration test, (2) the stepped discharge test, (3) the constant discharge test and (4) the recovery test. Factors determining which of these tests must be performed include: (1) the potential yield of the borehole and (2) the amount of water which it will be required to supply.

In instances where a slug is introduced, the water level will recede to its original level. The sudden removal of a quantity of water from the borehole will cause the water level to rise to its original level. The rate of recession or rise provides an indication of the yield of the borehole. In qualitative terms the more rapid this is, the higher the potential yield of the borehole.

(a) The Calibration Test

A calibration test requires that water be pumped from the borehole at three or more different rates over short (15 minutes), sequential periods of time. The response of the water level to each known pumping rate is measured and recorded. The calibration test provides a means of assessing the yield potential of borehole according to the magnitude of the water level decline associated with each pumping rate. This information is used to select appropriate pumping rates at which to perform a stepped discharge test or a pumping rate at which to perform a constant discharge test.

(b) The Stepped Discharge Test

Also known as a step drawdown test, it is performed to assess the productivity of a borehole. It also serves to more clearly define the optimum yield at which the borehole can be subjected to constant discharge testing if required.

The test involves pumping the borehole at three or more sequentially higher pumping rates each maintained for an equal length of time, generally not less than 60 minutes and seldom longer than 120 minutes. The magnitude of the water level drawdown in the borehole in response to each of these pumping rates must be measured and recorded in accordance with a prescribed time schedule. The actual pumping rate maintained during each "step" must also be measured and recorded. As a rule, the rate of water level recovery for a period of time immediately following the period of pumping should also be monitored according to the same time schedule as during pumping.

(c) The Constant Discharge Test

A constant discharge test is performed to assess the productivity of the aquifer according to its response to the abstraction of water. This response can be analysed to provide information in regard to the hydraulic properties of the groundwater system and arrive at an optimum yield for the medium to long-term utilisation of the borehole. This test entails pumping the borehole at a single pumping rate, which is kept constant for an extended period of time. The test duration shall not be less than 12 hours and, in some instances, might last up to 72 hours or more. The duration is generally determined by the importance, which is attached to the borehole and groundwater resource not only in terms of its yield potential but also in terms of its intended application.

The pumping rate is set at a yield, which it is considered the borehole and groundwater system will be able to maintain for the entire planned duration of the test and, in the process, utilising better than 70 per cent but not exhausting the available drawdown. It is critical that the pumping rate during the entire duration of the test be kept as constant as possible. The drawdown in water level in the borehole during the course of the test is again measured and recorded according to a prescribed time schedule. In the case of this type of test, it is imperative that water level measurements be made during the recovery period following the end of pumping.

(d) The Recovery Test

This test provides an indication of the ability of a borehole and groundwater system to recover from the stress of abstraction. This ability can again be analysed to provide information with regard to the hydraulic properties of the groundwater system and arrive at an optimum yield for the medium to long-term utilisation of the borehole.

Although referred to as a test, it rather represents a period of monitoring activity following a period of pumping. The rate at which the water level in the tested borehole (or any other borehole affected by the abstraction) recovers towards its starting level (the groundwater rest level before pumping started) is monitored in this period. The duration of this monitoring is generally equal to that of the preceding period of pumping unless the rate of recovery is sufficiently rapid so that the starting water level is reached in a shorter period of time.

3.3.2 General Approach and Methodology

As mentioned in subsection 3.3.1, various factors determine which type of pumping test (or tests) might need to be performed. It is the responsibility of the Hydrogeological Consultant to formulate a test pumping schedule for each successful borehole.

All project-related test pumping activities will also be carried out under the direct supervision of the Hydrogeological Consultant. The execution of a pumping test in accordance with established scientific protocols must be undertaken by a suitably experienced and equipped Test pumping Contractor. It will be the task of the Hydrogeological Consultant to evaluate and analyse the data, draw conclusions with regard to the productivity of the borehole and the aquifer, and make recommendations with regard to a suitable operating schedule for the borehole and the optimum exploitation of the groundwater resource.

Both the practical and analytical aspects of test pumping benefit greatly from prior information regarding the borehole and the aquifer which it taps into. This information is gleaned during the drilling and the construction of the borehole. It includes knowledge of: (1) the amount of water blown out of the borehole during drilling operations, (2) the depth(s) at which water was struck in the borehole, (3) the construction of the borehole in terms of the setting of especially perforated (slotted) casing and (4) the nature of the rock formation at the depth(s) where water was struck. This information should be communicated to the Test pumping Contractor by the Hydrogeological Consultant. If not, the contractor has the right to request and expect to receive this information from the Hydrogeological Consultant prior to the testing of any borehole.

The Test pumping Contractor must keep a full record of the test pumping which was undertaken and provide this on completion of the test. This record must include the following basic information: (1) the depth to water level before the start of testing, (2) the depth at which the test pump was installed, (3) the type, make and model of the test pump used, (4) the pumping rate as measured at regular intervals during the test and (5) the water level in the borehole as measured according to a prescribed time schedule both during and after pumping, (6) the depth to which steel casing was installed in the borehole. The contractor must be sufficiently well equipped to gather this information with acceptable accuracy.

3.3.3 Equipment and Materials

These represent the test unit and all ancillary equipment and materials needed to accurately and efficiently perform borehole testing. Details are provided as follows.

(a) Test Unit

The test unit must comprise a positive displacement (PD) type pump element and a pump head driven by a motor fitted with an accelerator, gearbox and clutch. The unit must be in good working order and capable of maintaining a minimum of 72 hours of continuous operation.

The unit must be capable of delivering water at a rate in excess of the expected maximum yield of the borehole to be tested.

(b) Discharge Piping

This comprises both the pipe (rising main or pump column) which brings the water to surface and the pipe (discharge hose) used to lead the pumped water away from the borehole being tested. The Test pumping Contractor must supply sufficient rising main to set the test pump at a depth of at least 100 m below the surface. It may, however, be required under certain circumstances to set the test pump at a greater depth in the borehole. The pump column must be of uniform diameter throughout. The contractor must also provide discharge piping in the amount of at least 50 m. This must be free of leaks for its entire length. It may again, under certain circumstances, be required to discharge the pumped water at a point further away than 50 m (possibly in excess of 300 m) from the borehole being tested. In such instances, a similar procedure to that discussed above in regard to the rising main must be followed.

(c) Discharge Measuring Equipment/Instrumentation

This must be adequate to accurately measure the pumping rate within the range of yields expected from successful project boreholes. If volumetric methods are used, a stopwatch for measuring time to an accuracy of at least one-tenth of a second is required. The full capacity of each container must be determined accurately. The contractor must also ensure that a container stands level when it is being used for discharge measurements. Guidelines regarding the use of different size containers for volumetric discharge rate measurements in specific yield ranges are given below:

YIELD RANGE	CONTAINER SIZE
Less than 2 ℓ/s	20 ℓ
2 ℓ/s to 5 ℓ/s	50 ℓ
5 ℓ/s to 20 ℓ/s	210 ℓ
20 ℓ/s 30 ℓ/s	500 ℓ

It is recognized that some water leakage will generally occur especially at the borehead during pumping. This is acceptable provided that: (1) such leakage does not interfere with any water level monitoring and (2) the total amount of leakage to the end of the discharge pipeline does not exceed one per cent of the pumping rate as measured at the end of this pipeline.

(d) Water Level Measuring Equipment/Instrumentation

The contractor must provide at least three water level measuring devices which are each capable of providing an accuracy of at least 0,01 m (10 mm) and are of sufficient length to match the pump installation depth. If ungraduated electrical contact meters (dipmeters) are used for this purpose, each such instrument must be equipped with a measuring tape of an acceptable length and approved standard and which is graduated to an accuracy of at least 0,01 m (10 mm). These instruments must be in good working order and number at least one spare for each two on site

The contractor must further provide conduit tubing of sufficient length to match the pump installation depth. The diameter of this tube must be large enough (minimum 15 mm) to allow free movement of the dipmeter probe and cable therein. The tubing must be made of material strong enough to withstand reasonable pressure on its sidewall which might cause a constriction. The tube must be open at its lower end to allow the free entrance of water into the tube. This is facilitated by perforating the bottom section of the conduit tube sidewall. Precautions should also be taken to prevent the dipmeter probe from passing beyond the bottom end of the conduit tube and, as a result of entanglement, not able to be withdrawn.

(e) Other Materials

No pumping test should commence without field data sheets on which to record all data and information relevant to the test pumping activities in an acceptable format. The examples provided in Section 6 of the Contract Documents indicate the format and level of detail which is required of these data sheets. The contractor must also provide backup measuring equipment and instrumentation which is immediately available to replace any similar item which may become damaged or broken during the course of the test such that measurements are no longer accurate or reliable.

3.3.4 Arrival-on-site Actions

The contractor must firstly establish whether the borehole is equipped or not. If so, the contractor will be required to: (1) remove the equipment taking care not to damage either it or the installation, (2) inspect the equipment for defects and (3) note down all particulars regarding the equipment and the installation.

The latter includes but should not be limited to the manufacture and type of pump (and motor if motorised), the depth to which the pump was installed, the power rating of the motor and the diameter, length and quantity of pump column sections. The contractor must next establish whether there are any other boreholes in the vicinity of that to be tested. If so, then the following information must be gathered and recorded for each: (1) the straight-line distance (in metres) between each such borehole and that to be tested, (2) whether the borehole is equipped, open or sealed and, if equipped (3) whether the installation is operational or not. Depending on the degree of access allowed by such a borehole, the contractor must establish whether there is water in the borehole and if so, measure and record: (1) the depth to the groundwater rest level, (2) the height of the borehole collar above ground level and where possible also (3) the depth of the borehole.

The final activities to be carried out prior to the actual installation of the test pump into the borehole to be tested must involve measuring and recording: (1) the diameter of the borehole, (2) the depth of the borehole as determined by means of a weighted line or plumb bob and (3) the depth to the groundwater rest level in the borehole, again referenced to a date.

An example of a field data sheet for recording the above information is presented in Section 6 of the Contract Documents. Payment for this work shall be incorporated into that for data recording.

3.3.5 Test Pump Installation

The conduit tube should be attached and secured to the first section of pump column behind the pump element and the test pump installed to the required depth, attaching and securing the conduit tube to the riser main every 2 to 3 m.

The Test pumping Contractor will be remunerated for the installation of a test pump per linear metre of depth installed at the rate Bidded as set out in the Schedule of Rates. The rate Bidded for this activity shall also apply to the withdrawal of the test pump from the borehole on completion of all testing activities.

3.3.6 Equipment Set-up and pre-test Actions

Where possible, the discharge pipe must be laid out in a downhill direction from the borehole to be tested unless this will take it in the direction of or past another borehole located in the vicinity of that to be tested. In such instances, lay the discharge pipe out in a downhill direction which will take its furthest end as far as possible away from any other borehole in the vicinity.

In field situations where the terrain is extremely flat, the length of the discharge pipe must be extended from 50 m to at least 300 m if any possibility exists that the discharged water may infiltrate to the groundwater resource within the radius of influence of the test.

A final decision in this regard must be made by the Hydrogeological Consultant and communicated to the contractor. The dipmeter should be inserted into the installed conduit tube and run down this tube to the bottom to make sure that it passes freely along the full length of the tube. If the dipmeter used is not graduated to an accuracy of 0,01 m, mark the position on the dipmeter cable where it indicates the depth to the groundwater rest level and attach the end of the graduated tape at this position on the cable ensuring that the zero mark of the graduated tape corresponds exactly to this mark. Slowly lower the dipmeter and graduated tape down the conduit tube, in the process securing the tape to the dipmeter cable every 2 to 3 m. Ensure that there is no slack between each point where the tape is secured to the dipmeter cable. Also make sure that the dipmeter cable and graduated tape combination passes freely along the full length of the conduit tube.

The Test pumping Contractor shall be remunerated for this work per set-up at the rate Bidded for one such activity as set out in the Schedule of Rates.

3.3.7 Final pre-test Measurements

The Contractor shall ensure that all the basic information required on the field data sheet has been collected and recorded as completely as possible. The basic information data entry fields can be used as a checklist for information to be measured/collected and recorded. The Contractor shall not guess at any information which has not been measured.

Payment for this work shall be incorporated into that for data recording and reporting.

3.3.8 Data Recording

(a) Discharge Measurements

The measurement of discharge (yield or pumping rate) must be consistently accurate and reliable. The method of measurement must be appropriate to meet this requirement. Where volumetric calculation methods are applied, time will be measured using a stopwatch and the container volume must be accurately known. The volumetrically measured yields recorded on the field data sheets must be based on the average obtained from a set of three sequential measurements.

(b) Water Level Measurements

The periodicity of water level measurements for each type of test are given in the data recording forms in Section 6 of this document. This information must be filled in as a record of all data collection activities carried out for a pumping test.

The type of water level measurement values required to be recorded on the field data sheet are the actual (or true) drawdown values. These represent measurements which reflect the depth of the water level below the groundwater rest level depth, i.e. which already take into account the groundwater rest level depth below the reference measuring point. It should be noted that the more basic type of measurement which reports the depth of the dynamic water level as a distance below the reference measuring point, ie which combines the depth of the water level below the groundwater rest level depth and the depth of the groundwater rest level below the reference measuring point, gives only an apparent (or false) drawdown value. All water level measurements must be measured to an accuracy of at least 0,01 m (10 mm). The water level data must be plotted on the semi-logarithmic graph paper provided with each set of field data sheets. The plotting of these data must take place as the test proceeds, i.e. each water level measurement must be plotted on the graph as soon as possible after it was measured. The field data sheets and accompanying water level graphs must be shown to any authorised supervisory personnel at request and will be up-to-date at the time of such request.

(c) Other Information

The Test pumping Contractor must also record any extraordinary observations made during the test. These may include: (1) changes in the colour of the discharged water, (2) changes in the turbidity of the discharged water, (3) the presence of air in the discharged water, and (4) rainfall events which occur during a test. Remuneration for all data collection and recording activities by the Contractor in the course of a pumping test shall be incorporated into an hourly rate as set out in the Schedule of Rates.

3.3.9 Groundwater Sampling

Sampling for Macro-element Analysis

A water sample should be collected from the end of the discharge pipeline no sooner than 15 minutes before the scheduled end of a pumping test whether this be of a calibration, stepped discharge or constant discharge nature. This will ensure that a water sample is collected in case testing does not proceed to include either one or both of the latter two types of test. The standard amount of sample normally collected is in a clean, sterilised plastic bottle of capacity 240 millilitre or greater and equipped with a watertight screw-on cap. This is the standard issue sample bottle provided by the DWS. Depending on the analysing laboratory's requirements, however, a sample of up to two litres in volume may have to be collected. The Hydrogeological Consultant will advise on this matter in instances where the contractor is required to collect samples, in which case the consultant will provide ampoules containing preservative chemicals if required. All other materials such as sample bottles, tie-on labels and sample custody are to be provided by the contractor.

(a) Sampling Procedure

Wash hands thoroughly and rinse the sample bottle three times with the water to be sampled, i.e. that being pumped from the borehole. Fill the bottle so that a space of five to ten millimetres is left at the top. Add the preservative as instructed in (b).

(b) Sample Preservation

Gently tap the bottom of an ampoule of preservative on a firm surface so that all the chemical flows to below the constriction. Hold the ampoule firmly upright with thumbs placed either side of the constriction, flex off the neck, turn the ampoule upside down and place it in the bottle together with the broken-off neckpiece. Firmly screw on the cap of the sample bottle after rinsing it well with water from the borehole. Shake the capped sampled bottle well. Caution should be exercised when handling the preservative since this chemical is poisonous.

(c) Sample Custody

Place the sample bottle in a cooler or icebox and keep it stored under chilled conditions. The water sample will be collected by the Hydrogeological Consultant.

3.3.10 Aborted Tests and Breakdowns

The Hydrogeological Consultant may at any stage during the execution of a pumping test request the Test pumping Contractor to abort a test if, in the opinion of the consultant, continuation of the test is not in the interests of the project. Factors which might contribute to such a decision by the Hydrogeological Consultant are: (1) sufficient data having been collected for an adequate scientific evaluation thereof, (2) the execution of the test not meeting project criteria and requirements (such as for constancy of yield, accuracy of yield measurements or accuracy of water level measurements, sufficiency of discharge line length, etc) or (3) a mechanical breakdown occurring during pumping which causes a test to be interrupted or aborted.

(a) Tests aborted due to sufficiency off data

In such instances, the Test pumping Contractor will be remunerated for the actual duration of testing (including recovery testing) at the hourly rates set out in the Schedule of Rates.

(b) Tests aborted due to incorrect execution

The Test pumping Contractor will be required to remedy the cause(s) for an abort decision by the Hydrogeological Consultant. The test shall be restarted, as if it were the first attempt, after the water level has recovered to within five per cent of the pre-test rest water level or the contractor is instructed thereto by the Hydrogeological Consultant. The Test pumping Contractor shall not be entitled to remuneration for any test which is aborted under these circumstances irrespective of the time elapsed up to receipt of the instruction to abort.

(c) Tests aborted due to breakdowns

The following procedures are recommended when a mechanical breakdown occurs during pumping which causes a test to be interrupted or aborted.

Calibration Test:

Start immediately with the measurement and recording of the water level recovery rate according to the periodicity given in reporting forms. Irrespective of how long after the start of pumping the breakdown occurs or how rapidly the breakdown can be fixed, continue with water level recovery measurements until the water level is within five per cent of the pre-test rest water level or, at the discretion of the Hydrogeological Consultant, may be discontinued. Restart the calibration test as if it is the first attempt. The Test pumping Contractor shall not be entitled to remuneration for a calibration test which is aborted under such circumstances.

Stepped discharge test:

Record the time of the breakdown and start immediately with the measurement and recording of the water level recovery according to the periodicity given in reporting forms. If the breakdown occurs during the first or second steps of the test, continue with water level recovery measurements until the water level is within five per cent of the start rest water level and then restart the stepped discharge test as if it is the first attempt. If the breakdown occurs during the third step of the test, can be fixed and the pump restarted to produce the same yield (as before the breakdown) within five minutes of the breakdown occurring, continue with the test at this yield after measuring and recording the water level immediately before restarting the pump. Only one such breakdown event is allowed.

If a second breakdown occurs, proceed as described for a first step breakdown. If the breakdown occurs during the fourth or later step of the test, can be fixed and the pump restarted to produce the same yield (as before the breakdown) within five minutes of the breakdown occurring, continue with the test and complete it at this yield after measuring and recording the water level immediately before restarting the pump. If a breakdown at this stage cannot be fixed within five minutes, continue with water level recovery measurements as if the test has been fully completed. The Contractor shall not be entitled to remuneration for a stepped discharge test, which is aborted: (1) within the first or second step, or (2) within the third step and cannot be restarted within the time allowed for repair.

Constant discharge test:

Note the time of the breakdown and start immediately with the measurement and recording of the water level recovery according to the periodicity given in reporting forms.

If the breakdown occurs within the first two hours after the start of pumping, continue with water level recovery measurements until the water level is within five per cent of the pre-test (start) rest water level and then restart the test. If the breakdown occurs later than two hours into the test, can be fixed and the pump restarted to produce the same yield as before the breakdown within the time periods (after the breakdown occurring) given in Table 3-1, continue with the test at this yield after measuring and recording the water level immediately before restarting the pump.

If the breakdown cannot be fixed and the pump started within one hour of the breakdown occurring, continue with water level recovery measurements until the water level is within five per cent of the pre-test rest water level and then restart the constant discharge test as if it is the first attempt unless the following condition has been met. If the breakdown occurs after approximately 80 per cent of the planned duration of the constant discharge test has been successfully completed, continue with water level recovery measurements as if the test has been fully completed. The allowable elapsed time (in hours) in regard to selected constant discharge test total durations in order for this specification to be acceptable is given in Table 3-2.

Table 3-1: Period allowed for breakdown repair and continuation of testing

TIME BREAKDOWN AFTER START	PERIOD ALLOWED FOR REPAIR OF TEST
2 hours to 4 hours	6 minutes
4 hours to 6 hours	12 minutes
6 hours to 8 hrs hours	18 minutes
8 hours to 10 hours	24 minutes
10 hours to 12 hours	30 minutes
12 hours to 14 hours	36 minutes
14 hours to 16 hours	42 minutes
16 hours to 18 hours	48 minutes
18 hours to 20 hours	60 minutes
Longer than 20hrs	60 minutes

Table 3-2: Period after which a constant discharge test may be considered completed in the event of a breakdown

CONSTANT DISCHARGE TEST	ALLOWABLE TIME ELAPSED TO BREAKDOWN
24 hours	20 hours (equivalent to 80% of total time
36 hours	30 hours (equivalent to 83% of total time
48 hours	38 hours (equivalent to 79% of total time
72 hours	60 hours (equivalent to 77% of total time

The Test pumping Contractor shall not be entitled to remuneration for a constant discharge test, which is aborted under circumstances, which preclude its restart within the time allowable for repair and continuation. The contractor will, however, be entitled to remuneration for a constant discharge test which is aborted after approximately 80 per cent of the planned duration of the constant discharge test (refer to Table 5-10-1) has been successfully completed, payment being made for the actual duration of the test (including the recovery test) at the hourly rates set out in the Schedule of Rates.

4 APPENDIX 1: SCHEDULE OF RATES - DRILLING

1-0 Specialised Drilling of borehole for MTHAMBALALA SECONDARY SCHOOL					
Item No.	**Description**	**Unit**	**Qty**	**Rate**	**Amount R / c**
1-0	**Establishment of Own Facilities on Site** – All listed items to be available on each site – according the 'Occupational Health and Safety specification for Contractual work) – Document will be signed by successful bidder. - GPS, Accommodation (Tents, caravans etc.) - Dedicated wash area (shower, basin etc.) - Dedicated area for food preparation, - Demarcated area for fuel, oil etc. - Medical kit, Demarcation barrier (Not danger tape) - Protection clothing (Hard hat, safety shoe, etc.) - Overalls with contractors name and/or logo Contractors will be monitored by Consultants. This will include instructions to improve etc. reporting to the client and actions taken.				
1-1	Establishment of Own Facilities on Site	Sum	1		
1-2	Mobilisation and set-up of plant to/at first borehole	Sum	1		
1-3	Set-up of plant per boreholes (after first) up to 10km	No	0		Rate Only
1-4	Inter hole moves				
1-4-1	For distances exceeding 10 km	Km	0		Rate Only
1-5	De-establishment from site	Sum	1		
2-0	**DRILLING (Unconsolidated sediments and igneous, metamorphic and fractured carbonate rocks, may apply Foam where required)**				
2-1	Symetrix/Odex (including supply, delivery & installation of at least 6mm sidewall Symetrix/Odex casing)–loose/fractured formation–boulders and sand				
2-1-1	194mm OD (Including casing)	m	0		Rate Only
2-1-2	219mm OD (Including casing)	m	50		
2-1-3	273mm OD (Including casing)	m	0		Rate Only
3-0	**DRILLING (Highly abrasive rocks e.g. quartzite)**				
3-1	Symetrix/Odex (including supply, delivery & installation of at least 6mm sidewall Symetrix/Odex casing)				
3-1-1	194mm OD (Including casing)	m	0		Rate Only
3-1-2	219mm OD (Including casing)	m	0		Rate Only
3-1-3	273mm OD (Including casing)	m	0		Rate Only
				Sub-total carried over	

1-0 Specialised Drilling of borehole for MTHAMBALALA SECONDARY SCHOOL					
Item No.	**Description**	**Unit**	**Qty**	**Rate**	**Amount R / c**
			Sub-total brought forward		
4-0	**DRILLING (Leached / cavernous carbonate rocks)**				
4-1	Symetrix/Odex (including supply, delivery & installation of at least 6mm sidewall Symetrix/Odex casing)				
4-1-1	194mm OD (Including casing)	m	0		Rate Only
4-1-2	219mm OD (Including casing)	m	0		Rate Only
4-1-3	273mm OD (Including casing)	m	0		Rate Only
5-0	**CASING (supplied, delivered and installed)**				
5-1	uPVC (flush internal / external thread-jointed, plain)				
5-1-1	144/150mm ID (minimum wall thickness 7mm)	m	12		
5-1-2	181mm ID (minimum wall thickness 8.5mm)	m	0		Rate Only
5-1-3	203mm ID (minimum wall thickness 9.1mm)	m	0		Rate Only
5-1-4	227mm ID (minimum wall thickness 11mm)	m	0		Rate Only
5-2	uPVC (flush internal / external thread-jointed, perforated)				
5-2-1	127mm ID (minimum wall thickness 6mm)	m	0		Rate Only
5-2-2	144/150mm ID (minimum wall thickness 6mm)	m	38		
5-2-3	165mm ID (minimum wall thickness 7mm)	m	0		Rate Only
5-2-4	181mm ID (minimum wall thickness 8.5mm)	m	0		Rate Only
5-2-5	203mm ID (minimum wall thickness 9.1mm)	m	0		Rate Only
5-2-4	227mm ID (minimum wall thickness 11mm)	m	0		Rate Only
6-0	**CASING SHOES – For drill & drive – on instruction from client/consultant only**				
6-1	To fit 165 mm ID steel casing	m	0		Rate Only
6-2	To fit 215 mm ID steel casing	m	0		Rate Only
6-3	To fit 254 mm ID steel casing	m	0		Rate Only
7-0	**REAMING OF BOREHOLES (Reaming bids must be available)**				
7-1	152 mm / 165 mm to 203 mm or 219 mm diameter	m	0		Rate Only
7-2	203 mm or 219 mm to 254 mm diameter	m	0		Rate Only
7-3	152 mm or 165 mm to 254 mm diameter	m	0		Rate Only
8-0	**RECOVERY OF STEEL CASING**	m	0		Rate Only
9-0	**FORMATION STABILISER (supplied, delivered and installed) – See specifications.**	Per/kg	0		Rate Only
10-0	**CONCRETE COLLAR (complete per borehole)**	No	1		
11-0	**SANITARY SEAL (complete per borehole) per m – maximum five metres**	No	1		
12-0	**BOREHOLE DISINFECTION (complete per borehole)**	No	1		
				Sub-total carried over	

1-0 Specialised Drilling of borehole for MTHAMBALALA SECONDARY SCHOOL					
Item No.	**Description**	**Unit**	**Qty**	**Rate**	**Amount R / c**
			Sub-total brought forward		
13-0	**BOREHOLE PROTECTION (complete per borehole) (including casing lid – refer to Drawing No. 10)**				
13-1	Borehole ϕ 165 casing lid (obtainable from DWS refer to Drawing No. 10) (Borehole Protection)	No	1		
14-0	**BOREHOLE MARKING (complete per borehole) (refer to Drawing No. 9)**	No	1		
15-0	**DATA RECORDING AND REPORTING (complete per borehole)**	No	1		
	It is required that all payment certificates be accompanied by proof that the required data recording and reporting was submitted for entry onto the NGA The invoices of the contractors will not be certified for payment if it does not comply with the above requirements.				
16-0	**Development of Borehole (also for blow yield)**	Hr	1		
17-0	**STANDING TIME RATE (rate only)**	Hr	1		
18-0	**BOREHOLE REHABILITATION**				
18-1	With rotary air percussion drilling rig with foam	Hr	0		Rate Only
19-0	**Casual (Day) labour sourced locally**	Day	0		Rate Only
	TOTAL CARRIED FORWARD TO SECTIONAL SUMMARY (VAT excluded)				

5 APPENDIX 2: SCHEDULE OF RATES - TEST PUMPING

2-0 Test pumping of boreholes for MTHAMBALALA SECONDARY SCHOOL					
Item No.	**Description**	**Unit**	**Qty**	**Rate**	**Amount R / c**
1-0	**ESTABLISHMENT, PLANT SET-UP, INTER-HOLE MOVES AND DE-ESTABLISHMENT.**				
1-1	**Establishment of Own Facilities on Site** – All listed items to be available on each site – according the 'Occupational Health and Safety specification for Contractual work) – Document will be signed by successful tenderer. - GPS, - Accommodation (Tents, caravans etc.) - Dedicated wash area (shower, basin etc.) - Dedicated area for food preparation, - Demarcated area for fuel, oil etc. - Medical kit, - Demarcation barrier (Not danger tape) - Protection clothing (Hard hat, safety shoe, etc.) - Overalls with contractors name and/or logo - Contractors will be monitored by Consultants. This will include instructions to improve etc. reporting to the client and actions taken.	Sum	1		
1-2	Mobilisation and set-up of plant to/at first borehole	Sum	1		
1-3	Set-up of plant per boreholes (after first)	No	0		Rate Only
1-4	Inter-hole moves				
1-4-1	For distances up to 10 km	No	0		Rate Only
1-4-2	For distances exceeding 10 km	Km	0		Rate Only
1-5	De-establishment from site	Sum	1		
2-0	**TEST PUMPING**				
2-1	Installation of Test Pump **(depth up to 80m)**				
2-1-1	For yield up to 10 ℓ/s	No	1		
2-1-2	For yield greater than 10 ℓ/s to max 25l/s	No	0		Rate Only
2-2	Installation of Test Pump **(per metre over 60m up to 120m)**				
2-2-1	For yield up to 10 ℓ/s	m	0		Rate Only
2-2-2	For yield greater than 10 ℓ/s to max 25l/s	m	0		Rate Only
2-3	Laying out of Discharge Hose				
2-3-1	Minimum of 100m	No	1		
2-3-3	100m to 300m (extra-over 100m)	m	0		Rate Only
2-4	Slug Test	No	0		Rate Only
2-5	Calibration Test up to 25l/s	Hr	1		
		Sub-total carried over			

2-0 Test pumping of boreholes for MTHAMBALALA SECONDARY SCHOOL					
Item No.	**Description**	**Unit**	**Qty**	**Rate**	**Amount R / c**
		Sub-total brought forward			
2-6	**Stepped Discharge Test (Maximum 120m**				
2-6-1	For yield up to 10 ℓ/s not deeper than 60m	Hr	4		
2-6-2	For yield >10 ℓ/s <25l/s up to 60m	Hr	0		Rate Only
2-6-3	For yields >20l/s but < 40l/s –max depth=60m	Hr	0		Rate Only
2-6-4	For yield up to 10 ℓ/s deeper than 60m <120m	Hr	0		Rate Only
2-6-5	For yields >10 ℓ/s <25l/s deeper than 60m <120m	Hr	0		Rate Only
2-7	**Constant Discharge Test (Maximum 120m**				
2-7-1	For yield up to 10 ℓ/s not deeper than 60m	Hr	24		
2-7-2	For yield >10 ℓ/s <25l/s up to 60m	Hr	0		Rate Only
2-7-3	For yield up to 10 ℓ/s deeper than 60m <120m	Hr	0		Rate Only
2-7-4	For yields >10 ℓ/s <25l/s deeper than 60m <120m	Hr	0		Rate Only
2-8	Recovery measurement after paragraph 2-5, 2-6, 2-7	Hr	24		
2-9	Borehole Disinfection (complete per borehole)	No	1		
2-10	Obtain & fit Borehole ϕ 165 casing lid (Borehole Protection)	No	0		Rate Only
2-11	Borehole Marking Rate Only	No	0		Rate Only
2-12	Site Finishing (complete per borehole)	No	1		
3-0	**DATA RECORDING AND REPORTING (Complete per borehole) Including measurements – Before & after installation of test equipment – depth & water level and Casing detection** ***IT IS REQUIRED THAT ALL PAYMENT CERTIFICATES BE ACCOMPANIED BY PROOF THAT THE REQUIRED DATA RECORDING AND REPORTING WAS SUBMITTED FOR ENTRY ONTO THE REGIONAL GRIP DATABASE AND NGA***	Per/bh	1		
	The invoices of the contractors will not be certified for payment if it does not comply with the above requirements.				
4-0	**WATER LEVEL MONITORING PER OBSERVATION BOREHOLE**	Hr	1		
5-0	**CHEMICAL ANALYSIS OF WATER SAMPLE (macro-elements only) – TO BE COLLECTED DURING TEST.**	Sum	1		
6-0	**STANDING TIME RATE**	Hr	0		Rate Only
7-0	**CASUAL (DAY) LABOUR SOURCED LOCALLY Per person**	Day	1		
8-0	**Water testing and reporting – water sample to be tested by an approved water testing laboratory and report to be provided on the quality of water including recommendation on the suitable water treatment solution**	Item	1		
		Sub-total carried over			

2-0 Test pumping of boreholes for MTHAMBALALA SECONDARY SCHOOL					
Item No.	Description	Unit	Qty	Rate	Amount R / c
			Sub-total brought forward		
9-0	Hydrogeological investigation report provided by a qualified Geotechnical Engineer detailing: 1) Geophysical survey results 2) Drilling results 3) Pump testing results 4) Water quality results Recommendation for usage and treatment of ground water	Item	1		
	TOTAL CARRIED FORWARD TO SECTIONAL SUMMARY (VAT excluded)				

6 APPENDIX 3: SCHEDULE OF RATES - PUMP SUPPLY AND INSTALLATION

3-0 Pump Supply and Installation for MTHAMBALALA SECONDARY SCHOOL

Item	Description	Unit	Qty	Rate	Amount
1-0	**Pump supply and installation**				
1-1	Trenching - rising main (soft)	m	175		
1-2	Trenching - Electrical cable to DB (soft)	m	50		
1-3	Excavation in all materials for cabling and water pipes including backfilling, compaction, reinstatement and disposal off site of all surplus materials.	m^3	25		
1-4	Commissioning	Sum	1		
	PUMP SUPPLY				
1-5	1.5 KW FRANKLIN MOTOR AND PUMP (or equivalent, to be approved by the Engineer)	No	1		
1-6	STANDARD CONTROL BOX (similar to fig. 1.1) to be lockable and weather proof and be installed on a concrete base)	No	1		
	FITTINGS AND PROTECTION				
1-7	Protective pump housing (concrete ring with lockable galvanized steel lid as per DWG NO.447/Sk102)	No.	1		
1-8	Piping HDPE 40 mm PE 100 Class 16 - Borehole riser	m	150		
1-9	Piping HDPE 40 mm PE 100 Class 16 - Rising Main	m	175		
1-10	16mm² 2 core 600/1000V rated PVC/SWA/ECC cable (down the borehole). Include for 2 No. termination	m	265		
1-11	16mm² 3 core 600/1000V PVC waterproof submersible. Include 2No. termination.	m	56		
1-12	16mm² 2 core 600/1000V rated PVC/SWA/ECC cable (borehole to DB in 50mm PVC sleeve including radius bends and conduits). Include for 2No. termination	m	97		
1-13	Safety Rope (minimum 12mm diameter SAB approved nylon safety rope)	m	100		
1-14	Pump Fittings and Compression fittings (all HDPE pipe fittings to be PN 16 SABS approved)	sum	1		
1-15	In-Line Klorman Feeder + 16 x Feeder Cartridges & Lamotte Chlorine Test Papers 0 – 10 ppm (or equally approved, to be approved by the Engineer)	Sum	1		
1-16	Supply and installation of 15A curve D Circuit Breaker 5kA fault level to existing main board including working on and updating the main board and legend card	Sum	1		
1-17	Supply and install combination of 10 amp circuit breaker and 20 amp double pole contactor in the existing distribution board	No.	1		
1-18	Supply and install surface mounted 20 amp isolator switch with indicator light	No.	1		
1-19	Electrical Compliance certificate	sum	1		
1-20	Supply and install 25 mm mild steel galvanised conduit	m	46		
1-21	Supply and install 200 mm x 200 mm York Box	No.	1		
				Sub-total carried over	

3-0 Pump Supply and Installation for MTHAMBALALA SECONDARY SCHOOL					
Item No.	**Description**	**Unit**	**Qty**	**Rate**	**Amount R / c**
			Sub-total brought forward		
2-0	**Tank stand**				
2-1	Elevated Tank stand and fittings and 5000l Jojo Tank (as per specification – Drawing No. 447/Sk100)	no	1		
2-2	HDPE Piping 40 mm PE100 PN 16 SABS approved	m	50		
3-0	**Reticulation**				
3-1	Trenching - feeding main (soft)	m	100		
3-2	HDPE Piping 40 mm PE100 PN 10 SABS approved - feeding main	m	100		
3-3	Installation of Tap Stand in accordance with Drawing No.447/Sk101	Sum	1		
	TOTAL CARRIED FORWARD TO SECTIONAL SUMMARY (VAT excluded)				

WIMS NO. 060602
SUMMARY OF BIDDED PRICES

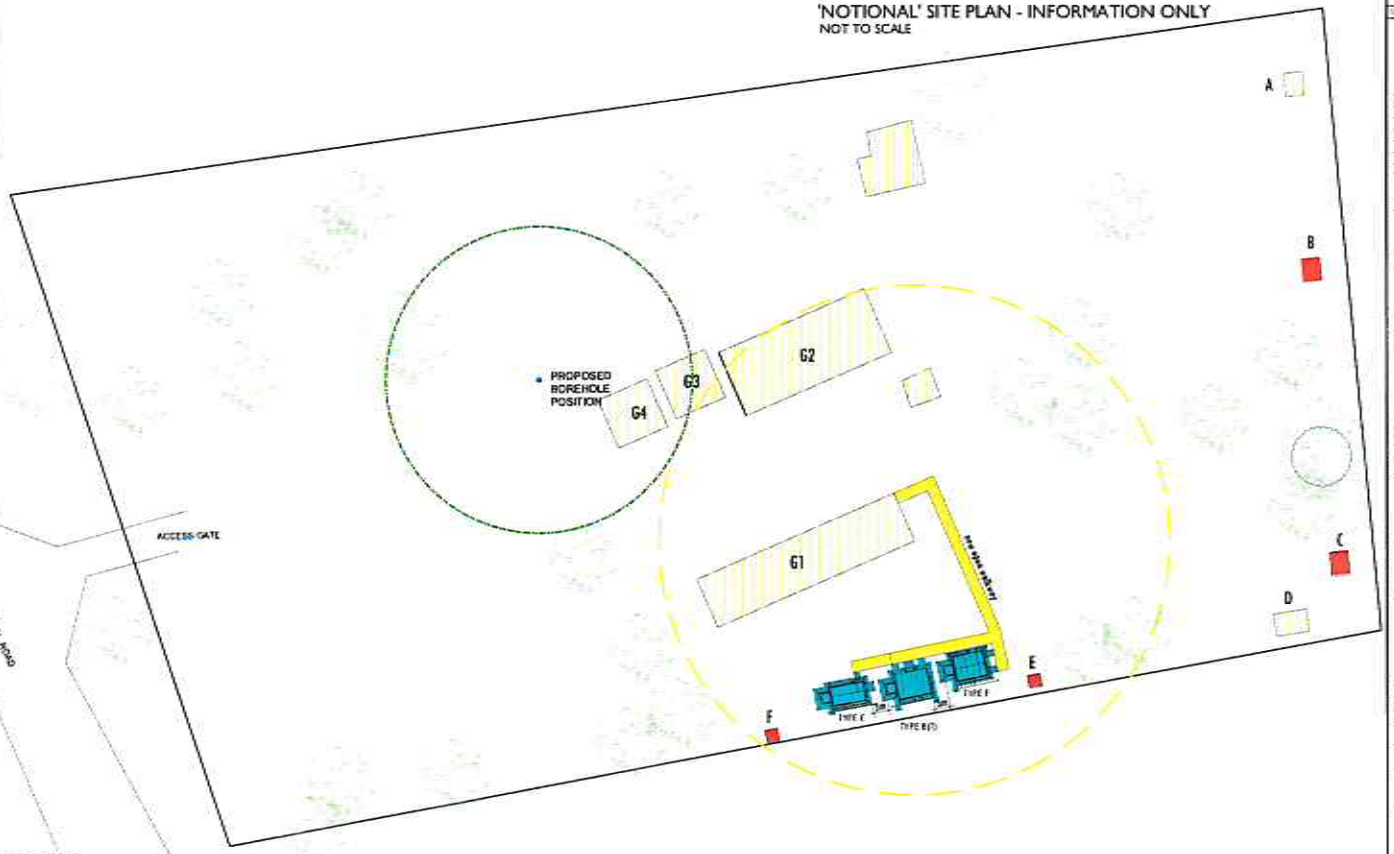
MTHAMBALALA SECONDARY SCHOOL	**AMOUNT BIDDED**
1. Specialised Drilling: Mthambalala Secondary School	
2. Pump Testing: Mthambalala Secondary School	
3. Pump Supply and Installation: Mthambalala Secondary School	
TOTAL AMOUNT BIDDED (VAT excl.) carried forward to form of Bid Section	

7 APPENDIX 4: LAYOUT SHOWING PROPOSED NEW WATER SERVICES

TYPE	DESCRIPTION
B(T)	7 STANCE FEMALES 7 SEATER MALES 1 PARAPLEGIC
S	6 STANCE BOYS, 2 PARA, 3 URINALS
F	6 SEATER GIRLS - 6 PANS

BLOCK	BUILDING TYPE
A	EXISTING GIRLS TOILET BLOCK TO BE DEMOLISHED
B	EXISTING FEMALE STAFF TOILET TO BE DEMOLISHED
C	EXISTING BOYS TOILET BLOCK TO BE DEMOLISHED
D	EXISTING NON FUNCTIONAL BOYS TOILET BLOCK TO BE DEMOLISHED
E	EXISTING MALE STAFF TOILET BLOCK TO BE DEMOLISHED
F	EXISTING NON FUNCTIONAL MALE STAFF TOILET BLOCK TO BE DEMOLISHED
G1-G4	EXISTING CLASS BLOCKS

'NOTIONAL' SITE PLAN - INFORMATION ONLY
NOT TO SCALE



KEY

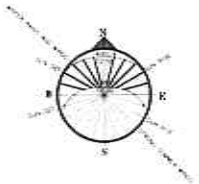
- EXISTING BUILDINGS
- EXISTING AMENITIES TO BE DEMOLISHED
- PROPOSED NEW TOILETS
- PROPOSED WALKWAY 2.2M WIDE
- PROPOSED COVERED WALKWAY 2.2M WIDE
- 50M PARAPLEGIC RADIUS
- 30M BOREHOLE CLEARANCE RADIUS
- APPROX PERCOLATION TEST PIT POINT

EARTHWORKS

MINOR EARTHWORKS

RETAINING WALLS

NO RETAINING WALLS REQUIRED



SITE PLAN

SCALE 1:500

37°32'55"S 32°18'29"E (S27.5486[illegible]; E32.30805556)

1. Please note that the site boundaries do not depict ownership boundaries in the 'notional site plan'. These 'notional' boundaries represent nominal fence lines and the layout is solely for reference information purposes only
2. For accurate and true ownership boundaries, cadastral survey diagrams must be obtained

FOR TENDER

N. FRANCIS

LDM

francisarchitects
architecture + restoration + urban design
think ARTchitecture

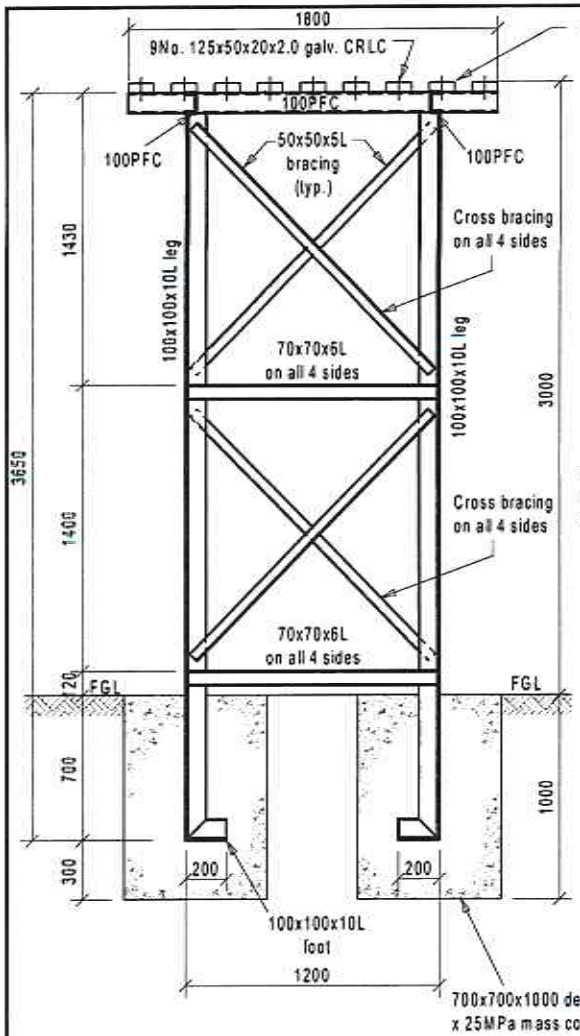
PROVINCE OF KWAZULU-NATAL
DEPARTMENT OF PUBLIC WORKS

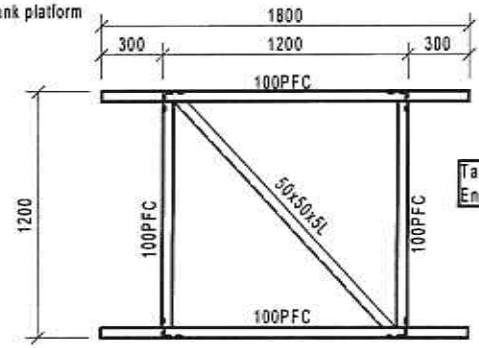
DEPARTMENT OF EDUCATION
SANITATION PROGRAMME
uMkhanyakude District Municipality(2019)
Mkhambathi Secondary School

SITE PLAN LAYOUT
TYPE B(T), (C.F)

n. makoena	n. francis		
27-11-20	AS SHOWN		
N57-Mkha55	0	T	A1 1/4
540602	S004404BH		0

8 APPENDIX 5: TYPICAL ELEVATED TANK STAND DETAIL

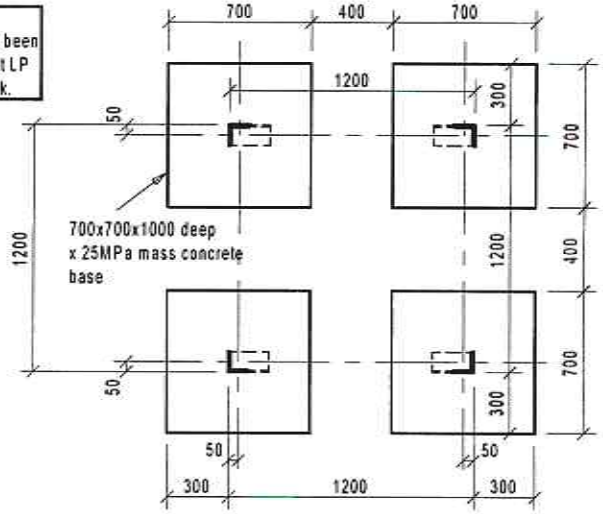




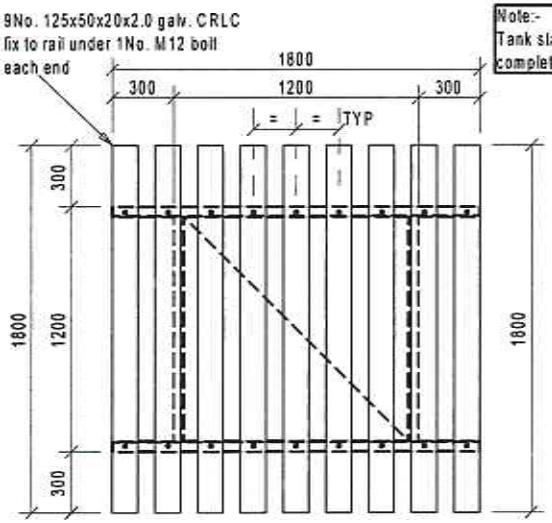
PLAN ON TANK PLATFORM SUPPORT FRAME

NOTE :
The elevated tank sland has been designed to support a 5000Lt LP (Low Profile JoJo Water Tank.

Tank securing straps as per Engineers instruction on site



PLAN ON FOUNDATION



PLAN ON TANK PLATFORM

Note:-
Tank sland supplied as a complete welded structure

Structural steel notes:-

1. All work in accordance with sans 1200H.
2. All welds to be min. 6mm continuous fillet welds.
3. All steelwork to be grade S355JR
4. All purlins to be commercial grade purlins.
5. All bolts to be grade 8.8 bolts.
6. All commercial quality H.D. Bolts and steelwork to have a min. grade stress of 200MPa.
7. All steelwork to be hot dipped galvanised to ISO 1461 or EN 10240 (unless otherwise noted). Galvanising certificate for all steelwork is to be submitted to the engineer on completion.
8. 2 sets of fabrication drawings to be provided to engineer for approval before commencing fabrication.
9. Certificates confirming the grade stress of all steelwork and bolts specified is to be submitted to the engineer on completion.
10. The structural steelwork contractor is to verify all setting out dimensions on site prior to fabrication.

REV.	DESCRIPTIONS	BY	DATE
P1	PRELIMINARY	Y.R	06/09/2018

professional person
M.NAIR PrTechEng

registration
200670211

LDM
Solutions For The Built Environment
WWW.LDM.CO.ZA

MAP AFRICA
CONSULTING ENGINEERS

PROJECT
WIMS NO. 064539
DEPARTMENT OF EDUCATION
WATER & SANITATION PROGRAMME

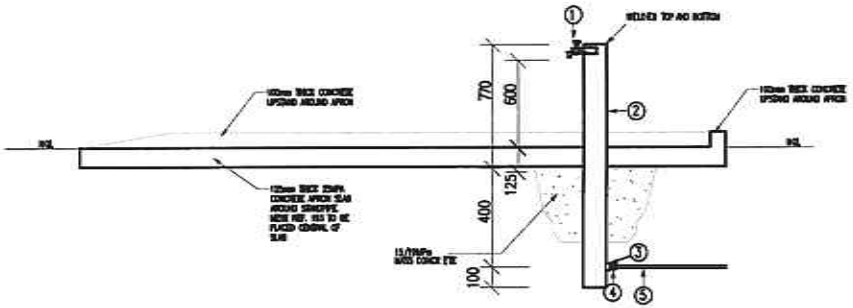
DATE
01/07/2016

REVISION
A

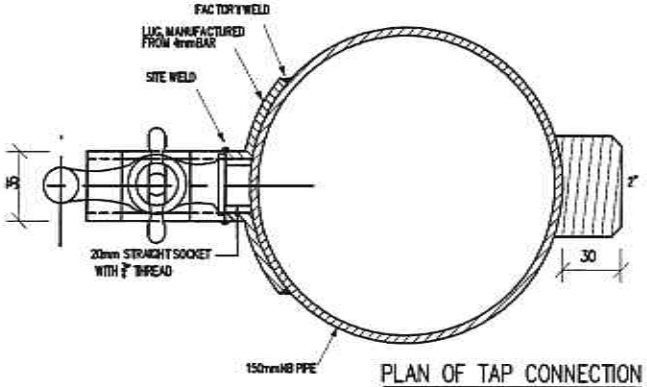
DETAILS
TYPICAL ELEVATED WATER TANK SUPPORT
STRUCTURAL STEEL LAYOUT & DETAILS

DRG. No.
447 / 100

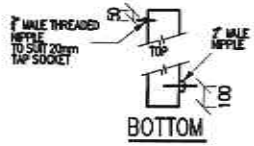
9 APPENDIX 6: TYPICAL STANDPIPE AND APRON DETAIL

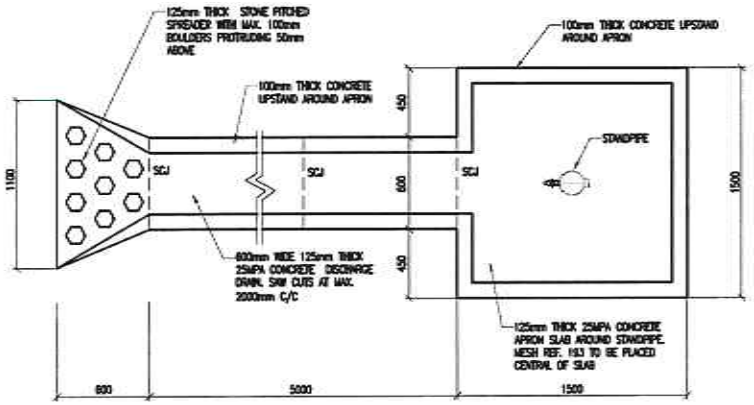


SECTION A–A

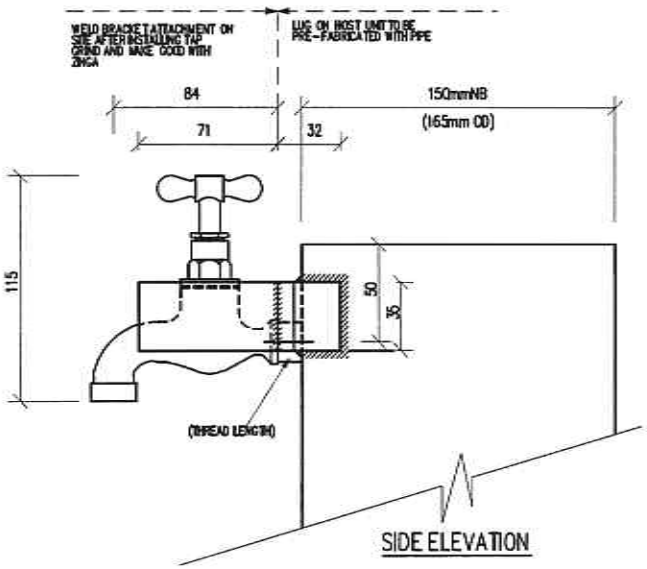


PLAN OF TAP CONNECTION

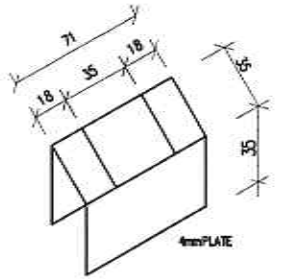




APRON SLAB DETAIL



SIDE ELEVATION



BRACKET ATTACHMENT

FITTINGS SCHEDULE			
ITEM	DESCRIPTION	UNIT	QTY
1	"TAP 108-20 WITH ¾" HAWE UNION	No.	1
2	150mm NB x 4mm GALVANISED MILD STEEL PIPE, 1620mm LONG, WELDED CLOSED TOP AND BOTTOM, WITH ¾" MALE NIPPLE WELDED TO TOP AND 2" MALE NIPPLE WELDED TO BOTTOM	No.	1
3	2" x ¾" REDUCING SOCKET	No.	1
4	¾" x 20 MALE ADAPTOR COMPRESSION FITTING	No.	1
5	20mm HDPE PIPE CLASS 10	m	2

FOR CONSTRUCTION

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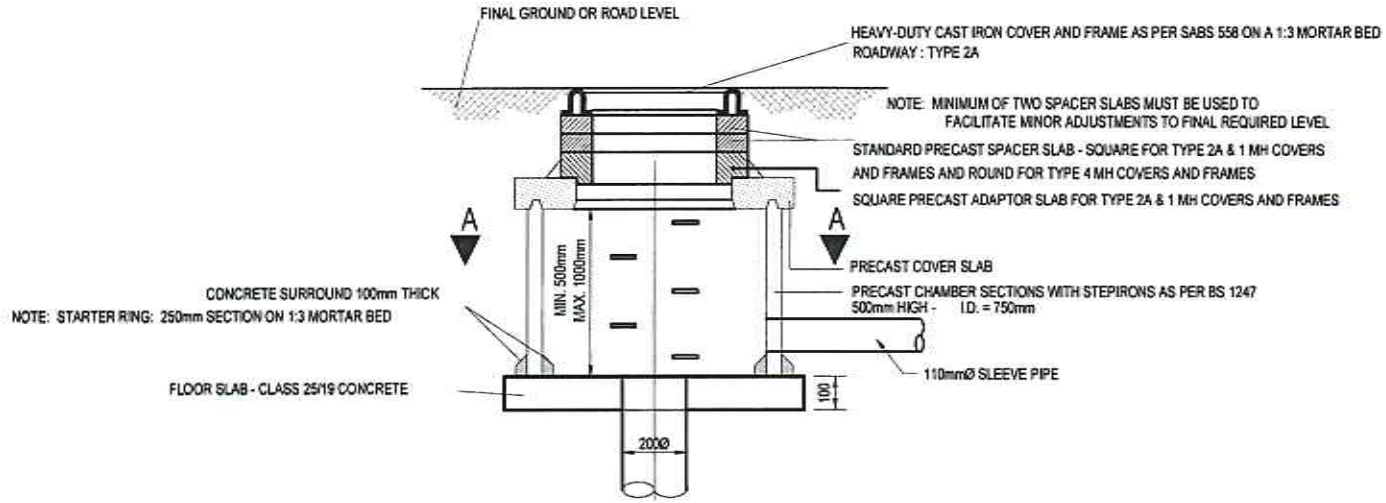
MAP AFRICA
CONSULTING ENGINEERS

PROJECT:
WIMS NO. 064539
DEPARTMENT OF EDUCATION
WATER & SANITATION PROGRAMME

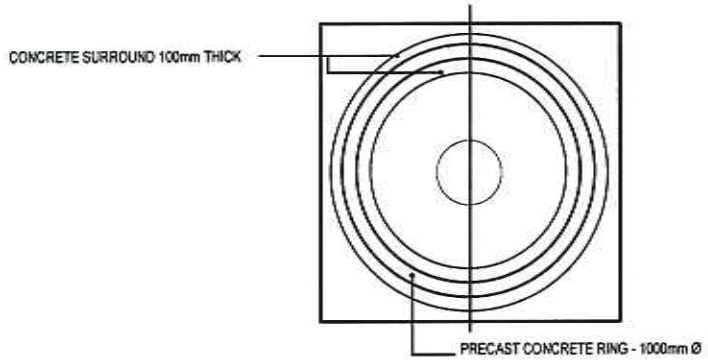
DETAILS:
TYPICAL STANDPIPE AND APRON DETAIL

DATE	REVISION
2017.03.03	A
PROJ. No.	SKETCH No.
447	Sk 101

10 APPENDIX 7: TYPICAL BOREHOLE MANHOLE DETAIL



SECTION



SECTION A - A

FOR CONSTRUCTION

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MAP AFRICA
CONSULTING ENGINEERS

PROJECT: WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER AND SANITATION PROGRAMME	DETAILS: TYPICAL BOREHOLE MANHOLE DETAIL	DATE 2017.03.03	REVISION A
		PROJ No 447	SKETCH No Sk 102

11 APPENDIX 8: STANDARD CONTROL BOX DETAIL

a. Manufacturers approved control box (or equally approved)
b. Control box to be weather proof and lockable
c. Control box kiosk to be mounted on a concrete base allowing for bottom entry cable duct into control box

12 APPENDIX 9: COMPLIANCE REQUIREMENTS

SECTION TWO

DATA CAPTURE AND RECORDING FORMS

Form 1

2 MAP CODE

DW 71

10 ENTRY - BASIC SITE INFORMATION

NATIONAL GROUNDWATER DATA BASE

Company

Address/Code

Signature

Name & Position [print]

11 Contact Name

Postal Address

Street Address

Box / P.O.

Tel No

Farm Name

INFORMATION FOR DATA BASE

These forms are designed specifically to have information entered into the Dept of Water Affairs data base. The more information and the speed with which the information is entered into this database will determine it's usefulness. It is imperative for end-users, contractors, local authorities and government to have this information at their finger tips

4 DISTRICT and FARM NUMBER Codes overleaf

For more information, contact the BOREHOLE WATER ASSOCIATION Tel (011) 942-1123 or fax (011) 942-1492 P.O.Box 2178 SOUTHDALE 2135

5 SITE NAME

22 WATER USE - APPLICATION

Agricultural and domestic	AD
Agricultural - irrigation	AI
Agricultural - stock watering	AS
Domestic - all purposes	DA
Domestic - garden only	DG
Nature conservation	L
Public	P
Industrial - commercial	IC
Industrial - industrial	II
Industrial - mining	IM
Industrial - power generation	IP
Other[Specify]	Z

6 TOPOGRAPHIC SETTING

Alluvial fan	A
Dunes	D
Flat surface plain	F
In or along sinkhole	H
Along dam, lake or swamp	L
On mountain or hill	M
In or along pan	P
In or along river	R
Hillside (slope)	S
Valley	V
Terrace	T
Other[Specify]	Z

13 SITE TYPE

Borehole	B
Dug well	D
Interconnected well	I
Well point	W
Other[Specify]	Z

The BOREHOLE OWNER will receive a set of 6 forms completed by the responsible person as listed below and copies of these forms MUST be sent by the borehole owner to

Directorate : Geohydrology
DEPT of WATER AFFAIRS
P/B X 313
PRETORIA 0001

and/or the local/regional authority

ONLY A COMPLETE SET OF 6 FORMS MUST BE SENT DO NOT SEND ONE FORM AT A TIME

MAP CO-ORDINATES (X,Y)

7 X

8 Y

OR

CO-ORDINATES IN DEGREES

7 Lat

8 Long

14 SITE SELECTOR

Engineer/Siting Inspector	EI
Water diviner	DIV
Driller	DRI
Dept. Water Affairs	DWA
Geologist/Geophysicist	GEO
Geological survey	GSO
Owner	OWN

23 REPORTING INSTITUTION For office use only

24 EQUIPMENT

Airlift	A
Centrifugal pump	C
Hand pump	H
Jet	J
Screw-type pump	M
No equipment	N
Piston pump	P
Powerhead	Q
Submersible pump	S
Turbine	T
Windpump	W
Windpump and powerhead	X
Other[Specify]	Z

15 DIAMETER(mm)

16 COMPLETED DEPTH(m)

17 COMPLETION DATE

The 6 forms must be completed by the following:

The DRILLER is responsible for forms 1 - 4 which include:

- BOREHOLE LOGS consisting of 2 parts. These contain Basic Info - Penetration - Aquifer - Geology
- BOREHOLE CONSTRUCTION CERTIFICATE which contains Basic information - Hole Construction - Casing - Water Level

The PUMP INSTALLER is responsible for forms 5 & 6

- YIELD TEST CERTIFICATE [Pumping test data] which contains Pumping Test details - Discharge Rate - Water Level
- PUMP INSTALLATION CERTIFICATE which contains Basic Information - Pumping Equipment Data

18 STATUS

Destroyed	D
In use	G
Unused	U

25 POTABILITY

From chemistry	
Unsuitable for all consumption	U
For animals only	A
Marginal/human consumption	M
Good for human consumption	G
Very good	V
From taste	
Salty	
Fresh	F
Brack	B

9 CO-ORDINATE ACCURACY

Within 1 metres	0
Within 10 metres	1
Within 100 metres	2
Within 500 metres	3
Within 1000 metres	4

19 SITE PURPOSE

Exploration hole	E
Mine drainage	M
Observation	O
Production (water supply)	P
Recharge	R
Standby	S
Waste disposal	W
Other[Specify]	Z

11 ALTITUDE above sea level (m)

12 ALT. MEASUREMENT METHOD

Altimeter	A
Levelled or surveyed	L
Interpolated from map	M
Other[specify]	Z

21 WATER USE - CONSUMER

Urban	U
Non-urban	N

COMMENT

INSTRUCTIONS

1. ALL forms must contain an 8 digit map number [of the 1:5000 map] Last 2 digits are determined from 1:1000 map available in diagram
2. Latitude & longitude values must be accurately determined and completed either as X & Y or in degrees
3. For each multiple (and or sequence) CIRCLE the code of your choice (Only ONE code in one circle in each section)
4. Supply details of more than six boreholes on separate sheets
5. Name and address of person completing the form should be given in the space provided above
6. Sketch map is compulsory and must be drawn by owner
7. ALL UNSHADED BLOCKS MUST BE COMPLETED

1:5000 map to be divided into segments as follows

01	02	03	04	05
06	07	08	09	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25

IMPORTANT : BOREHOLE OWNER

Only a complete set of 6 forms must be sent to :

Directorate : GEOHYDROLOGY
Dept Water Affairs
P/B X313 PRETORIA 0001

DO NOT SEND ONE FORM AT A TIME.

Form 2a

2 MAP CODE

DW 71

20 LOGS; 21 PENETRATION RATE; 22 AQUIFER

NATIONAL GROUNDWATER DATA BASE

112 Customer Name	Street Address
Postal Address	Plot/Erf No. 113 Borehole No.
	Farm Name

Circle one of the following:	
FOR DEPTH	0 - 50m
OR DEPTH	101 - 150m

MAP CO-ORDINATES IN X&Y	
7 X	
8 Y	

OR

CO-ORDINATES IN DEGREES	
7 Lat	
8 Long	

INSTRUCTIONS

PENETRATION RATE

You will be recording penetration rate in minutes taken to drill a metre. Mark the penetration rate by drawing a vertical line over the appropriate number of minutes taken to drill that metre. The scale above the column heading is in metres drilled per hour. This is for computer use only.

eg

	6	5	7.5	8.5	10	12	15	20	30	60
015.00					10	9	8	7	6	5
016.00					10	9	8	7	6	5
017.00					10	9	8	7	6	5
018.00							8	7	6	5
019.00							8	7	6	5
020.00										5
021.00										5

STRIKE

Mark water strike with S in the block headed "S"

YIELD

Actual yield should be recorded in litres per second

METHOD Mark method used to determine yield while drilling	
Current meter	C
Estimated	E
Flume	F
Totalling meter	M
Notch (V- or U-notch)	N
Submerged orifice	S
Volumetric measurement	V
Venturi meter	U
Weir	W
Other(Specify)	Z

IMPORTANT : BOREHOLE OWNER

Only a complete set of 6 forms must be sent to :

Directorate : GEOHYDROLOGY
Dept Water Affairs
P/B X313
PRETORIA 0001

DO NOT SEND ONE FORM AT A TIME.

[mm] Diam	Depth	6 6.5 7.5 8.5 10 12 15 20 30 60 Penetration rate (min/m)	[See tables] Aquifer code	S	[dddd.dd] Yield (l/s)	Comment
	1.00	10 9 8 7 6 5 4 3 2 1				
	2.00	10 9 8 7 6 5 4 3 2 1				
	3.00	10 9 8 7 6 5 4 3 2 1				
	4.00	10 9 8 7 6 5 4 3 2 1				
	5.00	10 9 8 7 6 5 4 3 2 1				
	6.00	10 9 8 7 6 5 4 3 2 1				
	7.00	10 9 8 7 6 5 4 3 2 1				
	8.00	10 9 8 7 6 5 4 3 2 1				
	9.00	10 9 8 7 6 5 4 3 2 1				
	10.00	10 9 8 7 6 5 4 3 2 1				
	11.00	10 9 8 7 6 5 4 3 2 1				
	12.00	10 9 8 7 6 5 4 3 2 1				
	13.00	10 9 8 7 6 5 4 3 2 1				
	14.00	10 9 8 7 6 5 4 3 2 1				
	15.00	10 9 8 7 6 5 4 3 2 1				
	16.00	10 9 8 7 6 5 4 3 2 1				
	17.00	10 9 8 7 6 5 4 3 2 1				
	18.00	10 9 8 7 6 5 4 3 2 1				
	19.00	10 9 8 7 6 5 4 3 2 1				
	20.00	10 9 8 7 6 5 4 3 2 1				
	21.00	10 9 8 7 6 5 4 3 2 1				
	22.00	10 9 8 7 6 5 4 3 2 1				
	23.00	10 9 8 7 6 5 4 3 2 1				
	24.00	10 9 8 7 6 5 4 3 2 1				
	25.00	10 9 8 7 6 5 4 3 2 1				
	26.00	10 9 8 7 6 5 4 3 2 1				
	27.00	10 9 8 7 6 5 4 3 2 1				
	28.00	10 9 8 7 6 5 4 3 2 1				
	29.00	10 9 8 7 6 5 4 3 2 1				
	30.00	10 9 8 7 6 5 4 3 2 1				
	31.00	10 9 8 7 6 5 4 3 2 1				
	32.00	10 9 8 7 6 5 4 3 2 1				
	33.00	10 9 8 7 6 5 4 3 2 1				
	34.00	10 9 8 7 6 5 4 3 2 1				
	35.00	10 9 8 7 6 5 4 3 2 1				
	36.00	10 9 8 7 6 5 4 3 2 1				
	37.00	10 9 8 7 6 5 4 3 2 1				
	38.00	10 9 8 7 6 5 4 3 2 1				
	39.00	10 9 8 7 6 5 4 3 2 1				
	40.00	10 9 8 7 6 5 4 3 2 1				
	41.00	10 9 8 7 6 5 4 3 2 1				
	42.00	10 9 8 7 6 5 4 3 2 1				
	43.00	10 9 8 7 6 5 4 3 2 1				
	44.00	10 9 8 7 6 5 4 3 2 1				
	45.00	10 9 8 7 6 5 4 3 2 1				
	46.00	10 9 8 7 6 5 4 3 2 1				
	47.00	10 9 8 7 6 5 4 3 2 1				
	48.00	10 9 8 7 6 5 4 3 2 1				
	49.00	10 9 8 7 6 5 4 3 2 1				
	50.00	10 9 8 7 6 5 4 3 2 1				

6 6.5 7.5 8.5 10 12 15 20 30 60
Penetration rate (min/m)

Form 2b

2-MAP CODE

DW 71

20 LOGS; 21 PENETRATION RATE; 22 AQUIFER

NATIONAL GROUND WATER DATA BASE

1. Samples must be laid out after every metre drilled in order to complete the Geology Information Sheet.
2. On reaching final drilling depth, rule off penetration table column and record the final blow yield in appropriate column.
3. This information will be required to complete your Casing and Hole Construction Data Sheet.
4. Use the notes section at the bottom to record casing details, development and work time.

Circle one of the following:	
FOR DEPTH	51 - 100m
OR DEPTH	151 - 200m

ON COMPLETION OF DRILLING COMPLETE THE FOLLOWING SUMMARY:
TOTAL DEPTH OF HOLE
NOMINAL DIAMETER
STATIC WATER LEVEL
FINAL BLOW YIELD

NOTES

[mm] Diam	Depth	6 6.5 7.5 8.5 10 12 15 20 30 60 Penetration rate (min/m)	[See tables] Aquifer code	S	[ddd.dd] Yield (l/s)	Comments
	51.00	10 9 8 7 6 5 4 3 2 1				
	52.00	10 9 8 7 6 5 4 3 2 1				
	53.00	10 9 8 7 6 5 4 3 2 1				
	54.00	10 9 8 7 6 5 4 3 2 1				
	55.00	10 9 8 7 6 5 4 3 2 1				
	56.00	10 9 8 7 6 5 4 3 2 1				
	57.00	10 9 8 7 6 5 4 3 2 1				
	58.00	10 9 8 7 6 5 4 3 2 1				
	59.00	10 9 8 7 6 5 4 3 2 1				
	60.00	10 9 8 7 6 5 4 3 2 1				
	61.00	10 9 8 7 6 5 4 3 2 1				
	62.00	10 9 8 7 6 5 4 3 2 1				
	63.00	10 9 8 7 6 5 4 3 2 1				
	64.00	10 9 8 7 6 5 4 3 2 1				
	65.00	10 9 8 7 6 5 4 3 2 1				
	66.00	10 9 8 7 6 5 4 3 2 1				
	67.00	10 9 8 7 6 5 4 3 2 1				
	68.00	10 9 8 7 6 5 4 3 2 1				
	69.00	10 9 8 7 6 5 4 3 2 1				
	70.00	10 9 8 7 6 5 4 3 2 1				
	71.00	10 9 8 7 6 5 4 3 2 1				
	72.00	10 9 8 7 6 5 4 3 2 1				
	73.00	10 9 8 7 6 5 4 3 2 1				
	74.00	10 9 8 7 6 5 4 3 2 1				
	75.00	10 9 8 7 6 5 4 3 2 1				
	76.00	10 9 8 7 6 5 4 3 2 1				
	77.00	10 9 8 7 6 5 4 3 2 1				
	78.00	10 9 8 7 6 5 4 3 2 1				
	79.00	10 9 8 7 6 5 4 3 2 1				
	80.00	10 9 8 7 6 5 4 3 2 1				
	81.00	10 9 8 7 6 5 4 3 2 1				
	82.00	10 9 8 7 6 5 4 3 2 1				
	83.00	10 9 8 7 6 5 4 3 2 1				
	84.00	10 9 8 7 6 5 4 3 2 1				
	85.00	10 9 8 7 6 5 4 3 2 1				
	86.00	10 9 8 7 6 5 4 3 2 1				
	87.00	10 9 8 7 6 5 4 3 2 1				
	88.00	10 9 8 7 6 5 4 3 2 1				
	89.00	10 9 8 7 6 5 4 3 2 1				
	90.00	10 9 8 7 6 5 4 3 2 1				
	91.00	10 9 8 7 6 5 4 3 2 1				
	92.00	10 9 8 7 6 5 4 3 2 1				
	93.00	10 9 8 7 6 5 4 3 2 1				
	94.00	10 9 8 7 6 5 4 3 2 1				
	95.00	10 9 8 7 6 5 4 3 2 1				
	96.00	10 9 8 7 6 5 4 3 2 1				
	97.00	10 9 8 7 6 5 4 3 2 1				
	98.00	10 9 8 7 6 5 4 3 2 1				
	99.00	10 9 8 7 6 5 4 3 2 1				
	100.00	10 9 8 7 6 5 4 3 2 1				
		6 6.5 7.5 8.5 10 12 15 20 30 60 Penetration rate (min/m)				

Company

Address Code

Signature

Name & Position (print)

Form 3a

2 MAP CODE

DW 71

23 UNCONSOLIDATED; 24 CONSOLIDATED

NATIONAL GROUND WATER DATA BASE

112 Customer Name	Street Address
Postal Address	Plot/Erf No. 113 Borehole No.
	Farm Name

Fill in for ALL Boreholes							CONS ONLY	UNCONSOLIDATED FORMATIONS ONLY				
Depth	1 Lithology code			Colour 2P	3S	4Texture	Feature 5	6 Feature P	S	7A	8S	9R
1.00												
2.00												
3.00												
4.00												
5.00												
6.00												
7.00												
8.00												
9.00												
10.00												
11.00												
12.00												
13.00												
14.00												
15.00												
16.00												
17.00												
18.00												
19.00												
20.00												
21.00												
22.00												
23.00												
24.00												
25.00												
26.00												
27.00												
28.00												
29.00												
30.00												
31.00												
32.00												
33.00												
34.00												
35.00												
36.00												
37.00												
38.00												
39.00												
40.00												
41.00												
42.00												
43.00												
44.00												
45.00												
46.00												
47.00												
48.00												
49.00												
50.00												

Circle one of the following:	
FOR DEPTH	1 - 50m
OR DEPTH	101 - 150m

1 LITHOLOGY CODE

Overburden	OBDN
Clay	CLAY
Clay and sand	CLSD
Coal	COAL
Boulders	BLDR
Boulderclay	BLCL
Alluvium	ALVM
Chert	CHRT
Calcrete	CLCR
Conglomerat	CLGM
Diabase	DIBS
Dolerite	DLRT
Dolomite	DLMT
Granite	GRNT
Gravel	GRVL
Lava	LAVA
Quartsite	QRTZ
Sand	SAND
Shale	SHLE
Sandstone	SNDS

2 PRIMARY COLOURS

Black	S
Blue	B
Brown	C
Green	G
Grey	H
Purple	N
Orange	O
Pink	P
Red	R
White	W
Yellow	Y
No information	

3 SECONDARY COLOURS

Bluish	B
Brownish	C
Dark	D
Greenish	G
Greyish	H
Light	I
Purple	M
Orange	O
Pinkish	P
Reddish	R
Olive	V
Yellowish	Y
No information	

4 TEXTURE

Cryptic	CR
Very fine	VF
Fine	FN
Fine/medium	FM
Medium	MD
Medium/Coarse	MC
Coarse	CO
Very coarse	VC

5 FEATURE (Consolidated only)

Cemented	CE
Consolidated	CS
Fractured	FC
Hard	D
Soft	SF
Unconsolid	UC
Weathered	WT

Form 3b

2:MAP CODE

DW 71

23 UNCONSOLIDATED; 24 CONSOLIDATED

NATIONAL GROUNDWATER DATA BASE

Fill in for ALL Boreholes								CONS. ONLY	UNCONSOLIDATED FORMATIONS ONLY				
Depth	1 Lithology code		Colour 2P	3S	4Texture			Feature 5	6Feature P	S	7A	8S	9R
51.00													
52.00													
53.00													
54.00													
55.00													
56.00													
57.00													
58.00													
59.00													
60.00													
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92.00													
93.00													
94.00													
95.00													
96.00													
97.00													
98.00													
99.00													
100.00													

Circle one of the following:	
FOR DEPTH	51 - 100m
OF DEPTH	151 - 200m

CODES FOR UNCONSOLIDATED ONLY

6

PRIMARY AND SECONDARY FEATURES	
Argillaceous	AG
Arenaceous	AR
Baked	BK
Calcareous	CA
Carbonaceous	CB
Cemented	CE
Chloritic	CL
Consolidated	CS
Clayey	CY
Dark	DK
Fractured	FC
Ferruginous	FE
Fresh	FR
Feldspathic	FS
Glauconitic	GL
Gravel-bearing	GV
Hard	HD
Heavy minerals	HM
Jointed	JT
Loose	LS
Light	LT
Micaceous	MC
Mineralised	MN
Massive	MS
Oolitic	OO
Phosphatic-bearing	PO
Primary	PR
Peaty	PT
Siliceous	SC
Solid	SD
Soft	SF
Shelly	SH
Silicified	SI
Silty	SL
Sandy	SN
Secondary	SR
Unconsolidated	UC
Weathered	WT
No information	

7

NATURE ATTRIBUTE	
Slightly	-
Very	+
No information	

8

SORTING	
Unsorted	11
Poorly sorted	22
Poorly to moderately sorted	23
Moderately sorted	33
Moderately to well sorted	34
Well to moderately sorted	43
Well sorted	44
No information	

9

ROUNDNESS	
Angular	11
Angular to sub-angular	12
Angular to sub-rounded	13
Angular to rounded	14
Sub-angular	22
Sub-angular to sub-rounded	23
Sub-angular to rounded	24
Sub-rounded	33
Sub-rounded to rounded	34
Rounded	44
No information	

Company

Address/Code

Signature

Name & Position (print)

IMPORTANT : BOREHOLE OWNER

Only a complete set of 6 forms must be sent to :

Directorate : GEOHYDROLOGY
Dept Water Affairs
P/B X313 PRETORIA 0001

DO NOT SEND ONE FORM AT A TIME.

Form 4

2.MAP CODE

DW 71

30 CONSTRUCTION; 31 HOLE; 32 CASING; 33 OPENINGS; 34 FILL

NATIONAL GROUND WATER DATA BASE

Company
Address/Code
Signature
Name & Position [print]

112.Customer Name
Postal Address
Street Address
Plot/Erf No. 113 Borehole No.
Farm Name

8 DATA SOURCE	
Driller/Driving Inspector	D
Geologist/Technician	G
Other[Specify]	Z

INSTRUCTIONS

1 Begin with largest diameter in first column. The last column used will indicate open hole diameter i.e. no casing installed.

2. Where fill was used section 34 of the appropriate column only must be completed
3 FINAL FIGURE IN LAST COLUMN USED MUST INDICATE FINAL DEPTH OF HOLE

9 METHOD OF CONSTRUCTION	
Air-rotary [Drag bit/tricone]	A
Cable-tool	C
Dug	D
Hydraulic rotary [Mud rotary]	H
Jetted	J
Air percussion [Down-the-hole-hammer]	P
Reverse rotary	R
Other[Specify]	Z

10 TYPE OF FINISH	
Brickwork	B
Porous concrete	C
Gravel pack with perforations	F
Gravel pack with screen	G
Horizontal gallery	H
Open bottom (partially cased)	O
Perforated or slotted casing	P
Screen	S
Well point	W
Open hole	X
Other[Specify]	Z

11 METHOD OF DEVELOPMENT	
Pumped with air lift	A
Bailed	B
Compressed air	C
Air lifted with inductor	I
Jetted or washed	J
None	N
Pumped	P
Surged	S
Other[Specify]	Z

12 DEVELOPMENT Duration[hrs]	

13 SPECIAL DEVELOPMENT TREATMENT	
Brushing	B
Chemical (acid, calgon etc)	C
Dynite	D
Explosives	E
Hydrofracturing	H
Other[Specify]	Z

14 TOTAL COST OF BOREHOLE

15 COMMENT

IMPORTANT:
BOREHOLE OWNER

Only a complete set of 6 forms must be sent to :

Directorate : GEOHYDROLOGY
Dept Water Affairs
P/B X313
PRETORIA 0001

DO NOT SEND ONE FORM AT A TIME.

BEGIN by filling in the LARGEST DIAMETER CASING used in COLUMN 1.

31,32 CASING DEPTH	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6
From top [m]						
To bottom [m]						
31,32 CASING INTERNAL DIAMETER						
32 CASING MATERIAL						
Brass	B	B	B	B	B	B
Concrete	C	C	C	C	C	C
Copper	D	D	D	D	D	D
PVC or other plastic	P	P	P	P	P	P
Plastic	O	O	O	O	O	O
Steel	S	S	S	S	S	S
Stainless Steel	X	X	X	X	X	X
Other[Specify]	Z	Z	Z	Z	Z	Z
32 MATERIAL/WALL THICKNESS [mm]						

33 FOR SLOTTED CASING [Additional info - Use only the column/s related to casing depth above]						
TYPE OF OPENINGS						
Perforated or slotted with fibre mesh	F	F	F	F	F	F
Mesh screen	M	M	M	M	M	M
Perforated or slotted	P	P	P	P	P	P
Screen	S	S	S	S	S	S
Well point	W	W	W	W	W	W
Open hole	X	X	X	X	X	X
Other[Specify]	Z	Z	Z	Z	Z	Z
33.1 LENGTH OF OPENINGS mm						
33 WIDTH OF OPENINGS mm						
33 DISTANCE BETWEEN OPENINGS						
Horizontal mm						
Vertical mm						
33 METHOD OPENINGS MADE						
Sawn	A	A	A	A	A	A
Drilled	D	D	D	D	D	D
Electric cut	E	E	E	E	E	E
Gas cut	G	G	G	G	G	G
Machine cut	M	M	M	M	M	M
Punched	P	P	P	P	P	P
Screen	S	S	S	S	S	S
Well point	W	W	W	W	W	W
Wire wound	X	X	X	X	X	X
Other[Specify]	Z	Z	Z	Z	Z	Z

34 FILL/GRAVELPACK [Use only the column/s where fill was used with the casing described above.]						
Depth to top[m]						
Depth to bottom[m]						
34 TYPE OF FILL						
Bentonite or clay	B	B	B	B	B	B
Cement	C	C	C	C	C	C
Gravel [>2mm]	G	G	G	G	G	G
Sand [<2mm]	S	S	S	S	S	S
Bottom closed	X	X	X	X	X	X

Form 5a

2:MAP CODE

DW 71

100 PUMPING TEST; 60,61 WATER LEVEL

NATIONAL GROUND WATER DATA BASE

Company
Address/Code
Signature
Name & Position [print]

112:Customer Name
Postal Address
Street Address
Plot/Erf No. 113:Borehole No.
Farm Name

PUMPING TEST DATA SHEET

23:REPORTING INSTITUTION
For office use only

5:TEST STARTED

Date	
Time	

6:METHOD TESTED		Duration/hrs
Air (blow out) test	A	
Bailer test	B	
Free flow test	F	
Owner test	O	
Controlled pumping test	P	
Controlled recovery test	R	
Slug test	S	

7:DEPTH TO PUMP INTAKE (m)
[Only if P is chosen above]

INSTRUCTIONS : 8, 9 & 10 only to be filled in once CONTROLLED PUMPING TEST is completed.
See Discharge Rate Sheet overleaf.

8:RECOMMENDED ABSTRACTION (l/s)

9:TRANSMISSIVITY (m^2/day)

10:STORATIVITY

11:COMMENT

IMPORTANT : BOREHOLE OWNER
Only a complete set of 6 forms must be sent to :
Directorate : GEOHYDROLOGY
Dept Water Affairs
P/B X313
PRETORIA 0001
DO NOT SEND ONE FORM AT A TIME.

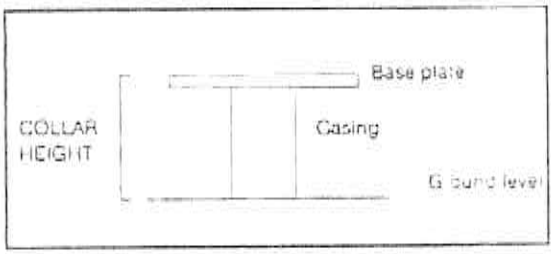
WATER LEVEL DATA SHEET

DO NOT FILL IN IF CONTROLLED PUMPING TEST IS PERFORMED
Use for any other water level measurements taken. Use one column for each measurement

6:MEASUREMT METHOD	1	2	3	4	5	6	7
Airline	A	A	A	A	A	A	A
Electrical contact meter	E	E	E	E	E	E	E
Pressure gauge	P	P	P	P	P	P	P
Recorder	R	R	R	R	R	R	R
Steel tape	S	S	S	S	S	S	S
Reported, unknown	U	U	U	U	U	U	U
Estimate	X	X	X	X	X	X	X

7:WATER LEVEL STATUS							
Water level affected by nearby pumping/drilling	A	A	A	A	A	A	A
Dry	D	D	D	D	D	D	D
Flowing	F	F	F	F	F	F	F
Obstruction, no water level measured	O	O	O	O	O	O	O
Pumping water level	P	P	P	P	P	P	P
Recovering water level	R	R	R	R	R	R	R
Static water level	S	S	S	S	S	S	S

8:COLLAR HEIGHT [m]



9:DATA SOURCE							
Driller	D	D	D	D	D	D	D
Geologist	G	G	G	G	G	G	G
Pump operator	P	P	P	P	P	P	P
Other[Specify]	Z	Z	Z	Z	Z	Z	Z

61:DATE														
Month														
Day														

61:TIME														
hrs														
mins														

61:WATER LEVEL
(m below casing top)

61:COMMENT

Form 5b

2 MAP CODE

DW 71

50,51 DISCHARGE RATE

NATIONAL GROUND WATER DATA BASE

Company
Address/Code
Signature
Name & Position [print]

112 Customer Name
Postal Address
Street Address
Plot/Erf No 113 Borehole No
Farm Name

5 TYPE OF DISCHARGE		Circle one below		
Pump	P	Blow	Bail	Pump
Flow - Artesian	F			

6 METHOD DISCHARGE MEASURED	
Current meter	C
Estimated	E
Flume	F
Totalling meter	M
Notch (V- or U-notch)	N
Submerged orifice	S
Volumetric measurement	V
Venturi meter	U
Weir	W
Other[Specify]	Z

STATUS Use to complete column below for contractor's reference purpose only	
Step test pump test	S
Recovering water level	R
Constant rate pumping test	C
Other[Specify]	Z

This form must be completed in conjunction with Pumping Test Data Sheet overleaf

WATER LEVEL MEASUREMENT METHOD	
Airline	A
Electrical contact meter	E
Pressure gauge	P
Recorder	R
Steel tape	S
Reported, unknown	U
Estimate	X

Date yyyymmdd	Time ddHdd	Discharge ddd ddl/s	Water level (m below casing top)	Status	Date yyyymmdd	Time ddHdd	Discharge ddd ddl/s	Water Level (m below casing top)	Status	Date yyyymmdd	Time ddHdd	Discharge ddd.ddl/s	Water level (m below casing top)	Status

Form 5c

2:MAP CODE								

BOREHOLE TEST RECORD SHEET

REQUEST NO:	MAP REFERENCE:		PROVINCE :
BOREHOLE NO :	COORDINATES (DD-MM-SS)	Lo:	DISTRICT :
ALT. BH. NO:	LATITUDE :	X:	FARM NAME
ALT. BH. NO.:	LONGITUDE:	Y:	SITE NAME :

BOREHOLE DEPTH (m)	DATUM LEVEL ABOVE CASING (m)	EXISTING PUMP:
WATER LEVEL (mbgl):	CASING HEIGHT (magl):	
	BH DIAM (PUMP INLET) (mm):	CONT:

SLUG TEST

TEST STARTED		DURATION (min):
DATE: TIME:		

SLUG IN			COMMENTS	SLUG OUT			COMMENTS
Time (Guide) (sec)	Time (Actual) (sec)	Displacement (mm)		Time (Guide) (sec)	Time (Actual) (sec)	Displacement (mm)	
5				5			
10				10			
15				15			
20				20			
30				30			
40				40			
60				60			
80				80			
100				100			
120				120			
150				150			
300				300			
400				400			
500				500			
600				600			
800				800			
1000				1000			
1200				1200			
1500				1500			
1800				1800			
2500				2500			

COMMENTS. 1).

Form 5d

2.5 MAP CODE									

BOREHOLE TEST RECORD SHEET

REQ / PROJ. NO	MAP REFERENCE		PROVINCE
BOREHOLE NO	COORDINATES (DD-MM-SS)	Lo	DISTRICT
ALT. BH. NO	LATITUDE	X	FARM NAME
ALT. BH. NO	LONGITUDE	Y	SITE NAME

BOREHOLE DEPTH (m)	DATUM LEVEL ABOVE CASING (m)	EXISTING PUMP
WATER LEVEL (mbgl)	CASING HEIGHT (magl)	CONTRACTOR
DEPTH OF PUMP (m)	BH DIAM. (PUMP INLET) (mm)	PUMP TYPE

CALIBRATION TEST AND RECOVERY

DISCHARGE RATE 1					DISCHARGE RATE 2					DISCHARGE RATE 3				
DATE		TIME			DATE		TIME			DATE		TIME		
Time (min)	Draw-down (m)	Yield (l/s)	Time (min)	Recovery (m)	Time (min)	Draw-down (m)	Yield (l/s)	Time (min)	Recovery (m)	Time (min)	Draw-down (m)	Yield (l/s)	Time (min)	Recovery (m)
1			1		1			1		1			1	
2			2		2			2		2			2	
3			3		3			3		3			3	
5			5		5			5		5			5	
7			7		7			7		7			7	
10			10		10			10		10			10	
15			15		15			15		15			15	
			20					20					20	
			30					30					30	
			40					40					40	
			50					50					50	
			60					60					60	
			70					70					70	
			80					80					80	
			90					90					90	
			100					100					100	
			110					110					110	
			120					120					120	
			150					150					150	

DISCHARGE RATE 4					DISCHARGE RATE 5					DISCHARGE RATE 6				
DATE		TIME			DATE		TIME			DATE		TIME		
Time (min)	Draw-down (m)	Yield (l/s)	Time (min)	Recovery (m)	Time (min)	Draw-down (m)	Yield (l/s)	Time (min)	Recovery (m)	Time (min)	Draw-down (m)	Yield (l/s)	Time (min)	Recovery (m)
1			1		1			1		1			1	
2			2		2			2		2			2	
3			3		3			3		3			3	
5			5		5			5		5			5	
7			7		7			7		7			7	
10			10		10			10		10			10	
15			15		15			15		15			15	
			20					20					20	
			30					30					30	
			40					40					40	
			50					50					50	
			60					60					60	
			70					70					70	
			80					80					80	
			90					90					90	
			100					100					100	
			110					110					110	
			120					120					120	
			150					150					150	
			180					180					180	
			210					210					210	
			240					240					240	

COMMENTS

Form 5e

2:MAP CODE									

BOREHOLE TEST RECORD SHEET

REQ / PROJ. NO	MAP REFERENCE		PROVINCE
BOREHOLE NO	COORDINATES (DD-MM-SS)	Lo	DISTRICT
ALT. BH. NO	LATITUDE	X	FARM NAME
ALT. BH. NO	LONGITUDE	Y	SITE NAME

BOREHOLE DEPTH (m)	DATUM LEVEL ABOVE CASING (m)	EXISTING PUMP
WATER LEVEL (mbgl)	CASING HEIGHT (magl)	CONTRACTOR
DEPTH OF PUMP (m)	BH DIAM. (PUMP INLET) (mm)	PUMP TYPE

STEPPED DISCHARGE TEST AND RECOVERY

DISCHARGE RATE 1					DISCHARGE RATE 2					DISCHARGE RATE 3				
DATE		TIME			DATE		TIME			DATE		TIME		
Time (min)	Draw down (m)	Yield (l/s)	Time (min)	Recovery (m)	Time (min)	Draw-down (m)	Yield (l/s)	Time (min)	Recovery (m)	Time (min)	Draw-down (m)	Yield (l/s)	Time (min)	Recovery (m)
1			1		1			1		1			1	
2			2		2			2		2			2	
3			3		3			3		3			3	
5			5		5			5		5			5	
7			7		7			7		7			7	
10			10		10			10		10			10	
15			15		15			15		15			15	
20			20		20			20		20			20	
30			30		30			30		30			30	
40			40		40			40		40			40	
50			50		50			50		50			50	
60			60		60			60		60			60	
70			70		70			70		70			70	
80			80		80			80		80			80	
90			90		90			90		90			90	
100			100		100			100		100			100	
110			110		110			110		110			110	
120			120		120			120		120			120	
			150					150					150	

DISCHARGE RATE 4					DISCHARGE RATE 5					DISCHARGE RATE 6				
DATE		TIME			DATE		TIME			DATE		TIME		
Time (min)	Draw-down (m)	Yield (l/s)	Time (min)	Recovery (m)	Time (min)	Draw-down (m)	Yield (l/s)	Time (min)	Recovery (m)	Time (min)	Draw-down (m)	Yield (l/s)	Time (min)	Recovery (m)
1			1		1			1		1			1	
2			2		2			2		2			2	
3			3		3			3		3			3	
5			5		5			5		5			5	
7			7		7			7		7			7	
10			10		10			10		10			10	
15			15		15			15		15			15	
20			20		20			20		20			20	
30			30		30			30		30			30	
40			40		40			40		40			40	
50			50		50			50		50			50	
60			60		60			60		60			60	
70			70		70			70		70			70	
80			80		80			80		80			80	
90			90		90			90		90			90	
100			100		100			100		100			100	
110			110		110			110		110			110	
120			120		120			120		120			120	
			150					150					150	
			180					180					180	
			210					210					210	
			240					240					240	

COMMENTS

Form 5f

2:MAP CODE									

BOREHOLE TEST RECORD SHEET

REQUEST NO. :	MAP REFERENCE:		PROVINCE :
BOREHOLE NO.	COORDINATES (DD-MM-SS)	Lo	DISTRICT :
ALT. BH. NO.:	LATITUDE :	X	FARM NAME :
ALT. BH. NO.	LONGITUDE:	Y	SITE NAME :

BOREHOLE DEPTH (m):	DATUM LEVEL ABOVE CASING (m)	EXISTING PUMP:
WATER LEVEL (mbgl):	CASING HEIGHT (magl):	
DEPTH OF PUMP (m):	BH DIAM. (PUMP INLET) (mm):	CONT:

CONSTANT DISCHARGE TEST AND RECOVERY

TEST STARTED		TEST COMPLETED		DURATION (min):
DATE	TIME	DATE:	TIME:	TYPE OF PUMP

* NOTE * Distance between discharge and observation holes in m.

DISCHARGE BOREHOLE					OBSERVATION HOLE 1		OBSERVATION HOLE 2		OBSERVATION HOLE 3	
					Nr :		Nr :		Nr :	
					Distance:		Distance:		Distance:	
Time	Drawdown	Yield	Time	Recovery	Time	Drawdown	Time	Drawdown	Time	Drawdown
(min)	s(m)	(l/s)	(min)	s' (m)	(min)	(m)	(min)	(m)	(min)	(m)
1			1		1		1		1	
2			2		2		2		2	
3			3		3		3		3	
5			5		5		5		5	
7			7		7		7		7	
10			10		10		10		10	
15			15		15		15		15	
20			20		20		20		20	
30			30		30		30		30	
40			40		40		40		40	
60			60		60		60		60	
90			90		90		90		90	
120			120		120		120		120	
150			150		150		150		150	
180			180		180		180		180	
210			210		210		210		210	
240			240		240		240		240	
300			300		300		300		300	
360			360		360		360		360	
420			420		420		420		420	
480			480		480		480		480	
540			540		540		540		540	
600			600		600		600		600	
720			720		720		720		720	
840			840		840		840		840	
960			960		960		960		960	
1080			1080		1080		1080		1080	
1200			1200		1200		1200		1200	
1320			1320		1320		1320		1320	
1440			1440		1440		1440		1440	

TOTAL TIME PUMPED (min)		
AVERAGE YIELD (l/s).		

COMMENTS. 1)

Form 6

2 MAP CODE

DW 71

40 INSTALLATION

NATIONAL GROUND WATER DATA BASE

Company
Address/Code
Signature
Name & Position [print]

112 Customer Name
Postal Address
Street Address
Plot/Erf No. 113 Borehole No.
Farm Name

5 INSTALLATION'S DATE

6 INSTALLATION TYPE	
Airlift	A
Centrifugal pump	C
Gravity suction	G
Hand pump	H
Jet	J
Screw-type pump	M
No equipment	N
Observation tube	O
Piston pump	P
Powerhead	Q
Recorder	R
Submersible pump	S
Turbine	T
Windpump	W
Windpump and powerhead	X
Other[Specify]	Z

7 DEPTH TO PUMP INTAKE (m)

8 TYPE OF POWER	
Diesel engine	D
Electric engine	E
Hand	H
Wind pump	W
Other[Specify]	Z

9 PUMP POWER RATING [kW]

10 MANUFACTURER OF PUMP

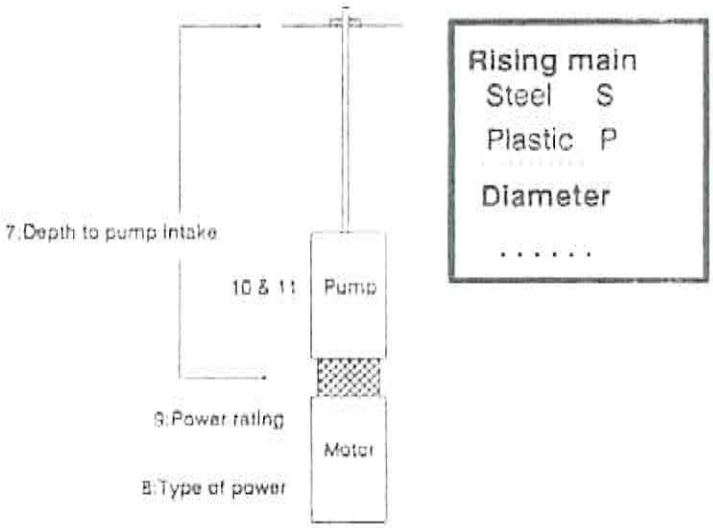
11 SERIAL No OF PUMP

12 POWER METER No (electrical)

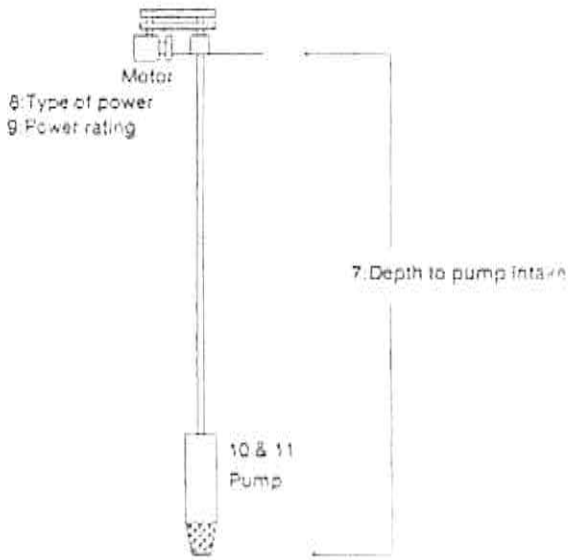
13 MONITORING FACILITY	
Airline	A
Piezometer inside casing	I
Piezometer outside casing	O
Pressure transducer	T
Other[Specify]	Z

14 DATA SOURCE	
Driller's logs	D
Geologist, technician, operator's record	G
Owner's record	O
Pump operator's record	C
Other[Specify]	Z

IMPORTANT : BOREHOLE OWNER
Only a complete set of 6 forms must be sent to:
Directorate : GEOHYDROLOGY
Dept Water Affairs
P/B X313
PRETORIA 0001
DO NOT SEND ONE FORM AT A TIME.



Submersible pump



Lineshaft pump

Form 6a

2 MAP CODE								

RECORD OF EXISTING EQUIPMENT AT BOREHOLE	
Borehole No.	Date
District	Contractor
Village/Farm	
Locality	

ITEM(S) PARAMETER(S)	DESCRIPTION (furnish particulars as are relevant to the specific installation)
TYPE OF INSTALLATION	(State type of pump, eg. reciprocal cylinder, mono-type, submersible, hand, wind, solar, etc.)
Type Name & model Depth installed (m) Element diameter (mm) Element stroke (mm)	
PIPE COLUMNS & SHAFTS	
Diameter (mm) Length / section (m) No. of sections Pipe material Shaft diameter (mm)	
MOTORIZED PUMP (State type of motor, eg. electric or diesel)	
Type Name/model of motor Motor power rating (kW) Motor pulley diam (mm) Pump pulley diam (mm)	
HANDPUMP	
Name/model	
WINDPUMP	
Wheel diameter (m) Mast height (m)	
SOLAR PUMP	
No. of panels Rating per panel (Watts)	
ANCILLARY EQUIPMENT	
Storage tank volume (m^3) Stand height (m) Water meter name/model Water meter reading	

Form 7

2 MAP CODE								

VERTICALITY TEST				
Company		Customer Name		
Address/Code		Postal Address		
Signature		Street Address		
Name & Position (print)		Plot/Erf No.	Borehole No	
		Farm Name		
DEPTH (m)	DEFLECTION (m)	DEFLECTION CALCULATION FACTOR	ACTUAL DRIFT (mm)	COMPASS DIRECTION

Form 8

DW 45

2 MAP CODE

GROUNDWATER SAMPLE CUSTODY

INSTRUCTIONS

1 SAMPLING POINT TYPE CODE

NON STATION		STATION
NO1	BOREHOLE	= S01
NO2	ARTESIAN BOREHOLE	= S02
NO5	MINE	= S05
N20	FOUNTAIN / SPRING	= S20
N21	RIVER / SPRUIT / CREEK	= S21
N51	PAN	= S51
N79	OTHER	= S79

2 DRAINAGE REGION

i.e.
A21 = 0121
J 12 = 0912

3 SAMPLING METHOD CODE

I = IRREGULAR INTV. GRAB
M = PUMPED
U = UNKNOWN
O = FLOWING

4 WATER USE CODE

AD = AGRICULTURAL AND DOMESTIC
AI = IRRIGATION
AS = STOCK WATERING
DA = DOMESTIC
DG = GARDENING
E = NATURE CONSERVATION
P = PUBLIC
TC = COMMERCIAL
TM = MINING
TP = POWER GENERATION

5 EQUIPMENT CODE

A = AIRLIFT
C = CENTRIFUGAL PUMP
H = HAND PUMP
J = JET PUMP
M = MONO PUMP
N = NONE
P = PISTON PUMP
O = POWER HEAD PUMP
R = WATER LEVEL RECORDER
S = SUBMERSIBLE PUMP
T = TURBINE PUMP
W = WIND PUMP
Z = OTHER

6 DEPT CODE

1 = EASTERN CAPE
2 = HIGHVELD
3 = NATAL
4 = OVS
5 = TVL
6 = WESTERN CAPE

7 PRESERVE CODE

= UNKNOWN
0 = UNPRESERVED
1 = Hg Cl 2
2 = HNO3
3 = H2SO4
4 = Na OH
5 = COOLING

8 ANALYSE FOR

MACRO1	MACRO
MACRO2	MACRO + B
MACRO3	MACRO + TURB
PHOS01	MACRO + KN + TP
PHOS02	MACRO + B + KN + TP
TRMEO1	TRACE ELEMENTS
TRMEO2	HG
TRMEO3	AL + FE
CO	UNKNOWN

9 PROJECT NUMBER

= NONE
GH = GEOHYDROLOGY
HN = HYDRO RESEARCH INST
TH = APPLIED HYDROLOGY

H NO

BATCH NO

SAMPLING POINT TYPE CODE: 1

BOTTLE NO.:

DRAINAGE REGION (EG. D41): 2

1:50 000 MAP NO

LAT (DMS)

LONG:(DMS)

L/L ACC: 0 (1m) 1 (10m) 2 (100m) 3 (1000m) 4 (10000m)

DECIMAL

DECIMAL

Non-sta. No.:

W No.

Geohydrology No.: G

FARM / PLACE

Province District Farm No.

FARM NO

PROJECT No.: 9

SAMPLING METHOD CODE 3

Hole depth (m)

DATE sampled 1 9

TIME

Altitude (m)

Site ID

Water use code: 4

Equipment code: 5

Dept Region 6

Temperature (°C)

PRESERVE WITH 7

Water level (m)

Depth (m) or Pump rate (L/s)

ANALYSE FOR 8

SAMPLER

Remarks

Item No		Quantity	Rate	Amount

SECTION NO. 6

BILL NO. 1

TYPE B - NEW BUILDING (1NO)

ELECTRICAL INSTALLATION(CPAP WORK GROUP NO. 160 UNLESS OTHERWISE STATED)

SUPPLEMENTARY PREAMBLES

ELECTRICAL

1. The work is to be carried out in accordance with SANS 10142 and the Occupational Health and Safety Act of 1993 as amended. The installation is to be tested and compliance certificate submitted on completion of works.
2. Workmanship must comply with good engineering practice.
3. All materials necessary to satisfactorily complete the installation as per the bill of quantities.
4. The scope of work is for the complete electrical installation as shown on the layout drawings / site instruction.
5. The installation is to be covered by a 12 month unconditional guarantee, commencing from date of completion and acceptance of the works.
6. Ablution Block Being Demolished - the contractor to make safe and disconnect the feeder cable from the incomer distribution board and also from the distribution board before the demolition of the ablution block.
7. Refurbished Ablution Block - the contractor to verify that the electrical installation is compliant and advise the electrical engineer.
8. New Ablution Block - refer to electrical drawings layout.
9. Light fittings as per the bill of quantities / site instruction.
10. All surface conduit to be mild steel galvanised.

Carried Forward R

	Brought Forward			R
	11. 2.5mm² uPVC copper insulated wiring in conduit to be used			
	LIGHTNING PROTECTION			
	1. This work is to be carried out by a specialist 2. The test result to be below 10 ohms. 3. 25mm² uPVC conduit dropper to be installed. 4. 50mm² Aluminium earth conductors to be used. 5. 10mm² Aluminium ridge conductor to be used for non-metal roofs. 6. Earth spike to be 1.8m. 7. Stainless steel lugs, bolts and nuts.			
	ELECTRICAL INSTALLATION			
	GUARANTEE			
1	Guarantee the efficient and safe working of the whole installation for 12 months after hand over of the completed building to the Department.		Item	
	EARTHING SYSTEM			
2	Earthing of wash hand basin and all cold and hot water piping, by means of standard copper tape earth strapping at regular intervals of 6m and connecting same to the electrical earth system at the distribution board (2 No wash hand basins)		Item	
	TESTING			
3	After the installation has been completed the Electrical Contractor shall issue a certificate of compliance		Item	
4	Before issuing a certificate of compliance, an accredited person shall inspect and test each new installation or extension of an existing installation for compliance with the relevant standard		Item	
	P& G's			
5	Preliminary and General		Item	
	Carried Forward			R

				R
	Brought Forward			
	DISTRIBUTION BOARDS			
	Distribution boards complete with sheet metal trays, frames, sub frames, bus bars, provision for four future circuit breakers, labeling and legend cards			
6	Distribution board DB 1 as per single line drawing 16016_400, supplied complete with detailed shop drawing and specification including circuit breakers, Earth & Neutral busbars.	No	1	
7	20A CBI / HYMAG SX1-G3 single pole 230 V circuit breaker 5 kA fault level installed in existing main board	No	1	
8	40A CBI / HYMAG SX1-G3 single pole 230 V circuit breaker 5 kA fault level installed in existing main board	No	1	
9	Allow to work on existing distribution board and update legend card		Item	
	DISTRIBUTION CABLES			
	600/1000V rated cables laid in ground or in sleeves. To be protected when installed vertically up wall from ground			
10	10mm² 2 Core Airdec cable	m	76	
11	Termination for 10 mm² 2 core cable above	No	2	
12	4mm² 2 Core uPVC SWA Surfix cable	m	45	
13	Termination for 4mm² 2 core cable above	No	2	
	EARTHWORKS (PROVISIONAL)(CPAP WORK GROUP NO. 104 UNLESS OTHERWISE STATED)			
	EXCAVATION			
14	Excavate for and build cable inspection chamber with half brick sides fitted with 600 x 600 x 600 medium duty cover and frame complete with drain holes. Size internally 600 x 600 x 600mm deep	No	1	
	Carried Forward			R

				R
	Brought Forward			
15	Excavate not exceeding 600mm deep in soft intermediate rock material for cabling and cable pipe trench including bedding, backfilling, compaction and disposal of surplus material	m3	19	
16	Excavate not exceeding 600mm deep in hard rock for and cabling and cable pipe trench including bedding, backfilling,compaction and disposal of surplus material	m3	4	
	SLEEVES			
17	50mm uPVC sleeves	m	12	
18	50mm uPVC long radius bend	No	2	
	LIGHTING AND SMALL POWER			
	Thin walled hot dipped galvanised conduits			
19	20mm Diameter surface mounted on brickwork	m	15	
20	20mm Diameter fixed on timber rafters	m	35	
	Thin walled uPVC conduits			
21	20mm Diameter chased in brickwork	m	35	
22	20mm Diameter fixed on timber rafters	m	36	
	CONDUIT BOXES AND FITTINGS			
23	100 x 100 x 100/50mm Deep hot dipped galvanised box for 20mm diameter conduit in brick or concrete walls including conduit ends and cover	No	3	
24	65mm Round hot dipped galvanised box for 20mm diameter steel conduit in brick or concrete walls or ceiling void including conduit ends and cover	No	16	
	Carried Forward			R

				R
	Brought Forward			
	CONDUCTORS			
	uPVC insulated stranded copper conductors drawn into wire ways			
25	2.5mm²	m	198	
	LIGHT SWITCHES, SWITCHED SOCKET OUTLETS ETC.			
	Switches etc. complete with cover plates fixed in flush boxes			
26	20A Light switch with cover plate	No	3	
27	20A IP65 Double pole Weatherproof Isolator	No	1	
	LUMINARIES AND EQUIPMENT			
	Luminaries or equipment complete with lamps, connections etc. mounted in position			
28	Type A - Magnet/Lihlelight or other approved RML round bulkhead with die cast aluminium base & 1xPL26 Watt lamp complete with electronic control gear	No	16	
29	Type B - 2 x 35W T5 Vapour proof fluorescent light fitting complete with electronic control gear	No	1	
30	Photocells inclusive of enclosure	No	1	
	LIGHTNING PROTECTION			
	ABLUTION BLOCK			
31	Undertake soil resistivity test, witnessed by the Engineer inclusive of submitting a typed test report/certificate		Item	
32	10mm² Aluminium conductor	m	45	
33	50mm² uPVC insulated aluminium earth wire	m	22	
34	Bonding of earth tails to sheet trusses/roof sheeting/tiles	No	4	
	Carried Forward			R

				R
	Brought Forward			
35	Supply and install 25mm galvanised conduit	m	16	
36	Supply and install stainless steel lugs	No	4	
37	Supply and install stainless steel bolts and nuts	No	4	
38	Supply and install stop cork box	No	4	
39	1,8m Earth spike	No	10	
	TESTING AND CERTIFICATE OF COMPLIANCE			
40	Allow for testing of the complete installation to be witnessed by the Electrical Engineer, including the issue of SABS Certificate of Compliance of Earthing Systems, Annexures of recorded test results and "As Built" drawings as specified.		Item	
	Carried to Final Summary of Section No. 6			R

Section No. 6
Bill No. 1
Type B - New Building
LDM QUANTITY SURVEYORS

Item No		Quantity	Rate	Amount
	SECTION NO. 6			
	BILL NO.2			
	TYPE E - NEW BUILDING (1NO)			
	ELECTRICAL INSTALLATION (CPAP WORK GROUP NO. 160 UNLESS OTHERWISE STATED)			
	SUPPLEMENTARY PREAMBLES			
	ELECTRICAL			
	1. The work is to be carried out in accordance with SANS 10142 and the Occupational Health and Safety Act of 1993 as amended. The installation is to be tested and compliance certificate submitted on completion of works. 2. Workmanship must comply with good engineering practice. 3. All materials necessary to satisfactorily complete the installation as per the bill of quantities. 4. The scope of work is for the complete electrical installation as shown on the layout drawings / site instruction. 5. The installation is to be covered by a 12 month unconditional guarantee, commencing from date of completion and acceptance of the works. 6. Ablution Block Being Demolished - the contractor to make safe and disconnect the feeder cable from the incomer distribution board and also from the distribution board before the demolition of the ablution block. 7. Refurbished Ablution Block - the contractor to verify that the electrical installation is compliant and advise the electrical engineer. 8. New Ablution Block - refer to electrical drawings layout. 9. Light fittings as per the bill of quantities / site instruction. 10. All surface conduit to be mild steel galvanised.			
	Carried Forward		R	

	Brought Forward			R
	11. 2.5mm² uPVC copper insulated wiring in conduit to be used			
	LIGHTNING PROTECTION			
	1. This work is to be carried out by a specialist 2. The test result to be below 10 ohms. 3. 25mm² uPVC conduit dropper to be installed. 4. 50mm² Aluminium earth conductors to be used. 5. 10mm² Aluminium ridge conductor to be used for non-metal roofs. 6. Earth spike to be 1.8m. 7. Stainless steel lugs, bolts and nuts.			
	ELECTRICAL INSTALLATION			
	GUARANTEE			
1	Guarantee the efficient and safe working of the whole installation for 12 months after hand over of the completed building to the Department	Item		
	EARTHING SYSTEM			
2	Earthing of wash hand basin and all cold and hot water piping, by means of standard copper tape earth strapping at regular intervals of 6m and connecting same to the electrical earth system at the distribution board (2 No wash hand basins)	Item		
	TESTING			
3	After the installation has been completed the Electrical Contractor shall issue a certificate of compliance	Item		
4	Before issuing a certificate of compliance, an accredited person shall inspect and test each new installation or extension of an existing installation for compliance with the relevant standard	Item		
	P& G's			
5	Preliminary and General	Item		
	Carried Forward			R

				R
	Brought Forward			
	DISTRIBUTION BOARDS			
	Distribution boards complete with sheet metal trays, frames, sub frames, busbars, provision for four future circuit breakers, labeling and legend cards			
6	Distribution board DB 1 as per single line drawing 16016_400, supplied complete with detailed shop drawing and specification including circuit breakers, Earth & Neutral busbars	No	1	
7	20A CBI / HYMAG SX1-G3 single pole 230 V circuit breaker 5 kA fault level installed in existing main board	No	1	
8	40A CBI / HYMAG SX1-G3 single pole 230 V circuit breaker 5 kA fault level installed in existing main board	No	1	
9	Allow to work on existing distribution board and update legend card		Item	
	DISTRIBUTION CABLES			
	600/1000V rated cables laid in ground or in sleeves. To be protected when installed vertically up wall from ground			
10	10mm² 2 core Airdec cable	m	67	
11	Termination for 10mm² 2 core cable above	No	2	
12	4mm² 2 core uPVC SWA Surfix cable	m	63	
13	Termination for 4mm² 2 core cable above	No	2	
	Carried Forward			R

				R
	Brought Forward			
	EARTHWORKS (PROVISIONAL)(CPAP WORK GROUP NO. 104 UNLESS OTHERWISE STATED)			
	EXCAVATION			
14	Excavate for and build cable inspection chamber with half brick sides fitted with 600 x 600 x 600 medium duty cover and frame complete with drain holes. Size internally 600 x 600 x 600mm deep	No	1	
15	Excavate not exceeding 600mm deep in soft intermediate rock material for cabling and cable pipe trench including bedding, backfilling, compaction and disposal of surplus material	m3	19	
16	Excavate not exceeding 600mm deep in hard rock for and cabling and cable pipe trench including bedding, backfilling,compaction and disposal of surplus material	m3	4	
	SLEEVES			
17	50mm uPVC sleeves	m	12	
18	50mm uPVC long radius bend	No	2	
	LIGHTING AND SMALL POWER			
	Thin walled hot dipped galvanised conduits			
19	20mm Diameter surface mounted on brickwork	m	9	
20	20mm Diameter fixed on timber rafters	m	29	
	Thin walled uPVC conduits			
21	20mm Diameter chased in brickwork	m	26	
22	20mm Diameter fixed on timber rafters	m	49	
	Carried Forward			R

				R
	Brought Forward			
	CONDUIT BOXES AND FITTINGS			
23	100 x 100 x 100/50mm Deep hot dipped galvanised box for 20mm diameter conduit in brick or concrete walls including conduit ends and cover	No	2	
24	65mm Round hot dipped galvanised box for 20mm diameter steel conduit in brick or concrete walls or ceiling void including conduit ends and cover	No	12	
	CONDUCTORS			
	uPVC insulated stranded copper conductors drawn into wire ways			
25	2.5mm²	m	186	
	LIGHT SWITCHES, SWITCHED SOCKET OUTLETS ETC.			
	Switches etc. complete with cover plates fixed in flush boxes			
26	20A Light switch with cover plate	No	1	
27	20A IP65 Double pole Weatherproof Isolator	No	2	
	LUMINARIES AND EQUIPMENT			
	Luminaries or equipment complete with lamps, connections etc. mounted in position			
28	Type A - Magnet/Lihlelight or other approved RML round bulkhead with die cast aluminium base & 1xPL26 Watt lamp complete with electronic control gear	No	12	
29	Type B - 2 x 35W T5 Vapour proof fluorescent light fitting complete with electronic control gear	No	1	
30	Photocells inclusive of enclosure	No	1	
	Carried Forward			R

				R
	Brought Forward			
	LIGHTNING PROTECTION			
	ABLUTION BLOCK			
31	Undertake soil resistivity test, witnessed by the Engineer inclusive of submitting a typed test report/certificate		Item	
32	10mm² aluminium conductor	m	43	
33	50mm² uPVC insulated aluminium earth wire	m	21	
34	Bonding of earth tails to sheet trusses/roof sheeting/tiles	No	4	
35	Supply and install 25mm galvanised conduit	m	18	
36	Supply and install stainless steel lugs	No	4	
37	Supply and install stainless steel bolts and nuts	No	4	
38	Supply and install stop cork box	No	4	
39	1,8m Earth spike	No	10	
	TESTING AND CERTIFICATE OF COMPLIANCE			
40	Allow for testing of the complete installation to be witnessed by the Electrical Engineer, including the issue of SABS Certificate of Compliance of Earthing Systems, Annexures of recorded test results and "As Built" drawings as specified		Item	
	Carried to Final Summary of Section No. 6			R

Section No. 6
Bill No. 2
Type E - New Building
LDM QUANTITY SURVEYORS

Item No		Quantity	Rate	Amount

SECTION NO. 6

BILL NO.3

TYPE F - NEW BUILDING (1NO)

ELECTRICAL INSTALLATION(CPAP WORK GROUP NO. 160 UNLESS OTHERWISE STATED)

SUPPLEMENTARY PREAMBLES

ELECTRICAL

1. The work is to be carried out in accordance with SANS 10142 and the Occupational Health and Safety Act of 1993 as amended. The installation is to be tested and compliance certificate submitted on completion of works.
2. Workmanship must comply with good engineering practice.
3. All materials necessary to satisfactorily complete the installation as per the bill of quantities.
4. The scope of work is for the complete electrical installation as shown on the layout drawings / site instruction.
5. The installation is to be covered by a 12 month unconditional guarantee, commencing from date of completion and acceptance of the works.
6. Ablution Block Being Demolished - the contractor to make safe and disconnect the feeder cable from the incomer distribution board and also from the distribution board before the demolition of the ablution block.
7. Refurbished Ablution Block - the contractor to verify that the electrical installation is compliant and advise the electrical engineer.
8. New Ablution Block - refer to electrical drawings layout.
9. Light fittings as per the bill of quantities / site instruction.
10. All surface conduit to be mild steel galvanised.

Carried Forward R

				R
	Brought Forward			
	11. 2.5mm² uPVC copper insulated wiring in conduit to be used			
	LIGHTNING PROTECTION			
	1. This work is to be carried out by a specialist 2. The test result to be below 10 ohms. 3. 25mm² uPVC conduit dropper to be installed. 4. 50mm² Aluminium earth conductors to be used. 5. 10mm² Aluminium ridge conductor to be used for non-metal roofs. 6. Earth spike to be 1.8m. 7. Stainless steel lugs, bolts and nuts.			
	ELECTRICAL INSTALLATION			
	GUARANTEE			
1	Guarantee the efficient and safe working of the whole installation for 12 months after hand over of the completed building to the Department.	Item		
	EARTHING SYSTEM			
2	Earthing of wash hand basin and all cold and hot water piping, by means of standard copper tape earth strapping at regular intervals of 6m and connecting same to the electrical earth system at the distribution board (2 No wash hand basins)	Item		
	TESTING			
3	After the installation has been completed the Electrical Contractor shall issue a certificate of compliance	Item		
4	Before issuing a certificate of compliance, an accredited person shall inspect and test each new installation or extension of an existing installation for compliance with the relevant standard	Item		
	P& G's			
5	Preliminary and General	Item		
	Carried Forward			R

				R
	Brought Forward			
	DISTRIBUTION BOARDS			
	Distribution boards complete with sheet metal trays, frames, sub frames, busbars, provision for four future circuit breakers, labeling and legend cards			
6	Distribution board DB 1 as per single line drawing 16016_400, supplied complete with detailed shop drawing and specification including circuit breakers, Earth & Neutral busbars.	No	1	
7	20A CBI / HYMAG SX1-G3 single pole 230 V circuit breaker 5 kA fault level installed in existing main board	No	1	
8	40A CBI / HYMAG SX1-G3 single pole 230 V circuit breaker 5 kA fault level installed in existing main board	No	1	
9	Allow to work on existing distribution board and update legend card		Item	
	DISTRIBUTION CABLES			
	600/1000V rated cables laid in ground or in sleeves. To be protected when installed vertically up wall from ground			
10	10mm² 2 core Airdec cable	m	45	
11	Termination for 10mm² 2 core cable above	No	2	
12	4mm² 2 core uPVC SWA Surfix cable	m	55	
13	Termination for 4mm² 2 core cable above	No	2	
	Carried Forward			R

				R
	Brought Forward			
	EARTHWORKS (PROVISIONAL)(CPAP WORK GROUP NO. 104 UNLESS OTHERWISE STATED)			
	EXCAVATION			
14	Excavate for and build cable inspection chamber with half brick sides fitted with 600 x 600 x 600 medium duty cover and frame complete with drain holes. Size internally 600 x 600 x 600mm deep	No	1	
15	Excavate not exceeding 600mm deep in soft intermediate rock material for cabling and cable pipe trench including bedding, backfilling, compaction and disposal of surplus material	m3	19	
16	Excavate not exceeding 600mm deep in hard rock for and cabling and cable pipe trench including bedding, backfilling,compaction and disposal of surplus material	m3	4	
	SLEEVES			
17	50mm uPVC sleeves	m	12	
18	50mm uPVC long radius bend	No	2	
	LIGHTING AND SMALL POWER			
	Thin walled hot dipped galvanised conduits			
19	20mm Diameter surface mounted on brickwork	m	9	
20	20mm Diameter fixed on timber rafters	m	31	
	Thin walled uPVC conduits			
21	20mm Diameter chased in brickwork	m	26	
22	20mm Diameter fixed on timber rafters	m	45	
	Carried Forward			R

				R
	Brought Forward			
	CONDUIT BOXES AND FITTINGS			
23	100 x 100 x 100/50mm Deep hot dipped galvanised box for 20mm diameter conduit in brick or concrete walls including conduit ends and cover	No	2	
24	65mm Round hot dipped galvanised box for 20mm diameter steel conduit in brick or concrete walls or ceiling void including conduit ends and cover	No	13	
	CONDUCTORS			
	uPVC insulated stranded copper conductors drawn into wire ways			
25	2.5mm²	m	186	
	LIGHT SWITCHES, SWITCHED SOCKET OUTLETS ETC.			
	Switches etc. complete with cover plates fixed in flush boxes			
26	20A Light switch with cover plate	No	1	
27	20A IP65 Double pole Weatherproof Isolator	No	2	
	LUMINARIES AND EQUIPMENT			
	Luminaries or equipment complete with lamps, connections etc. mounted in position			
28	Type A - Magnet/Lihlelight or other approved RML round bulkhead with die cast aluminium base & 1xPL26 Watt lamp complete with electronic control gear	No	14	
29	Type B - 2 x 35W T5 Vapour proof fluorescent light fitting complete with electronic control gear	No	1	
30	Photocells inclusive of enclosure	No	1	
	Carried Forward			R

	Brought Forward			R
	LIGHTNING PROTECTION			
	ABLUTION BLOCK			
31	Undertake soil resistivity test, witnessed by the Engineer inclusive of submitting a typed test report/certificate		Item	
32	10mm² aluminium conductor	m	35	
33	50mm² uPVC insulated aluminium earth wire	m	22	
34	Bonding of earth tails to sheet trusses/roof sheeting/tiles	No	4	
35	Supply and install 25mm galvanised conduit	m	18	
36	Supply and install stainless steel lugs	No	4	
37	Supply and install stainless steel bolts and nuts	No	4	
38	Supply and install stop cork box	No	4	
39	1,8m Earth spike	No	10	
	TESTING AND CERTIFICATE OF COMPLIANCE			
40	Allow for testing of the complete installation to be witnessed by the Electrical Engineer, including the issue of SABS Certificate of Compliance of Earthing Systems, Annexures of recorded test results and "As Built" drawings as specified.		Item	
	Carried to Final Summary of Section No. 6			R

Section No. 6
Bill No. 3
Type F - New Building
LDM QUANTITY SURVEYORS

SECTION SUMMARY - ELECTRICAL INSTALLATION (PROVISIONAL)

Bill No		Page No	Amount
1	Type B - New Building	148	
2	Type E - New Building	154	
3	Type F - New Building	160	

Carried to Final Summary Page R

Section No. 6
LDM QUANTITY SURVEYORS

FINAL SUMMARY

Section No		Page No	Amount
1	PRELIMINARIES	23	
2	REPAIRS AND RENOVATIONS TO PIT ABLUTIONS (PROVISIONAL)	27	
3	NEW BUILDINGS	123	
4	EXTERNAL WORKS (PROVISIONAL)	138	
5	BOREHOLE INSTALLATION (PROVISIONAL)	142	
6	ELECTRICAL INSTALLATION (PROVISIONAL)	161	
	SUB-TOTAL		R
	VAT @ 15%		R
	Total Carried to Form of Offer (T2.21)		R

LDM QUANTITY SURVEYORS

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

PART C3. SCOPE OF WORKS

C3.1 SCOPE OF WORKS
GCC FOR CONSTRUCTION WORKS (Edition 2 of 2010)

Scope of Works complied in accordance with SANS 10403 where reference is made to this part of SANS 1921-1:2004

Project title:	**DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER**		
Tender no:	**ZNTU04134W**	**Project Code:**	**060602**

SECTION 1

1 EXTENT OF THE WORKS

1.1 EMPLOYERS OBJECTIVES

The upgrade of the school's existing sanitation infrastructure including associated external works.

1.2 OVERVIEW OF THE WORKS

The upgrade of the existing school sanitation infrastructure to the schools including demolitions, construction of new ablution facilities, including external works, new walkways, jojo tanks, borehole installation etc.

1.3 EXTENT OF THE WORKS

Refer to Bills of Quantities and attached drawings for detailed scope of work.

1.4 LOCATION OF THE WORKS

KZN North Coast Region: 27°32'55"S 32°18'29"E

1.5 TEMPORARY WORKS

All temporary work to comply with the Occupational Health and safety Act (Act 85 of 1993)

2 ENGINEERING

2.1 EMPLOYER'S DESIGN

The Employer design and related documentation and specification is as per the Appointed Consultants.

2.2 DESIGN BRIEF

As per the drawings and specifications provided by the appointed Engineers and Architects.

2.3 DRAWINGS

See list of Drawings/Annexures attached to this document.

	2.4	**DESIGN PROCEDURES** As per the design, documentation and specification issued by the Appointed Consultants and/or the Employer.
3		**PROCUREMENT**
	3.1	**PREFERENTIAL PROCUREMENT PROCEDURES** This tender will be subject to the implementation of the Preferential Procurement Regulations, 2022, pertaining to the Preferential Procurement Policy Framework Act, Act Number 5 of 2000 and the relevant Supply Chain Management Legislation and the KwaZulu-Natal Supply Chain Management Policy Framework published by the KwaZulu-Natal Provincial Treasury. Tenderers are referred to www.kzntreasury.gov.za for access to the relevant documents. Tenderers are advised to familiarize themselves with the contents of the KwaZulu-Natal Supply Chain Management Policy Framework regarding Preference Point Systems, evaluation of tenders appeals and other matters.
	3.2	**RESOURCE STANDARD PERTAINING TO TARGETED PROCUREMENT** NOTE : This project will be adjudicated as not exceeding R 50,000 000,00
	3.3	**SCOPE OF MANDATORY SUBCONTRACT WORK** Not Applicable
	3.4	**PREFERRED SUBCONTRACTORS/SUPPLIERS** As per the conditions stated in form T2.6, in Section 1 of this document.
	3.5	**SUBCONTRACTING PROCEDURES** Not Applicable
4		**CONSTRUCTION**
	4.1	**APPLICABLE SANS 2001 STANDARDS FOR CONSTRUCTION WORKS** The Contractor is referred to the "ASAQS Model Preambles to Trades - 2008", any "Supplementary Preambles", the Electrical Specifications and Mechanical Specification for full descriptions of materials and methods referred to in these Bills of Quantities/Lump Sum documents, insofar as they apply. The Contractor is advised to study the "Standard Preambles to all Trades", any "Supplementary Preambles", the Electrical Specifications and Mechanical Specification, before pricing Bills of Quantities/Lump Sum documents. Where the description in the Bills of Quantities/Lump Sum documents differ from those in the Standard Electrical Specifications, the descriptions in the Bills of Quantities/Lump Sum documents are to apply. No claim whatsoever will be allowed in respect of errors in pricing due to brevity of description of items in the Bills of Quantities/Lump Sum documents which are fully described when read in conjunction with the relevant Preambles and/or Specifications. Suppliers of materials and the like, whose quality systems apply with one or more of the SABS/SANS ISO 9000 Series should be used whenever possible in the absence of a particular SABS/SANS Specification Standard Mark. Wherever the words "shall be deemed to be included in the description", "shall be stated" or other words having the same effect, appear in the Standard System, it shall be deemed that all descriptions in these Bills of Quantities/Lump Sum documents incorporated such inclusions and statements whether specifically stated or not. The Contractor is hereby informed that where SABS/SANS Specifications are referred to in these Bills of Quantities/Lump Sums documents and Specifications thereto, then ONLY the Specification of Work Clauses will apply. The method of measurement and payment clauses will NOT apply to this Contract. The Contractor is hereby informed that risk of collapse and keeping excavations free from water (excluding subterranean water) generally are deemed to be included in the descriptions unless accommodated in the system of measurement. Please refer to the Geotechnical Investigation report when included at the end of these tender documents. Whenever reference is made to "Sub-Contractor", "Nominated Sub-Contractor" or the like in the specifications included or referred to in these Bills of Quantities/Lump Sums documents, it shall be deemed to mean "Contractor" as defined.

4.2 APPLICABLE NATIONAL AND INTERNATIONAL STANDARDS

See above 4.1

4.3 PARTICULAR / GENERIC SPECIFICATIONS

The Contractor is referred to the following documents whether attached to this document or not:

SPECIFICATION	PAGES
Specification for HIV/AIDS Awareness (CIDB)	HIV1 TO HIV3
Project Specific Health and Safety Specification	26
ASAQS Model Preambles for Trades 2008	51
General Electrical Specification	E/1 to E/21
Lightning Protection Installation	LP/1 to LP/6

4.4 CERTIFICATION BY RECOGNIZED BODIES

Only contractors registered with the Electrical Contracting Board of South Africa in accordance with the Regulations of the Occupational Health and Safety Act will be accepted and permitted to do work under this contract. Only contractors registered with the Department of Labour in the safe handling of asbestos products are allowed to remove and dispose of any asbestos type material and issue the associated certificates.

4.5 AGRÉMENT CERTIFICATES

Not Applicable

4.6 PLANT AND MATERIAL PROVIDED BY THE EMPLOYER

Not Applicable

4.7 SERVICES AND FACILITIES PROVIDED BY THE EMPLOYER

Not Applicable

4.8 OTHER SERVICES AND FACILITIES

The Contractor shall provide any artificial lighting which may be necessary or required for the proper execution of the works, and provide electric power and water required by all Sub-Contractors, Nominated Sub-Contractors and Sub-Contractors appointed directly by the Administration.
The Contractor shall give all notices and pay all fees in connection with temporary electrical and water connections and shall connect temporary Electrical and Water meters for and pay for all current and water consumed.
The Contractor is advised that the permanent light fittings and water points of any kind installed in the Works are not to be used to provide temporary lighting and supplement water requirements for construction purposes.

5 MANAGEMENT

5.1 APPLICABLE SANS 1921 STANDARDS

Tenderers are referred to
SECTION 2 : SPECIFICATION DATA ASSOCIATED WITH SANS 1921-1:2004 IN THIS DOCUMENT

5.2 RECORDING OF WEATHER

The Contractor shall keep record of abnormal climatic conditions to facilitate the adjudication of claims for extension of the contract period.

The Contractor shall allow in his programme for the following number of days for rain days (rain > 10mm per day) as per the table below:

CURRENT YEAR			YEAR + 1	YEAR + 2
January	w/days		3	3
February	w/days		3	3
March	w/days		3	3
April	w/days		3	3
May	w/days		3	3
June	w/days		3	3
July	w/days		3	
August	w/days		3	
September	w/days		3	
October	w/days		3	
November	w/days		3	
December	w/days	3	3	

5.3 MANAGEMENT MEETINGS

In order to facilitate the smooth functioning of the Works and to ensure the closest co-operation between all the parties concerned, the Employer will call for regular meetings to be held on the site (one technical meeting and one site meeting per month), at which a senior member of the Contracting firm and the General Foreman of the Works will always be required to be present.
In addition to the above, other persons will be required to attend these meetings as and when their presence is necessary, e.g., Consultants in all disciplines, representatives of the various Sub-Contractors, etc.
Proper minutes of these meetings will be kept by the Employer\Principal Agent and copies will be circulated to all persons attending the meetings and to others who need to be kept informed.

5.4 FORMS FOR CONTRACT ADMINISTRATION

The Employer shall provide all necessary forms.

5.5 ELECTRONIC PAYMENTS

The Contractor shall provide all required information to the Employer to facilitate electronic payments upon request.

5.6 DAILY RECORDS

The Contractor shall keep daily records of people and equipment employed as well as a site diary in respect of work performed on the site.
At the end of each week the Contractor shall provide the Principal Agent with a written record, in schedule form, reflecting the number and description of tradesmen and labourers employed by him and all Sub-Contractors on the works each day.
At the end of each week the Contractor shall provide the Principal Agent with a written record, in schedule form, reflecting the number, type and capacity of all plant, excluding hand tools, currently used on the works.

5.7 BONDS AND GUARANTEES

The Contractor shall within 10 calendar days after receiving notice from the Engineer and prior to receiving a completed copy of this agreement, including the schedule of deviations (if any), contact the Employer's agent (whose details are given in the contract data) to arrange the delivery of any bonds, guarantees, proof of insurance and any other documentation to be provided in terms of the conditions of contract identified in the Contract Data.

5.8	**PAYMENT CERTIFICATES** Requirements will be in accordance with the Employers prescriptions.
5.9	**PERMITS** The Contractor is advised that, in the case of an existing building or institution, all security measures in force will remain in operation and he must acquaint himself and his Employees with them as he and his Employees will at all times be subject to these measures. The Contractor will on no account extend his operations beyond the confines of the building site as indicated by the Employer and must ensure that all his Employees are made aware of these limits. Any Employee disregarding this instruction and found outside the limit of the building site without authority, shall be redeployed immediately and shall not again be employed on this Contract. The Contractor will be responsible for ensuring that this instruction is strictly enforced and must provide and remove upon completion or when directed, such other necessary temporary barriers, fences, etc., as may be required and is to allow opposite this item for any charges he may wish to make in this connection. The Employer will accept no responsibility whatsoever for damage to or the loss of plant, materials, etc., from the site.
5.10	**PROOF OF COMPLIANCE WITH THE LAW** The following certificates must be provided before first delivery is taken: - HIV/STI Report (Bound into this document) - Electrical Compliance Certificate - Plumbing Compliance Certificate - Lightning Certificate - Soil Protection Certificate - Concrete test and cube certificates - Waterproofing Guarantee certificates - TR1 and TR2 prefabricated roof truss certificates - Soil compaction certificates - Electrical and Mechanical test certificates - Plumbing and drainage pressure test certificates - Fire Compliance Certificate - Entomology Certificate - SANS 10400-A:2010 compliance certificates - Latest National Building Regulation
5.11	**INSURANCE PROVIDED BY THE EMPLOYER** Not Applicable

SECTION 2

SPECIFICATION DATA ASSOCIATED WITH SANS 1921-2004

Clause Numbers	
4.1.7	**The requirements for drawings, information and calculations for which the Contractor is responsible are**
	Prefabricated roof trusses design must be submitted for approval 30 days prior to erections.
4.2.1	**The responsibility strategy assigned to the Contractor for the works is:**
	Strategy A
4.2.2	**The structural engineer is:**
	Map Africa Consulting Engineers
4.2.3	**Drawings & other info are to be submitted in accordance with the contractors programme**
	N/A
4.3	**The planning, programme and method statement are to comply with the following:**
	The project would be done classroom block for classroom block and the Contractor must allow for the fact that

4.12.1	**Samples of materials**
	The work is to be executed with materials of the best specified and in the most substantial and workmanlike manner under the inspection of the Employer and to his satisfaction. The Contractor shall furnish, without delay, such samples as called for or may be called for by the Employer, who may reject all materials or workmanship not corresponding with the approved sample. The samples of materials, workmanship and finishes that the Contractor is to provide and deliver to the employer are: - Tile sample. - Brick sample. - Light Fitting sample. - Roof Sheeting sample. - Gutter sample. - Door sample. - Screed panel 2m x 2m impact test. - Tested trial mix to be approved by the Engineer. - Others as per the Consultants requirements.
4.12.2	**Fabrication drawings that the contractor is to provide to the employer are**:
	None
4.12.3	**Office accommodation, equipment, accommodation for site meetings and other facilities for use by the employer and his agents are:**
	OFFICE FOR FOREMAN
	Provide, erect, maintain and remove at completion a suitable temporary office for the Contractor or his Foreman, perfectly secured, lighted and ventilated and having a desk with drawers.
	TELEPHONE
	The Contractor shall provide a telephone on the site for the use of the Contractor and all Sub-Contractors for the duration of the Contract, and must make the necessary application for connection, give all notices and pay all fees, rentals and charges for the service and also for all calls.
	OFFICE FOR INSPECTOR OF WORKS
	Provide, erect, maintain and remove at completion a well constructed temporary office for the Inspector of Works not less than 4 x 3 m on plan and 3 m high to eaves to the approval of the Employer. The office shall be constructed of wood framing covered externally with corrugated iron or corrugated asbestos and with a lean-to roof covered with the same material as the external wall covering. The office shall be lined internally with soft board or other approved material and a ceiling shall be provided of the same material as the internal lining. A suspended wood floor shall be provided and is to finish not less than 300 mm above the ground level. A lockable door and a window, which provides adequate light and ventilation, shall be fitted. An office constructed of 115 mm thick brick-work and provided with a screeded concrete floor and roofed and ceiled as above described may be accepted as an alterative but prior permission of the Employer will be necessary before construction of such an office is commenced and his requirements shall be stated and fulfilled by the Contractor. The office shall be fitted in an approved manner with a sloping topped desk of height and length suitable for the laying out and studying of drawings, a desk or table with not less than two lock-up drawers, shelves, seating and wash-stand, and the Contractor shall provide all necessary attendance.
	TELEPHONE IN OFFICE FOR INSPECTOR OF WORKS
	The Contractor shall arrange for the installation of a lockable telephone in the Office for the Inspector of Works for the duration of the Contract. The Contractor will be required to make the necessary application for connection and give all notices on behalf of the Employer. The Employer will, however, be responsible for the direct payment of all fees, rentals and other charges by Telkom for the service for the Inspector of Works and for all calls made from this telephone.

	SHED
	Provide, erect, maintain and remove at completion, ample temporary sheds for the proper storage of materials and for the use of the workmen, and remove when no longer required.
4.14.6	**The requirement for provision and erection of signboards are:**
	Supply, erect, maintain and remove at completion a painted notice board, size overall 2800 x 2345 mm high sign written to detail as Drawing No. T9506 which drawing is available from offices of the Department of Public Works. Only the official notice board is to be displayed on the site and no Sub-Contractor's boards will be permitted. The Contractor, at his own cost, may provide a board on which all sub-contract firms' names may be sign written. The notice board is to be to the approval of the Employer and is to be maintained in first class condition and placed where directed at the entrance to the site and remain there for the duration of the Contract.
4.17.1	**Requirement for the termination, diversion or maintenance of existing services**
	Should the Contractor come in contact with any underground cables or pipes during excavations, immediate notification must be made to the Employer and all work in the vicinity of such cables, pipes, etc., shall cease until authority to proceed has been obtained from the Employer. Should the Contractor damage underground cables or pipes resulting in a disruption of services to an existing institution such damage shall be repaired immediately.
4.17.3	**Services which are known to exist on the site:**
	Investigate and provide detail drawings.
4.17.4	**Requirement for detection apparatus**
	None
4.18	**ADDITIONAL HEALTH AND SAFETY REQUIREMENTS ARE:**
	By the submission of a tender, any Tenderer will, if awarded the contract to which this tender document relates, be deemed to be the mandatory as envisaged by Section 37 (2) of the Act. As a mandatory the successful Tenderer will be deemed to be the "principal contractor" and an employer in his/her/their own right with duties as prescribed in the Act and accordingly will be deemed to have agreed to be solely responsible for ensuring that in connection with the service to which this tender document relates, all work will be performed and machinery and plant used in accordance with the Act. Should the Contractor, for whatever reason be unable to perform as required by the Act, the Contractor undertakes to inform the Employer accordingly. Tenderers are advised that it is a Condition of this Tender that a 'Construction Phase Safety, Health and Environmental Plan' specifically relates to the project for which tenders are being submitted and must be prepared by the Tenderer and submitted with the other tender documents at the time of tender. Failure to do so will invalidate the tender. Tenderers are therefore advised to study the 'Construction Safety, Health and Environmental Specification' which is issued as part of this tender document, the ASAQS Model Preambles to Trades - 2008, any project Specification included in this tender document and any and all drawings which are referred to and issued as part of this tender document before preparing their own project specific 'Construction Phase Safety, Health and Environmental Plan' . Tenderers are also advised that such a plan which is submitted with a tender but is incomplete or considered inadequate by the Employer or his Representative will invalidate the tender. The Contractor will be deemed to have satisfied himself with his obligations in terms of the Act and to have allowed for all costs arising from compliance with the Act as no claim for extra costs arising from compliance with, and obligations in terms of the Act will be entertained.
4.22	**WORK BY NOMINATED AND SELECTED SUBCONTRACTORS COMPRISE:**
	As per the relevant tender returnable.

C3.2 - SPECIFICATION FOR HIV/AIDS AWARENESS

1 Scope

This generic specification contains requirements applicable to the reduction of the risk of transfer of the HIV virus between and among construction workers and the local community through the following four strategies:

a) raising awareness about HIV/AIDS;

b) providing construction workers with access to condoms;

c) HIV counselling, testing and referral services; and

d) Sexually Transmitted Infection diagnosis and treatment.

2 Normative references:

The following standard contains provisions that, through reference in this text, constitute provisions of this standard:

SANS 4074 ISO 4074, *Condom Rubbers*

3 Definitions and Abbreviations

3.1 Definitions

Construction Worker: all persons in the employ of the contractor or in the employ of any of the subcontractors contracted by the contractor.

Local Community: the communities local to the site which are most likely to have contact with the construction worker and, in particular, sex workers in those communities.

Service provider: the natural or juristic person recognised by the South African Department of Health as specialist in conducting Aids Awareness Programmes.

3.2 Abbreviations

STI: Sexually transmitted infection

HIV: Human Immunodeficiency Virus

AIDS: Acquired Immune Deficiency Syndrome

4 Objectives

The objectives are to:

a) reduce the risk of transfer of the HIV virus between and among construction workers and the local community;

b) raise awareness amongst construction workers and the local community of the risk of infection with the HIV virus;

c) promote early diagnosis; and

d) assist affected individuals to access care and counselling.

5 Requirements

5.1 General requirement

The contractor shall, in order to satisfy the objectives stated in 4:

a) make condoms complying with the requirements of SABS ISO 4074 available to all construction workers at readily accessible points on the site, suitably protected from the elements, for the duration of the contract;

b) either place and maintain HIV/AIDS awareness posters of size of not less than A1 in areas which are highly trafficked by construction workers, or provide construction workers with a pamphlet, in languages largely understood by construction workers, which

c) encourage voluntary HIV/STI testing;

d) provide information concerning counselling, support and care of those that are infected services; and

e) comply with the requirements of 5.2.

***The* provisions *of* 5.1 c) *and d) do not apply to* this contract.**

5.2 HIV awareness programme

5.2.1 The contractor shall:

a) engage a qualified service provider as described in the scope of works to conduct an HIV Awareness Programme which is structured to achieve the outcomes stated in 5.2.3 for contract workers as soon as a construction workers camp is established and populated or, where no such camp is established, within two weeks of the commencement of a significant portion of the works and at subsequent intervals, if any, provided for in the scope of works; and

b) arrange for, provide a suitable venue, and instruct all construction workers to attend the HIV Awareness Programme and notify the Employer's Representative of the date, time and venue whenever a session with construction workers is conducted.

Note: The National Department of Public Works maintains a list of qualified service providers.

5.2.2 The contractor shall do nothing to dissuade construction workers from attending such an HIV Awareness Programme and shall take all reasonable steps to ensure that a minimum of 90% of construction workers engaged in the works attend such a programme, when it is conducted.

5.2.3 The outcomes of the HIV Awareness Programme shall as a minimum, result in contract workers exposed to such a programme being able to:

a) communicate the existence of problems of HIV and be able to outline the consequences of transmission of HIV to or from the local community;

b) recall and communicate the mode of HIV transmission and preventative measures including the proper use of the condom.

The HIV/ Aids awareness programme described in 5.2 is to be repeated at four month intervals throughout the duration of the contract. (Four times in total, including the initial one at the start of the contract)

5.3 Reporting

5.3.1 The contractor shall prepare and attach to his claims for payment a brief report which outlines how the actions taken by the contractor in the period for which payment is claimed satisfy the requirements and a schedule which lists the names, identity numbers, trade / occupation and name of employer of all construction workers exposed to the programme (see **HIV/STI Compliance Report**).

5.3.2 The employer's representative shall certify the report and schedule described in 5.3.1 whenever a claim for payment is issued to the employer.

Note: In the event that the contractor fails to satisfy the requirements of this specification, the employer (Head: Public Works) may apply any of the sanctions provided for in the contract. Sanctions may include the application of a financial penalty of .04% of the Contract Sum.

The *HIV /Aids* awareness programme *described* in 5.2 shall in addition *be conducted* for the benefit *of* the local community on two occasions in the community centre nearest to the building site. The contractor shall be *responsible* for inviting identifiable community-based *institutions and organisations, churches, and schools to participate in the* programme.

C3.3 - HIV/STI COMPLIANCE REPORT

Pro-forma reporting format in terms of the SPECIFICATION FOR HIV/AIDS AWARENESS

Project Code:	060602		
Payment Claim number:		Period covered by payment claim:	

1. Distribution of condoms (briefly describe where and how condoms are distributed).

2. Posters / pamphlets (briefly describe where posters were placed / how pamphlets were distributed).

3. Voluntary testing (briefly describe the actions taken / information provided to promote testing).

4. Counselling, support and care (summarise information provided).

5. HIV awareness programme (briefly describe action).

6. Schedule of construction workers exposed to the HIV awareness programme.

Name	Identity number	Trade / occupation	Name of employer

I hereby declare the above to be a true reflection of actions taken to ensure compliance with the specification.

For Contractor:

Name: _____

Signature: _____

Date: _____

Employer's representative:

Name: _____

Signature: _____

Date: _____

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

PART C4. SITE INFORMATION

C4.1 SITE INFORMATION
GCC FOR CONSTRUCTION WORKS (2 Edition of 2010)

Project title:	**DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER**		
Tender No.	**ZNTU04134W**	**Project Code:**	**060602**

C4.1 Site Information

C4.1 GENERAL

(a) The nature of ground is assumed to be loose, sandy material, possibly interspersed with soft and hard rock.

(b) The site is an existing, operational school. Extreme care must be taken to ensure that construction areas are kept secure and not accessible to students/staff. The Contractor must take note that storage material on site must be done in a well organized manner and the Contractor must create a workable space which will not disrupt the operation of the school or endanger the learners on the premises. The working area must be clearly demarcated and entrance to the work area must be controlled.

(c) The Tenderer is to note that various blocks that are currently in use, are required to be worked on. Planning and co-ordination therefore will be required by the Contractor to ensure that school activities are not interrupted, and under no circumstances will the Contractor be allowed to utlize any occupied buildings for any purpose other than the renovation of that building.

C4.2 GEOTECHNICAL INVESTIGATION REPORT

(a) Not Applicable

C4.2 WAIVER OF CONTRACTOR'S LIEN

DEFINITIONS

Contractor: _____

Employer: Head: Public Works (KZN Department of Public Works: Province of KwaZulu-Natal)

Agreement: GCC FOR CONSTRUCTION WORKS - SECOND EDITION 2010

Works (description): **DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER**

Site: GPS CO-ORDINATES: 27°32'55"S 32°18'29"E (S27.54861111; E32.30805556)

AGREEMENT

The Contractor waives, in favour of the Employer, any lien or right of retention that is or may be held in respect of the Works to be executed on the Site

Thus done and signed at _____ on _____
[Date]

_____ _____
Name of signatory Capacity of signatory

_____ _____
As witness For and on behalf of the contractor who by signature hereof warrants authorisation hereto

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

PART C5 - DRAWINGS / ANNEXURES

C5.1 - LIST OF DRAWINGS/ANNEXURES

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

Tender No.:	ZNTU04134W	Project Code:	060602

(Where drawings/annexures are issued, document compilers must insert the following paragraph and list the applicable drawings/annexures below.)

The following drawings/annexures shall be issued during the Tender period to form part of the tender documentation. Where applicable, drawings/annexures could be re-issued to the Contractor at commencement of the construction phase.

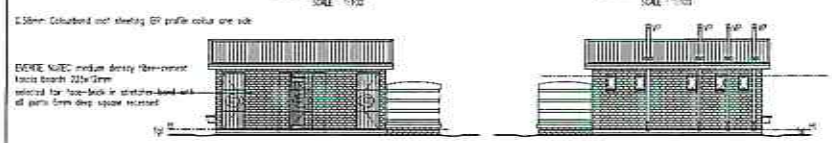
DRAWING NO	DESCRIPTION
ARCHITECTURAL	**VIP**
2B-2G-IP-TB	2 Seater Girls, 2 Seater Boys, Teacher / Paraplegic Ablution - Type B (VIP)
6B-TB	6 Seater,3 Pans, & 3 Urinal Type E (VIP)
6G-TB	6 Seater Girls, 6 Pans Type F (VIP)
TRH	Toilet Roll Holder
STRUCTURAL	**VIP**
447/301-REVP1	2 Seater Girls, 2 Seater Boys, Teacher / Paraplegic Ablution - Type B (VIP)
447/304-REVP1	6 Seater,3 Pans, & 3 Urinal Type E (VIP)
447/305-REVP1	6 Seater Girls, 6 Pans Type F (VIP)
447/312-REVP1	Tank Stand
ELECTRICAL	**VIP**
009-REV0	2 Seater Girls, 2 Seater Boys, Teacher / Paraplegic Ablution - Type B (VIP)
012-REV0	6 Seater,3 Pans, & 3 Urinal Type E (VIP)
013-REV0	6 Seater Girls, 6 Pans Type F (VIP)
005-REV0	Typical DB

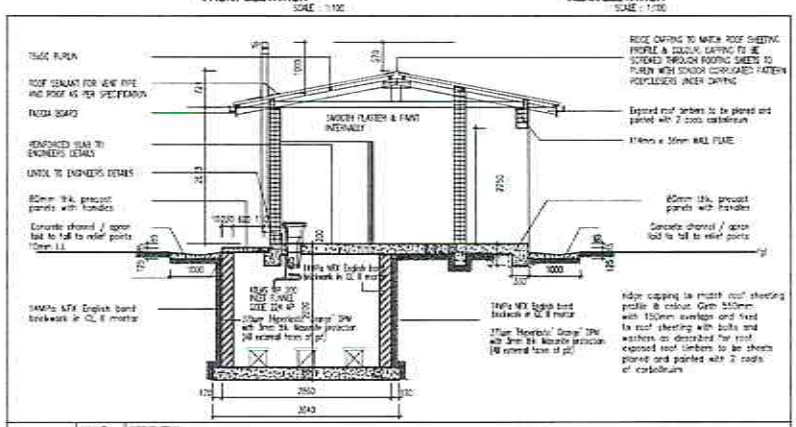
ANNEXURES	
Annexure 1	ASAQS Model Preambles for Trades 2008
Annexure 2	General Electrical Specifications
Annexure 3	Lightning Protection Specifications
Annexure 4	Map of Tender Submission Location
Annexure 5	Joint Venture Agreement
Annexure 6	Project Specific Health and Safety Specification
Annexure 7	Health and Safety Bill of Quantities
Annexure 8	Geotechnical Investigation Report - (If applicable)
Annexure 9	EPWP Employment Contract and EPWP Specification/Checklist
Annexure 10	Attendance Register - Infrastructure and Other Projects
Annexure 11	EPWP Data Collection tool for Phase 3 System
Annexure 12	Structural Engineers Project Specification Booklet

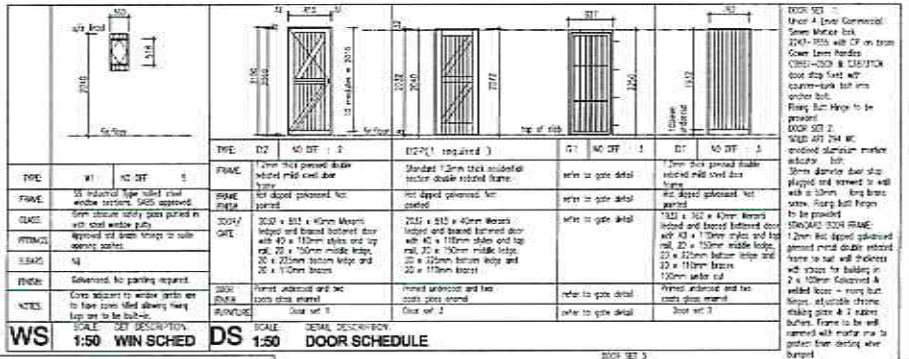
KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

STANDARD DRAWINGS AND SDP LAYOUTS







GENERAL SPECIFICATION NOTES:

This specified drawing to be read in conjunction with the NBRI Standard Preambles.

Roof:
0.58mm Colourbond roof sheeting 899 profile colour one side, fixed with lock wing roofing screws, plastic sealant at side laps. SANS309 899 pattern polystyrene under ridge capping.
Determine the direction of prevailing winds before laying sheets. sheets must project at 150mm beyond purlins at eaves. holes in sheets to be drilled not punched
sheets are to be fixed to 76x50 purlins spaced @ maxed 900cc on 114x38 trusses spaced @ max 1200cc
prefabricated steated roof trusses to be to engineers approval
roof is to be tied down to walls with 30mm x 1.6mm thick and 1.5m long galvanised hoop iron straps built in at least 10 courses
SISALATION 400 heavy industrial grade aluminium foil based underlay laid taunt over purlin and fixed with galvanised steel straining wires

HURRICANE CLIPS to be provided and secured to purlins and trusses at every intersection externally and internally
galvanised wire to be used.
exterior exposed roof timber to be painted with 2 coats ABE PINCHENE before fixing of roof sheets, fascias and barge boards.

FASCIAS:
EVERITE NUTEC medium density fibre-cement fascia boards
12mm thick x 225mm with aluminium H-profile fascia joiners
Drill for and fix with hot-dip
galvanised drive screws and washers.
Roof pitch to be 11 degrees

BARGEBOARD:
EVERITE NUTEC fibre cement sockettess bargeboards
200mm x 16mm.

Aluminium H-profile barge board joiners
Drill for and fix with hot-dipped galvanised screws and washers.
45 x 50mm trimmer batten fixed underside of purlin ends for barge board fixing.

WINDOWS:
Hot dipped galvanised " SS Industrial Type " metal windows.
No painting required.
6mm obscure glazing with steel putty. No painting necessary.
Refer to window schedule.

DOORS:
Galvanised Steel Single Rebated door frames (1.2mm thick) for 115mm brick walls – not painted with 1 pair of DOTEK DPR-05-012 , 102X75X3MM stainless steel swing butt hinge
1932 x 762 x 42mm Merant Hamad. braced and ledged battened doors.
All doors to be painted, undercoat and 2 coats – gloss enamel.
1 rubber door stop plugged and screwed to wall in position where padlock plate would strike wall

FASCIAS:
EVERITE NUTEC medium density fibre-cement fascia boards
12mm thick x 225mm with aluminium H-profile fascia joiners
Drill for and fix with hot-dip
galvanised drive screws and washers.

FOUNDATIONS / FLOORS:
refer to Engineers specification

WALLS:
All walls are to comply with "Part K" of the National Building Regulations
CORNERSTONE Travertine FSA Face brick walls in stretcher bond with ruled joints and perpends externally.
CORNERSTONE COMMONS to be used where to receive plaster.
CORNERSTONE ENGINEERING Bricks below ground level in foundation walls.
Brickforce to all courses from window head to underside wallplate.
Galvanised clamp wire wall ties (2 per square metre – laid staggered.)
External face of inner skin to be painted with bitumen paint.
External sills to be of sloping brick-on-edge rolled course. sills to be 30 degrees
Internal sills to be EVERITE NUTEC fibre-cement complete with fixing lugs and self-tapping screws.
3ply moisture embossed damp-proof membrane stepped below all window sills.
Where plaster is required internally (1.5 – 16mm thick), plaster is to have 1:5 cement sand mix.
Cement plaster to be painted with "ANEL V ALL" emulsion paint. Colour to be approved by the Department.
Beam filling to underside of roofing sheets.

VERANDAH WALKWAY:
concrete floor to be graded to fall 50mm and
cast in panels of 1800 maximum. Control joints at every 2.4m centres. Finish to be wood float non-slip. Control joints sealed with 10mm Polysulphide sealant with backing strip and centboard.

CONCRETE APRONS / CHANNELS
Concrete aprons laid to a fall of 1:200 and in panels with control joints at every 3m centres on fill compacted to MOD AASHTO 2005.
Control joints sealed with 10mm Polysulphide sealant with backing strip and centboard.

BACKFILL:
Filling to be approved clean earth, well watered and rammed in layers not exceeding 150mm in depth and thoroughly consolidated to a density of 93% MOD AASHTO

AIR-BRICKS:
220 x 150mm Terca-cotta vermin proofed air-bricks built into brick bears filling at approx. 1250mm centres.

SANITARY FITTINGS:
ATLAS VIP 200 (Code 2220VP) pedestal with footpiece and lid. Colour granite.
490 MP Waterless urinal fitting and waste.
SOLO MINOR PEDIJET ATLAS 1816P
TOILET ROLL HOLDER PER PAN AS PER DETAIL – TRH-0

6mm Silvered float glass copper backed mirrors with polished edges holed for and fixed with chromium plated dome capped mirror screws with rubber buffers to plugs in brickwork or concrete

FLOORS:
Refer to engineers specification re: 200 microns GUNFLEX LDSB BLACK waterproofing on
75mm oven ward blinding and 1:4 compacted to MOD AASHTO 2005.
Slab to be poured in accordance with SABS 1186.
(Certificate must be provided)

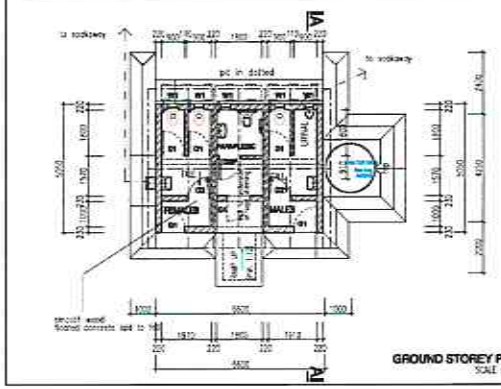
GN | detail description: GENERAL SPECIFICATION / CONSTRUCTION NOTES

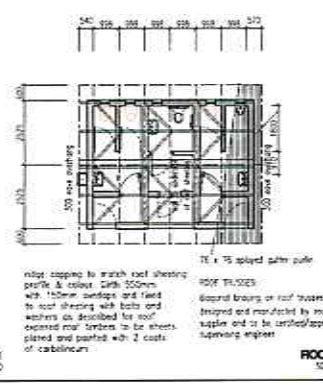
DOOR SET 1:
Union 4 Lever Commercial Series Mortice lock
2247-1005 with CP on brass Cover 1mm Handles
C2001-C2021 & C2012TCK door stop fixed with counter-sunk bolt into anchor bolt.
Rising Butt Hinge to be provided
DOOR SET 2:
SOLID ART 294 WC
anodised aluminium mortice adjustor bolt
38mm diameter door stop plugged and screwed to wall with 6 50mm long brass screw. Rising butt hinges to be provided
STANDARD DOOR FRAME:
1.2mm thick dipped galvanised pressed metal double rebated frame to suit wall thickness with lugs for building in
2 x 10mm Galvanised & welded lugs – rising butt hinges, adjustable chrome striking plate & 2 rubber buffers. Frame to be well rammed with mortar mix to protect from denting when bumped

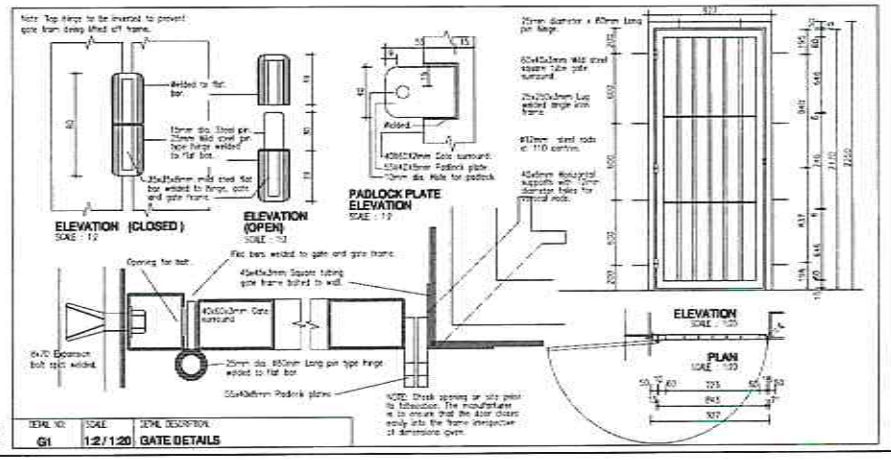
DOOR SET 3
1.2 gal – 203MM DIA-02-012 102x75x3mm Stainless steel rising butt hinge + light lead
2.2 each – 203MM SPECTRA 300x25mm stainless steel pull handle with fixing screws
1.5 off – Lever 2181 Yellow/hard polyamide bolt for passplate, etc
1.5 each – Samco 180-02-003 stainless steel adjustable roller bolt
1.2 each – 203MM 200-02-017 stainless steel floor stop
NB set in passplate supersedes by Samco Series Atlas comply with SANS1905

GENERAL NOTES

1. Contractor to verify all dimensions on site before commencement of any work.
2. Do not scale from drawings.
3. Any discrepancies to be reported to the Engineer before commencement of any work.
4. All dimensions are in millimetres unless otherwise stated.
5. All work to be carried out in accordance with the National Building Regulations and SABS 0400.
6. Contractor to provide all temporary shoring, bracing and propping as required.
7. Contractor to provide all necessary safety measures and barricades.
8. Contractor to liaise with all relevant authorities and utility companies.
9. Contractor to provide as-built drawings upon completion.
10. Contractor to provide guarantees and warranties as required.







STATUS OF ISSUE
FOR TENDER

SIGNATURE BY CLIENT DEPARTMENT

Rev. No.	Date	REVISIONS	Init.

Checked by Consultant
Name: N. FRANCIS
Signature:
Date: 06-09-18

PROJECT MANAGER
PRINCIPAL AGENT
LDM

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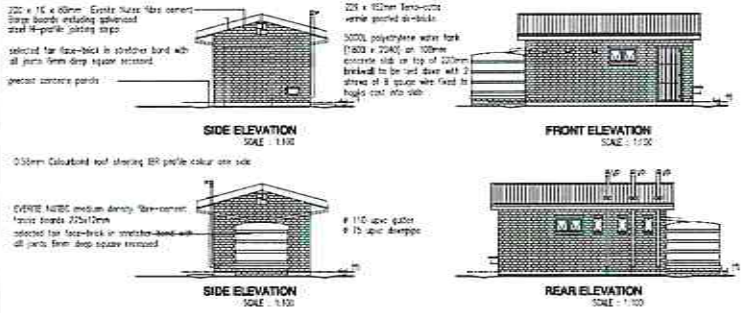
architecture + restoration + urban design
think architecture
francis
architect & interiors

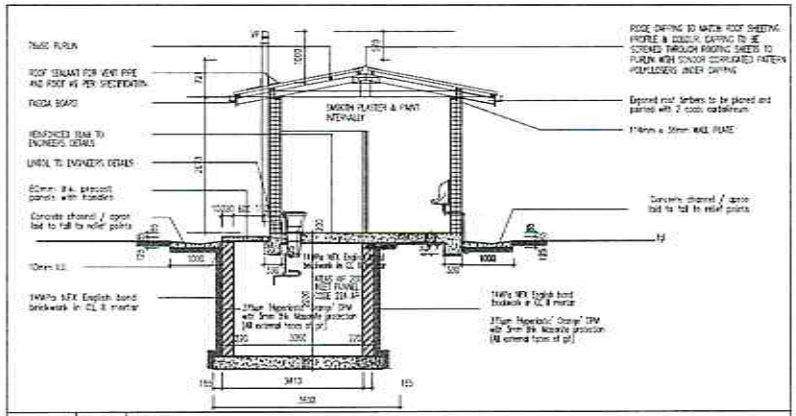
PROVINCE OF KWAZULU-NATAL
DEPARTMENT OF PUBLIC WORKS
HEAD OF PUBLIC WORKS
A. ADHIKARI

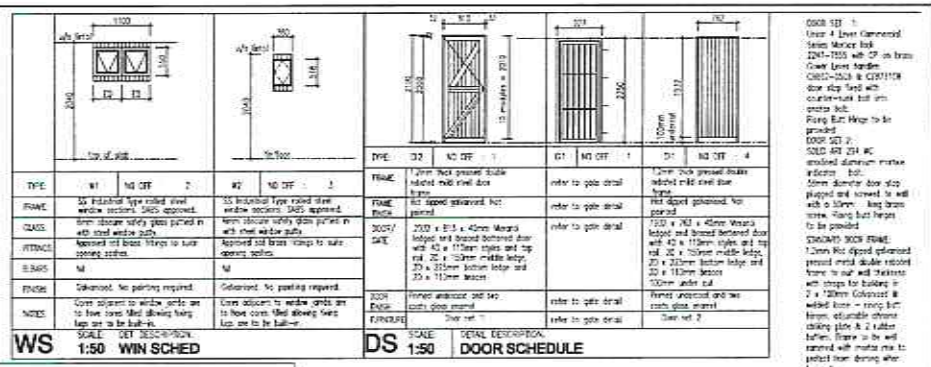
PROJECT
DEPARTMENT OF EDUCATION
SANITATION PROGRAMME
VIP TOILETS

DRAWING DESCRIPTION			type
3 SEATER GIRLS 3 SEATER BOYS – 1 PAN & 1 URINAL 3 TEACHER PANS			B
DRAWN: N. GENU	CHECKED: N. francis	PRINCIPAL AGENT	
DATE: 06-09-18	SCALES: AS SHOWN	ARCHITECT: N. francis	
DRAWING No.: 28-2G-1P-TB	REVISION: 0	STATUS: T	SHEET SIZE: A1	SHEET: 1/1
Where No: 064539	Contr. No.			

Stamped by Plans Approval Committee







GENERAL SPECIFICATION NOTES:

This specified drawing to be read in conjunction with the NBRI Standard Preambles.

Roof:
0.58mm Colourbond roof sheeting IBR profile colour one side, fixed with lead head ring roofing screws, metallic sealant at side laps. SCANSA IBR pattern polystyrene under ridge capping.
Determine the direction of prevailing winds before laying sheets, sheets must project at 225mm beyond purlins at eaves. Holes in sheets to be drilled not punched.
sheets are to be fixed to 76x50 purlins spaced @ maxi 920cc on 114x38 Sturdex spaced @ max 1250cc.
prefabricated clerated roof trusses to be to engineers approval.
roof is to be tied down to walls with 30mm x 1.6mm thick and 1.6m long galvanised hoop irons strapps built in at least 10 courses
SISALATEX 420 heavy industrial grade aluminium foil based underlay laid taunt over purlin and fixed with galvanised steel straining wire.

HURRICANE CLIPS to be provided and secured to purlins and trusses at every intersection externally and internally
galvanised wire to be used.
exterior exposed roof timbers to be painted with 2 coats ABE FINISHRITE before fixing of roof sheets, fascias and barge boards.

FASCIAS
EVERITE NUTEC medium density fibre-cement fascia boards
12mm thick x 225mm with aluminium H-profile fascia joiners
Drill for and fix with hot-dip galvanised drive screws and washers.
Roof pitch to be 11 degrees

BARGEBOARD:
EVERITE NUTEC fibre cement sackcloth barge boards
200mm x 80mm

Aluminium H-profile barge board joiners
Drill for and fix with hot-dipped galvanised screws and washers
76 x 50mm diameter bolters fixed underside of purlin ends for barge board fixing.

WINDOWS
Hot dipped galvanised " SS Industrial Type " metal windows
No painting required.
6mm obscure glazing with steel putty. No painting necessary.
Refer to window schedule.

DOORS:
Galvanised Steel Single Rebated door frames (1.2mm thick) for 115mm brick walls – not painted with 1 pair of BOHLER DIN-125-012 , 102X152X4MM stainless steel mining Butt Hinge
1932 x 762 x 40mm Versatil framed, braced and ledged battened doors
All doors to be planed, undercut and 2 coats – gloss enamel

1 rubber door stop plugged and screwed to wall in position where padlock plate would strike wall

FASCIAS:
EVERITE NUTEC medium density fibre-cement fascia boards
12mm thick x 225mm with aluminium H-profile fascia joiners
Drill for and fix with hot-dip galvanised drive screws and washers

FOUNDATIONS / FLOORS:
refer to Engineers specification

WALLS:
All walls are to comply with "Part K" of the National Building Regulations.
COPDERM Travertine FBA Face brick walls in stretcher bond with ruled joints and perpends externally.
COPDERM COMPASS to be used where to receive plaster.
COPDERM ENGINEERING Bricks below damp proof level in foundation walls.
Brickforce to all courses from window head to underside wallplate. Galvanised clamp wire wall ties (3 per square metre – laid staggered.)
Exposed face of brick skin to be painted with bituthem paint
Exposed cills to be of sloping brick-on-edge water tourte, cills to be 30 degrees.
Internal cills to be EVERITE NUTEC fibre-cement complete with facing caps and self-capping screws.
30% micron embossed damp-proof membrane stepped below all window cills.
Where plaster is required internally (1:5 – 16mm thick), plaster in to type 1:5 cement sand mix.
Exposed plaster to be painted with WALL 'n' KILL emulsion paint. Colour to be approved by the Department.
Beam filling to underside of moving sheets

VERANDAH WALKWAY:
Verandah floor to be graded to fall 50mm and
cast in panels of 1850 centres. Control Joints at every 9.4m centres. Finish to be wood float non-slip. Control joints sealed with 15mm Polysulphide sealant with backing strip and softboard.

CONCRETE APRONS / EMBANKS
Concrete aprons laid to a fall of 1:200 and in panels with control joints at every 3m centres on fill compacted to MOD AASHTO 180.
Control joints sealed with 10mm Polysulphide sealant with backing strip and softboard.

BACKFILL
Filling to be approved clean earth, well watered and rammed in layers not exceeding 150mm in depth and thoroughly consolidated to a density of 93% MOD AASHTO.

AIR-BRICKS
229 x 152mm Terra-cotta vermin proofed air-bricks built into brick beam filling at approx 1200mm centres.

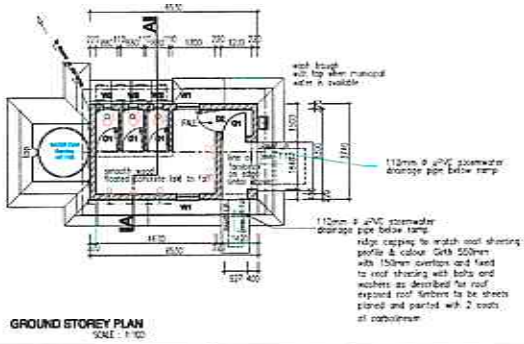
SANITARY FITTINGS
ATLAS VIP 200 (Code 2224APG) pedestal with footplate and lid. Colour: pagoda.

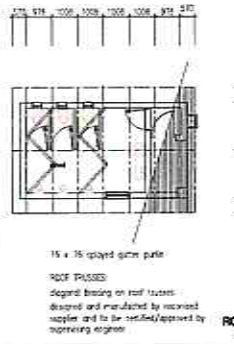
435 AP Waterless urinal fitting and waste.
SOLIT WASH TROUGH ATLAS 3644P
TOILET ROLL HOLDER PER PAN AS PER DETAIL – TRH-0

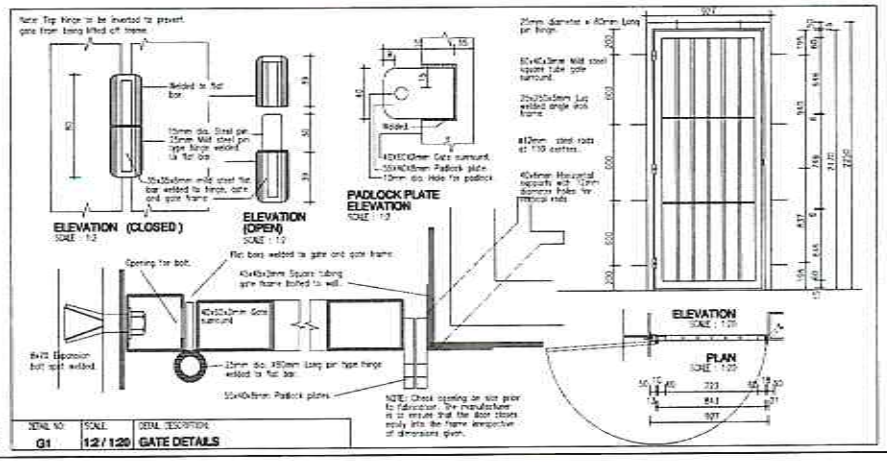
5mm Silvered float glass angled bedded mirrors with polished edges bedd ded and fixed with chromium plated dome capped mirror screws with rubber buffers to plugs in brickwork or concrete

FLOORS
Refer to engineers specification or 200
mixture SUPPLAS 209 BLACK waterproofing all
25mm inert sand bed on 50 compacted to MOD AASHTO T99.
Slab to be pastered in accordance with SANS 1163.
(Certificate must be provided)

GN	detail description: GENERAL SPECIFICATION / CONSTRUCTION NOTES







STATUS OF ISSUE
FOR TENDER
SIGNATURE BY CLIENT DEPARTMENT

Rev. No.	Date	REVISIONS	INIT.

Checked by Consultant:
Name: N. FRANCIS
Signature
Date: 06-09-18

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francis
architect & interiors

PROVINCE OF KWAZULU-NATAL
DEPARTMENT OF PUBLIC WORKS
HEAD OF PUBLIC WORKS
N. GOVENDER

PROJECT
DEPARTMENT OF EDUCATION
SANITATION PROGRAMME
VIP TOILETS

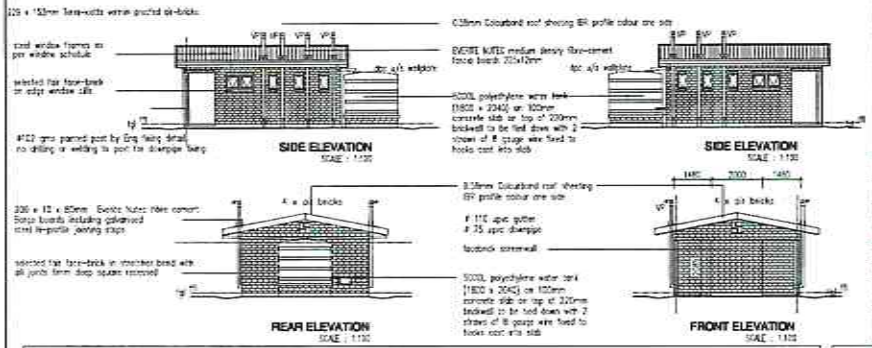
DRAWING DESCRIPTION
6-SEATER BOYS
3 PAN
3 URINAL
Type: E

DRAWN	CHECKED	PRINCIPAL AGENT
n. gavu	n. francis	
DATE	SCALES	PROJECT MAN.
06-09-18	AS SHOWN	QS CONSULTANT

DRAWING No.	REVISION	STATUS	SHEET SIZE	SHEET
6B-TB	0	T	A1	1/1

Wimp No: 064519
Cmis No.

Stamped by Plans Approval Committee



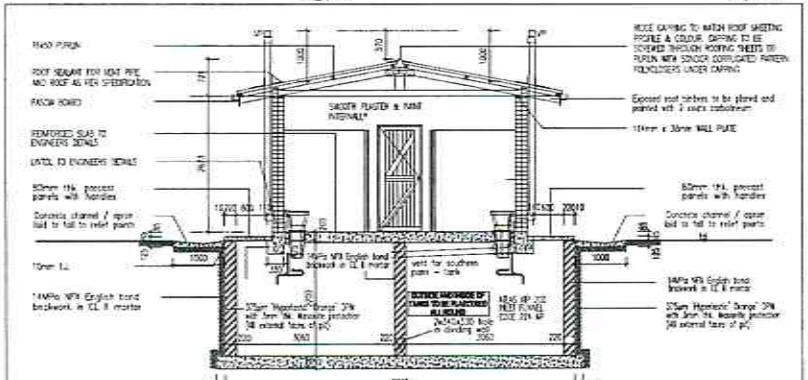
WS	SCALE: 1:50	DET. DESCRIPTION: WIN SCHED

TYPE:	W1	NO OFF : 2	W2	NO OFF : 6
FRAME:	25 Industrial type rolled steel window sections. SABS approved		25 Industrial Type rolled steel window sections. SABS approved	
GLASS:	4mm obscure safety glass putted in with steel window putty		4mm obscure safety glass putted in with steel window putty	
FITTINGS:	Approved stay bolts fittings to suite opening sashes.		Approved stay bolts fittings to suite opening sashes.	
FIXING:	Nil		Nil	
FINISH:	Galvanised. No painting required.		Galvanised. No painting required.	
NOTES:	Glass adjacent to window jambs are to have cases filled allowing fixing lugs are to be built-in.		Glass adjacent to window jambs are to have cases filled allowing fixing lugs are to be built-in.	

DS	SCALE: 1:50	DETAIL DESCRIPTION: DOOR SCHEDULE

TYPE:	D2	NO OFF : 1	G1	NO OFF : 1	D1	NO OFF : 6
FRAME:	1.2mm thick pressed double rebated mild steel door frame	refer to gate detail			1.2mm thick pressed double rebated mild steel door frame	
FRAME FINISH:	Hot dipped galvanised. Not painted	refer to gate detail			Hot dipped galvanised. Not painted	
DOOR/ GATE:	2532 x 813 x 40mm Meranti ledged and braced battened door with 42 x 110mm styles and top rail, 32 x 150mm middle ledge, 23 x 203mm bottom ledge and 23 x 150mm braces.	refer to gate detail			1932 x 762 x 40mm Meranti ledged and braced battened door with 42 x 110mm styles and top rail, 32 x 150mm middle ledge, 23 x 203mm bottom ledge and 23 x 150mm braces. 150mm under cut	
DOOR FINISH:	Primed undercoat and two coats gloss enamel	refer to gate detail			Primed undercoat and two coats gloss enamel	
FURNITURE:	Door set 1	refer to gate detail			Door set 2	

DOOR SET 1:
Union 4 Lever Commercial Series Mortice lock 2247-7555 with CP on brass Lever Levers handles (3855-0568 & 0278127CP) door stop fixed with counter-sunk bolt and anchor bolt.
Rising Butt Hinges to be provided.
DOOR SET 2:
SOLIC MT 254 WC anodised aluminium mortice deadlock bolt.
150mm diameter door stop plugged and screwed to wall with a 50mm loop brass screw. Rising Butt Hinges to be provided
STANDARD DOOR FRAME
1.2mm thick dipped galvanised pressed metal double rebated frame to suit wall thickness with straps for builders or 2 x 100mm Galvanised & welded lugs – rising butt hinges, adjustable chrome striking plate & 2 rubber buffers. Frame to be well rammed with mortar mix to protect lower corners when bumped



refer to dwg 447/305 rev P1 for Engineering drawings

SANITARY FITTINGS TO CONNECT TO SEPTIC TANK OR MUNICIPAL SEWER

INVERT LEVELS TO BE DETERMINED VIA SURVEY DRAWING

SIGNS - EVERY IS DEPENDENT ON EXISTING INVERT CONDITION OTHERWISE LEVINAL TO BE CONNECTED TO PIT

FOLLOWING TO BE CONFIRMED BY PRINCIPAL, SCHOOL GOVERNING BODY & PROFESSIONAL TEAM

- Colour of roof sheeting
- Colour of Fascia/soffit
- Colour of wall paint
- Colour of doors

FOLLOWING TO BE CONFIRMED ON SITE DUE TO SITE CONDITIONS

Soak-away & Evaporation areas
- Position/orientation of building
- Position of pit/s tanks

ORIENTATION OF VIP TOILETS

If possible, the doorpipe should always facing NORTH
Maximum 30° of North is acceptable
This will allow continue exposure to the sun. The pipe will heat up, more effectively and a better draft will be created from the pit to the open air above.
110mm diameter vent pipe to be painted black.

Where double sided toilet blocks – the South side toilets to be vented on the North side

DO NOT INSTALL THE SYSTEM WITHOUT THE FUNNEL!

CONFIRMATION OF INSTALLATION OF BASINS AND ASSOCIATED FITTINGS

Only if municipal water or available wash hand basins will be installed
ATLAS CARYSTY WHITE (CODE 345) AP

GENERAL SPECIFICATION NOTES:

This specified drawing to be read in conjunction with the PEDI Standard Preambles.

Roof:
0.5/6mm Colourbond roof sheeting IBR profile colour one side, fixed with leak king roofing screws, plastic sealant at side laps. SUPADEX IBR pattern polycloser under ridge capping.
Determine the direction of prevailing winds before layout sheets. sheets must prepare at 50mm beyond purlins of eaves holes in sheets to be drilled not punched
sheets are to be fixed to TE453 purlins spaced @ maxand 900cc on 114x38 trusses spaced @ max 1220cc
prefabricated checked roof trusses to be to engineers approval
roof is to be tied down to walls with 30mm x 1.6mm thick and 1.5m long galvanised hoop irons straps built in at least 10 courses
SISALATION 400 heavy industrial grade aluminium foil based underlay laid taunt over purlin and fixed with galvanised steel stapling wires

HURRICANE CLIPS to be provided and secured to purlins and trusses at every intersection externally and internally
galvanised wire to be used.
exterior exposed roof timber to be painted with 2 coats ARE PROVINITE before fixing of roof sheets, fascias and barge boards.

FASCIAS:
EVERITE NUTEC medium density fibre-cement fascia boards
16mm thick x 225mm with aluminium H-profile fascia joiners
Drill for and fix with hot-dip galvanised screws and washers.
Roof pitch to be 15 degrees

BARGEBOARD:
EVERITE NUTEC fibre cement sockettess bargeboards
200mm x 60mm.

Aluminium H-profile barge board joiners
Drill for and fix with hot-dipped galvanised screws and washers.
15 x 50mm trimmer bottom fixed underside of purlin ends for barge board fixing.

WINDOWS:
Hot dipped galvanised " SS Industrial Type " metal windows.
No painting required.
4mm obscure glazing with steel putty. No painting necessary.
Refer to window schedule.

DOORS:
Galvanised Steel Single Rebated door frames (1.2mm thick) for 110mm brick walls – not painted with 1 pair of DORMA DIR-65-012 , BZ3733UNM stainless steel rising butt hinge
1932 x 762 x 40mm Meranti framed, braced and ledged battened doors.
All doors to be primed, undercoat and 2 coats – gloss enamel

1 rubber door stop plugged and screwed to wall in position where padlock plate would strike wall

FOUNDATIONS / FLOORS:
refer to Engineers specification

WALLS:
All walls are to comply with "Part H" of the National Building Regulations.

CORDRYN Travertine FBA Face Brick walls in stretcher bond with ruled joints and perpends externally.
CORDRYN COMMONS to be used where to receive plaster.
CORDRYN ENGINEERING Bricks below ground level in foundation walls.

Brickforce to all courses from window head to underside cellplate.
Galvanised cranz wire wall ties (7 per square metre – laid staggered.)

External face of inner skin to be painted with bituminer paint.
External cills to be of sloping brick-on-edge rolled course, cills to be 30 degrees.
Internal cills to be EVERITE NUTEC fibre-cement
complete with fixing lugs and self-tapping screws.
375 micron embossed damp-proof membrane stepped below all window cills.
Where plaster is required internally (13 – 16mm thick), plaster is to have 1:6 cement:sand mix.
Cement plaster to be painted with "WALL 'n' ALL" emulsion paint.
Colour to be approved by the Department.
Beam filling to underside of roofing sheets.

VERANDAH RAILINGS:
Veranda floor to be graded to fall 50mm and cast in panels at 1850 centres. Control Joints at every 1.4m centres. Finish to be wood float non-slip. Control joints sealed with 10mm Polysulphide sealant with backing strip and softboard.

CONCRETE APRONS / CHANNELS:
Concrete aprons laid to a fall of 1:200 and in panels with control joints at every 3m centres on 98 compacted to MOD AASHTO T180.
Control joints sealed with 10mm Polysulphide sealant with backing strip and softboard.

BACKFILL:
Filling to be approved clean earth, well watered and rammed in layers not exceeding 150mm in depth and thoroughly consolidated to a density of 90% MOD AASHTO.

ANT-HYPERS:
228 x 152mm Terra-cotta vermin proofed air-bricks built into brick beam filling at approx. 1350mm centres

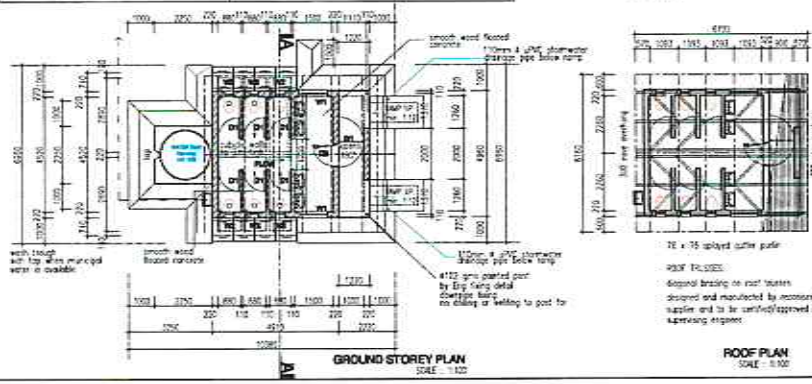
SANITARY FITTINGS:
ATLAS VIP 200 (Code 222AP) pedestal with backpiece and lid. Colour granite.
TOILET ROLL HOLDER PER PAN AS PER DETAIL – TRH-0

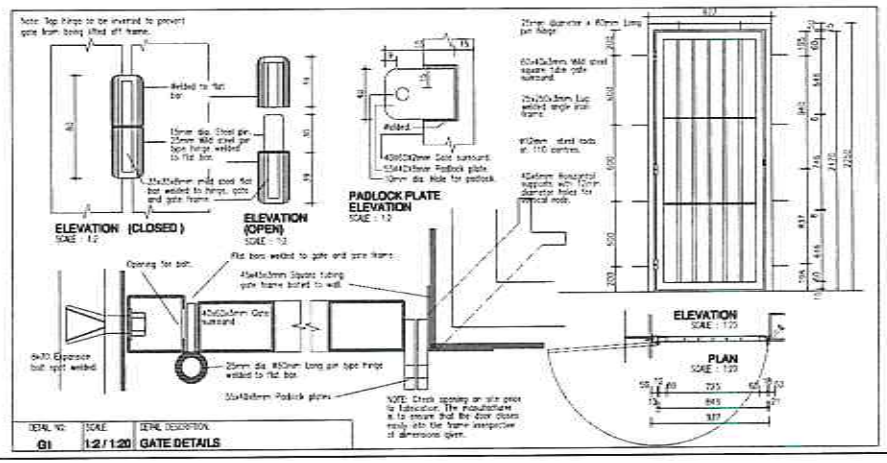
JOLT WASH THROUGH ATLAS 365AP

Silver Silvered float glass copper backed mirrors with polished edges holed for and fixed with chromium plated stone capped mirror screws with rubber buffers to place in brickwork or concrete

FLOORS:
Refer to engineers specification on 252
microsec DURAPLAS USB BLACK waterproofing at
20mm screed sand bed on 150 compacted to MOD AASHTO 93%.
Soil to be poisoned in accordance with SABS 1163.
[Certificate must be provided]

GN	detail description: GENERAL SPECIFICATION / CONSTRUCTION NOTES





GI	SCALE: 1:2 / 1:20	DETAIL DESCRIPTION: GATE DETAILS

STATUS OF ISSUE
FOR TENDER

SIGNATURE BY CLIENT DEPARTMENT

Rev. No.	Date	REVISIONS	INIT.

Checked by Consultant
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Signature:
Date: 06-08-18

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HEAD OF PUBLIC WORKS
A. SOMDOOD

PROJECT
DEPARTMENT OF EDUCATION
SANITATION PROGRAMME
VIP TOILETS

DRAWING DESCRIPTION
6 STEATER GIRLS
6 PANS

Type: F

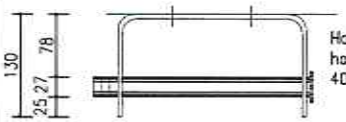
DRAWN	n. gazu	CHECKED	n. francis	PRINCIPAL AGENT	✓
DATE	06-09-18	SCALES	AS SHOWN	PROJECT MAN.	✓
				CA CONSULTANT	✓

DRAWING No.	REVISION	STATUS (S-C-T-E-F)	SHEET SIZE	SHEET
6G-T6	0	T	A1	1/1

Minor No: 064539
Cents No:

Stamped by Plans Approval Committee

Bend a 3mm thick steel plate as shown, with 2 x 30 holes to support roller. Fix to wall with 2 x 8mm dia. rawl bolts



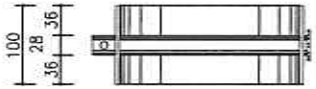
PLAN

Hole for padlock on one side of toilet roll holder and on the other side weld a 40mm x 3mm thick steel plate.

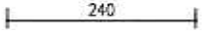
27 dia. x 2mm thick steel pipe toilet roll holder.

Note:–
Provide one toilet roll holder for girls toilet and one toilet roll holder for boys toilet– as shown on plan.

Steel to be finished with one coat zinc–chromate primer, one universal undercoat and two coats gloss enamel paint in approved colour.



All edges and sharp corners of bent plate are rounded to a radius of 1mm.



ELEVATION

Supply one padlock per holder.
N.B. All padlocks must be opened by one key
Supply one key for every 5 padlocks.

DETAIL No:	SCALE:	DETAIL DESCRIPTION
TRH	**1:5**	**DETAIL TOILET ROLL HOLDER**

STATUS OF ISSUE
FOR TENDER

SIGNATURE BY CLIENT DEPARTMENT

Revisions

Rev. No.	Date	REVISIONS	INIT.

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PROVINCE OF KWAZULU-NATAL
DEPARTMENT OF PUBLIC WORKS
HEAD OF PUBLIC WORKS
A. GOVENDER

PROJECT
DEPARTMENT OF EDUCATION
SANITATION PROGRAMME
VIP TOILETS

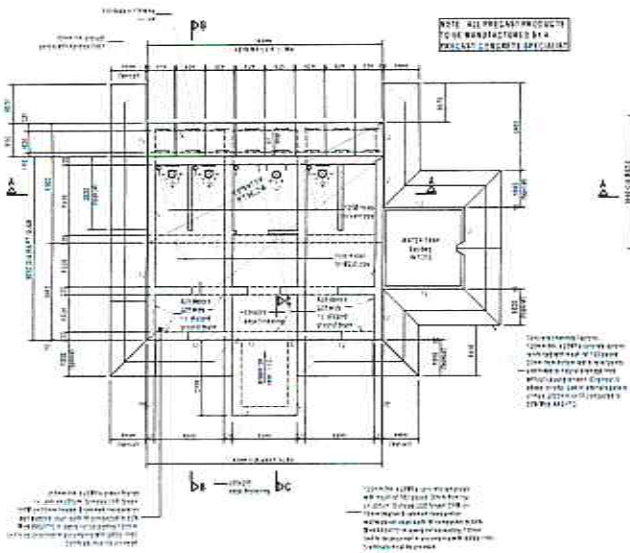
DRAWING DESCRIPTION	type
TOILET ROLL HOLDERS	TRH

DRAWN	CHECKED	PRINCIPAL AGENT	
n. gavu	n. francis	ARCHITECT	Y
DATE	SCALES	PROJECT MAN.	
06-09-18	AS SHOWN	XA CONSULTANT	

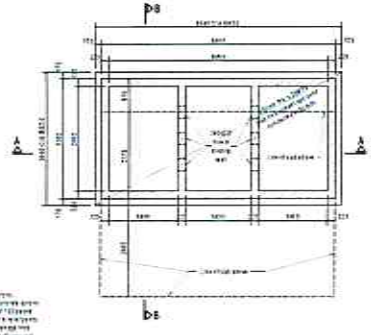
DRAWING No.	REVISION	STATUS S–C–AB–T	SHEET SIZE	SHEET
TRH	0	T	A3	1/1

Wims No	Emis No.	
064539		

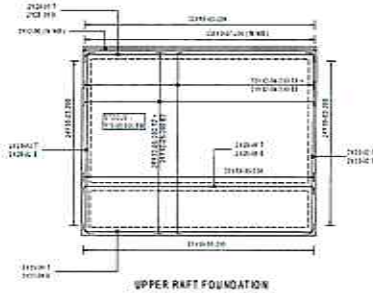
Stamped by Plans Approval Committee



PLAN ON UPPER FOUNDATION / APRONS



PLAN ON PIT FOUNDATION



UPPER RAFT FOUNDATION REINFORCEMENT LAYOUT

PIT FOUNDATION REINFORCEMENT LAYOUT

TYP. BEAM SECTION + NIB

TYP. BEAM SECTION

MEMBER	No. OF	MARK PER MEMB.	DIA	LENGTH	TOTAL MASS	MASS	SCHEDULE				
								A	B	C	D	E
LOWER RAFT FOUND	1	1A	R16	1800	14.2	14	A	1800				
		1AA	R16	1150	9.1	9.1	A	1150				
		1B	R16	1150	9.1	9.1	A	1150	150			
		1C	R16	1150	9.1	9.1	A	1150				
		1D	R16	1800	14.2	14	A	1800				
		1E	R16	1800	14.2	14	A	1800				
		1F	R16	1800	14.2	14	A	1800				
		1G	R16	1800	14.2	14	A	1800				
		1H	R16	1800	14.2	14	A	1800				
		1J	R16	1800	14.2	14	A	1800				
		1K	R16	1800	14.2	14	A	1800				
		1L	R16	1800	14.2	14	A	1800				
		1M	R16	1800	14.2	14	A	1800				
		1N	R16	1800	14.2	14	A	1800				
		1P	R16	1800	14.2	14	A	1800				
		1Q	R16	1800	14.2	14	A	1800				
		1R	R16	1800	14.2	14	A	1800				
		1S	R16	1800	14.2	14	A	1800				
		1T	R16	1800	14.2	14	A	1800				
		1U	R16	1800	14.2	14	A	1800				
		1V	R16	1800	14.2	14	A	1800				
		1W	R16	1800	14.2	14	A	1800				
		1X	R16	1800	14.2	14	A	1800				
		1Y	R16	1800	14.2	14	A	1800				
		1Z	R16	1800	14.2	14	A	1800				
		1AA	R16	1800	14.2	14	A	1800				
		1AB	R16	1800	14.2	14	A	1800				
		1AC	R16	1800	14.2	14	A	1800				
		1AD	R16	1800	14.2	14	A	1800				
		1AE	R16	1800	14.2	14	A	1800				
		1AF	R16	1800	14.2	14	A	1800				
		1AG	R16	1800	14.2	14	A	1800				
		1AH	R16	1800	14.2	14	A	1800				
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		1AM	R16	1800	14.2	14	A	1800				
		1AN	R16	1800	14.2	14	A	1800				
		1AP	R16	1800	14.2	14	A	1800				
		1AQ	R16	1800	14.2	14	A	1800				
		1AR	R16	1800	14.2	14	A	1800				
		1AS	R16	1800	14.2	14	A	1800				
		1AT	R16	1800	14.2	14	A	1800				
		1AU	R16	1800	14.2	14	A	1800				
		1AV	R16	1800	14.2	14	A	1800				
		1AW	R16	1800	14.2	14	A	1800				
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		1CX	R16	1800	14.2	14	A	1800				
		1CY	R16	1800	14.2	14	A	1800				
		1CZ	R16	1800	14.2	14	A	1800				
		1DA	R16	1800	14.2	14	A	1800				
		1DB	R16	1800	14.2	14	A	1800				
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		1DM	R16	1800	14.2	14	A	1800				
		1DN	R16	1800	14.2	14	A	1800				
		1DP	R16	1800	14.2	14	A	1800				
		1DQ	R16	1800	14.2	14	A	1800				
		1DR	R16	1800	14.2	14	A	1800				
		1DS	R16	1800	14.2	14	A	1800				
		1DT	R16	1800	14.2	14	A	1800				
		1DU	R16	1800	14.2	14	A	1800				
		1DV	R16	1800	14.2	14	A	1800				
		1DW	R16	1800	14.2	14	A	1800				
		1DX	R16	1800	14.2	14	A	1800				
		1DY	R16	1800	14.2	14	A	1800				
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		1FA	R16	1800	14.2	14	A	1800				
		1FB	R16	1800	14.2	14	A	1800				
		1FC	R16	1800	14.2	14	A	1800				
		1FD	R16	1800	14.2	14	A	1800				
		1FE	R16	1800	14.2	14	A	1800				
		1FF	R16	1800	14.2	14	A	1800				
		1FG	R16	1800	14.2	14	A	1800				
		1FH	R16	1800	14.2	14	A	1800				
		1FJ	R16	1800	14.2	14	A	1800				
		1FK	R16	1800	14.2	14	A	1800				
		1FL	R16	1800	14.2	14	A	1800				
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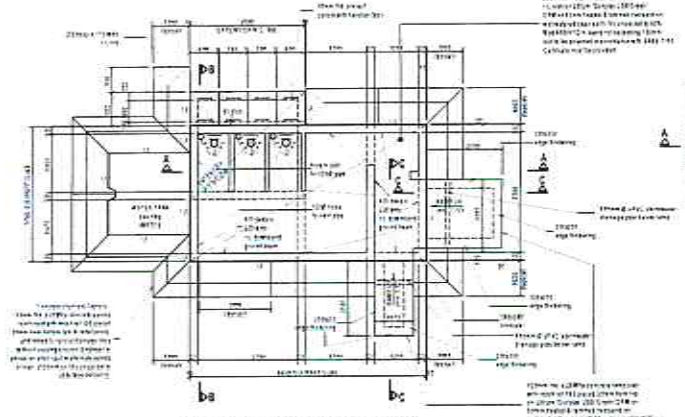
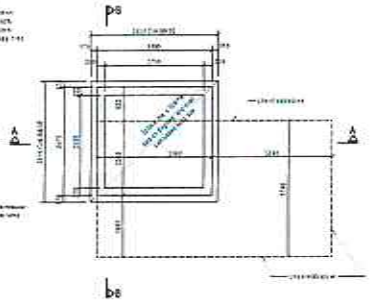
		1QP	R16

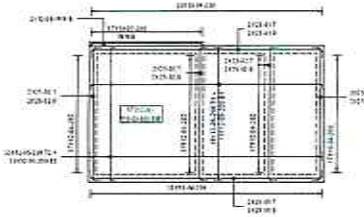
NOTE: ALL PRECAST PRODUCTS TO BE MANUFACTURED BY A PRECAST CONCRETE SPECIALIST



PLAN ON UPPER FOUNDATION / APRONS



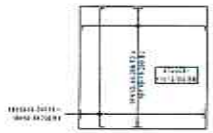
PLAN ON PIT FOUNDATION



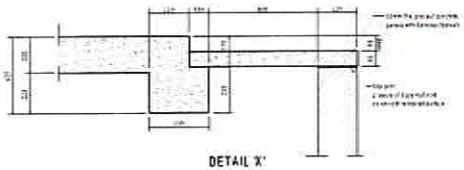
UPPER RAFT FOUNDATION REINFORCEMENT LAYOUT

TYP. BEAM SECTION + NB

TYP. BEAM SECTION



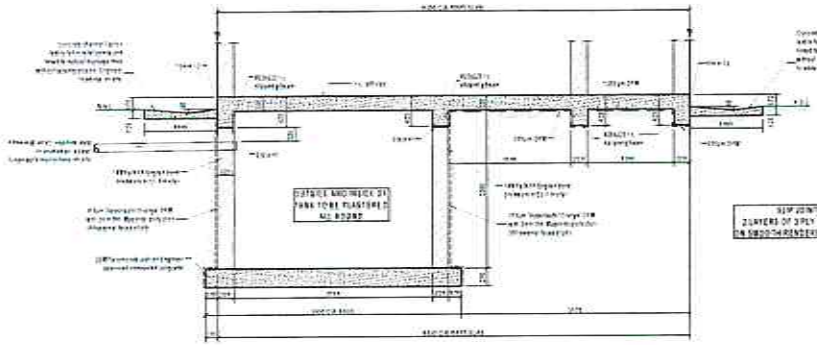
PIT FOUNDATION REINFORCEMENT LAYOUT



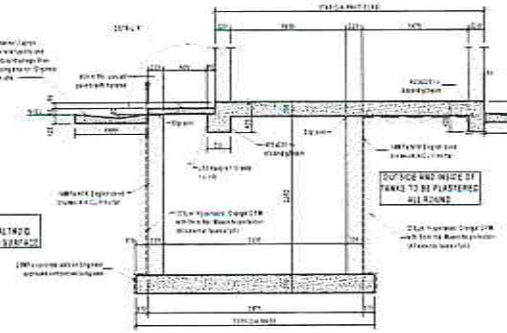
DETAIL 'X'

TYPICAL ISOLATION JOINT DETAIL (12)

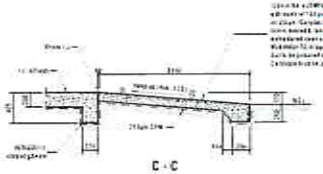
MEMBER	No. OF MEMBERS	BARS: NO. OF BARS	SIZE	LENGTH	TOTAL NO. OF BARS	WEIGHT	T.W.	BBS (kg) A	B	C	D	E
UPPER RAFT FOUNDATION	1	4	Y25	9400	8	58	464					
		10	Y25	4500	10	28	278					
		124	Y16	1100	124	68	340	340				
		68	Y12	3200	68	28	1904					
		68	Y12	4400	68	38	2618					
		17	Y12	1100	17	7	119		119			
		2	Y12	3200	2	1	32					
		2	Y12	1200	2	1	12					
PIT FOUNDATION	1	24	Y16	3400	24	10	240	240				
		10	Y16	3400	10	4	100		100			
		10	Y16	1200	10	4	40	40		40		



A - A



B - B



C - C

NOTES

1. ALL LEVELS AND DIMENSIONS TO BE CHECKED ON SITE.
2. THIS DRAWING TO BE READ IN CONJUNCTION WITH THE ARCHITECTURAL DRAWINGS.
3. ALL CONCRETE WORK TO COMPLY WITH SANS 10100.
4. CONCRETE CLASS:
   a) PLINTH & SUPPORTED SLABS: H 25 MPa
   b) TOP OF FOOTINGS & BASES: H 25 MPa
   c) COUPLING BEAM & LIFT WELLS: H 25 MPa
   d) SLABS, BEAMS & STAIRCASES: H 25 MPa
   e) RETAINING WALLS: H 25 MPa
   f) SURFACE BEDS: H 25 MPa / S 30
   g) PAVINGS: H 25 MPa
5. STEEL TO REINFORCEMENT:
   a) HIGH YIELD (HY): 450 MPa
6. ALL FORMWORK TO BE OILED PRIOR TO THE PLACING OF CONCRETE.
7. ALL REINFORCING TO BE TO BE INSPECTED BY THE ENGINEER PRIOR TO CASTING OF CONCRETE.
8. ALL CURING TO BE TAKEN PER YEAR. THESE TO BE TESTED AT 7 DAYS AND 28 DAYS. THE RESULTS TO BE FORWARDED TO THE ENGINEER.
9. CONTRACTOR TO CONSTRUCT A BUILDING UNDER SPECIAL CONDITIONS WHERE THE ENVIRONMENT COULD NOT BEING MAINTAINED.
10. ALL STRUCTURAL CONCRETE TO BE CURED FOR A MINIMUM OF FIVE DAYS.
11. ON SITE WHERE SPECIFIED (SHEET 1 AND 2) AN APPROVED LOAD BEARING BRICK WORK COURSE SHALL BE PUT UP ALL ENGINEERS TO ADVISE THE CLIENTS OF THE TIME THESE COURSES WILL BE REQUIRED.
12. ALL TIMBER FROM BRICK WORK TO BE REMOVED 1 COURSES BELOW SURFACE AT COMPLETION AND HOLES MADE GOOD AS REQUIRED.
13. ALL CONCRETE PLASTER AND BRICK WORK PLASTER WITH PLASTIC FINISH.
14. THE ENGINEER REQUIRES 24HRS NOTICE FOR ALL INSPECTIONS.

Note:
The locality and the exact boreholes to be
1. In compliance with National Environmental Legislation and the Water Act
2. Determined by the Principal Agent

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ARCHITECTS LAYOUT

no.	description	by	date
P1	PRELIMINARY		

LDM

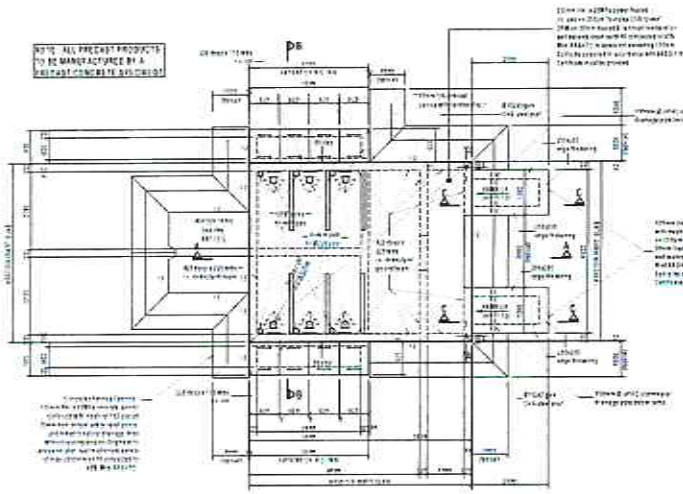
PROJECT
WIMS NO: 064515
DEPARTMENT OF EDUCATION
WATER & SANITATION PROGRAMME

DETAILS
TYPE 'E' (PIT ABLUTION)
TYPICAL LEARNERS BOYS ABLUTION
(3No WC + 3No URINALS)
STRUCTURAL LAYOUTS & DETAILS

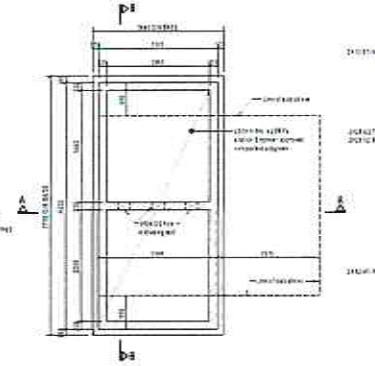
ATMP AFRICA
CESA

designed:	M.N.	Consultant details etc.	Date:
drawn:	H.M.		
approved:	M.N.		Scale: as indicated
drawing no.	4473/304		rev. P1

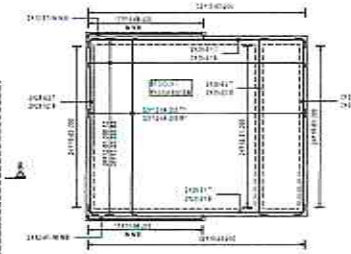
PRELIMINARY



PLAN ON UPPER FOUNDATION / APRONS



PLAN ON PIT FOUNDATION



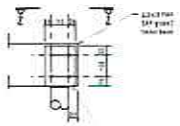
UPPER RAFT FOUNDATION REINFORCEMENT LAYOUT

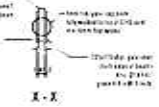
TYP. BEAM SECTION + NIB

TYP. BEAM SECTION

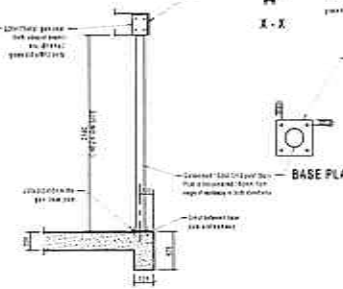
PIT FOUNDATION REINFORCEMENT LAYOUT

MEMBER	No. OF MEMB.	BARS PER MEMB.	DIA.	LENGTH	TOTAL NUM. BARS	MASS	L.C.	REMARKS				
								A	B	C	D	E/F
UPPER RAFT FOUNDATION	1	42	25	6400	42	24	25	6400				
	1	60	25	5200	60	32	25	4960				
	1	140	10	1100	140	86	25	960	140			
	1	84	12	5400	84	56	25	4800				
	1	152	12	1600	152	96	25	1400				
	1	48	12	1000	48	21	25	900	770			
	1	6	12	5400	6	5	25	5200				
	1	72	12	1200	72	32	25	1000	770	200		
PIT FOUNDATION	1	56	10	1200	56	34	26	1200				
	1	72	10	1200	72	72	25	1040				
	1	64	10	1200	64	71	26	1040	1200	200		



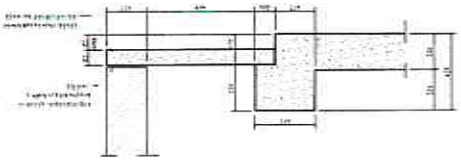


X - X

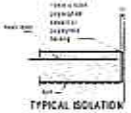


STEEL POST DETAIL

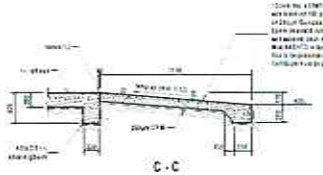
BASE PLATE DETAIL



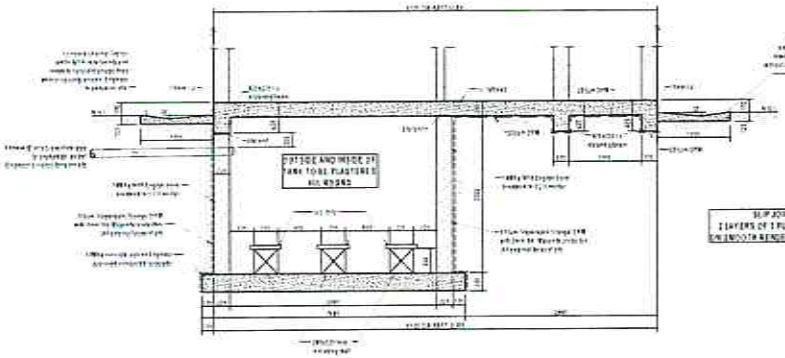
DETAIL 'X'



TYPICAL ISOLATION JOINT DETAIL (I.J.)



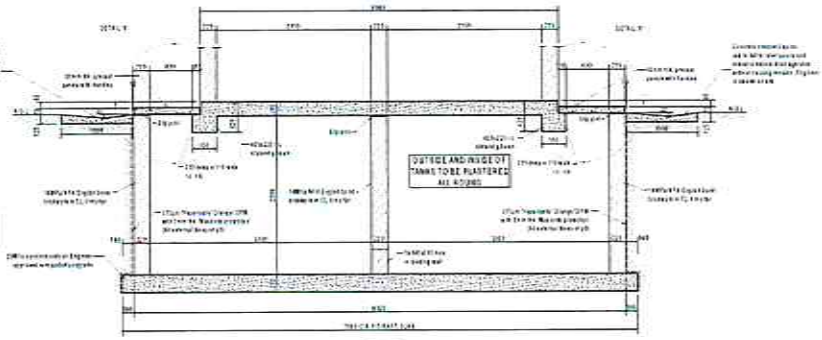
C - C



OUTSIDE AND INSIDE OF TANK TO BE PLASTERED ALL ROUND

SLIP JOINT 2 LAYERS OF 0.8UV WRAPPING EN SMOOTH RENDERED SURFACE

A - A



OUTSIDE AND INSIDE OF TANKS TO BE PLASTERED ALL ROUND

B - B

PRELIMINARY

NOTES

1. ALL LEVELS AND DIMENSIONS TO BE CHECKED ON SITE.
2. ALL CONCRETE WORK TO COMPLY WITH THE FOLLOWING:
   - a) FOUNDATIONS & GROUND BEAMS: 25 MPa
   - b) TOP OF FOOTINGS & BASES: 25 MPa
   - c) COVERED WORK & SUPERSTRUCTURE: 25 MPa
   - d) SLABS, BEAMS & STAIRCASES: 25 MPa
   - e) RETAINING WALLS: 25 MPa
   - f) RAMPED WORK: 25 MPa
   - g) PAVING: 25 MPa
3. CURING TO REINFORCEMENT
   - AS INDICATED ON DRAWINGS
4. ALL FOUNDATION EXCAVATIONS TO BE INSPECTED BY THE ENGINEER PRIOR TO CASTING OF CONCRETE.
5. ALL REINFORCING PLANES TO BE INSPECTED BY THE ENGINEER PRIOR TO CASTING OF CONCRETE.
6. SLAB LOADS TO BE TAKEN PER FLOOR. WHERE TO BE TESTED AT 28 DAYS CUBES, THE MANUFACTURER'S TWENTY EIGHT DAY STRENGTH TO BE FURNISHED TO THE ENGINEER.
7. CONCRETE TO CONSTRUCT A BUILDING UNDER SEVERE CONDITIONS AGAINST DETERIORATION/ COVER NOT BEING MAINTAINED.
8. ALL STRUCTURAL CONCRETE TO BE CURED FOR A MINIMUM OF FIVE DAYS.
9. ON SITE MIXED CONCRETE AND LEAN MIX TO BE BATCHED ACCURATELY BY MASS TO BE CARRIED OUT ON A WATERTIGHT PLATFORM.
10. ALL TANKS TO BE TESTED FOR WATERTIGHTNESS BEFORE BACKFILLING AND PLASTERING.
11. ALL CONCRETE PLASTER AND BRICKWORK PLASTER WITH FACES TO EXTERIOR: 1:4 CEMENT SAND.
12. THE ENGINEER'S REPRESENTATIVE SHALL ACCEPT FOR ALL INSPECTIONS.

NOTE

1. Site suitability and the no. of latrines to be
2. In accordance with National Environmental Legislation and the Water Act
3. Determined by the Principal Agent

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ARCHITECTS LAYOUT

No.	Description	By	Date
1	First submission	LM	2017.07.31

Professional Engineers & Project Managers — Registration No: 2008/21/07

LDM

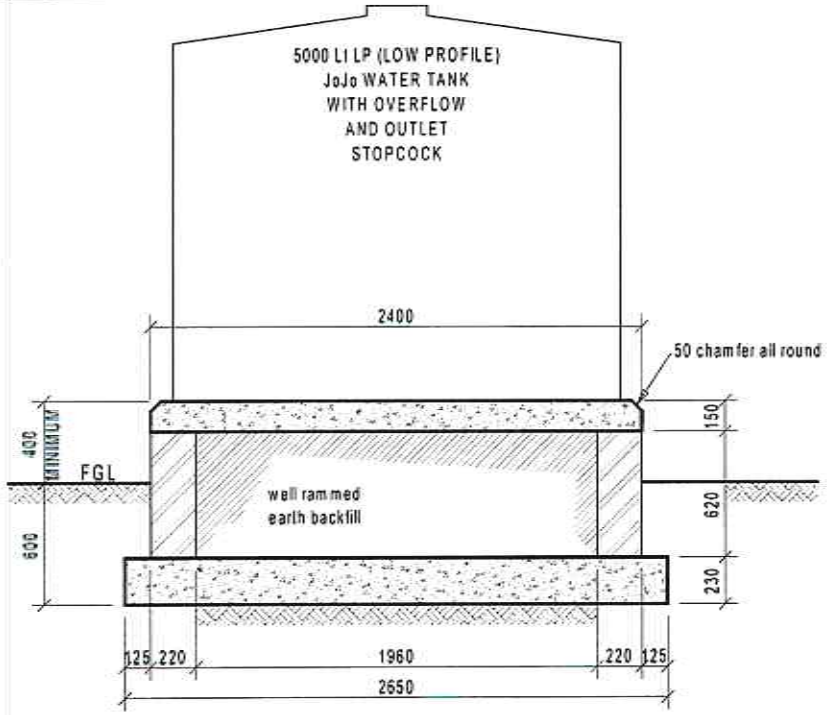
WIMS NO: 064539
DEPARTMENT OF EDUCATION
SANITATION PROGRAMME

TYPE F (PIT ABLUTION)
TYPICAL LEARNERS GIRLS ABLUTION
(5No. WC)
STRUCTURAL LAYOUTS & DETAILS

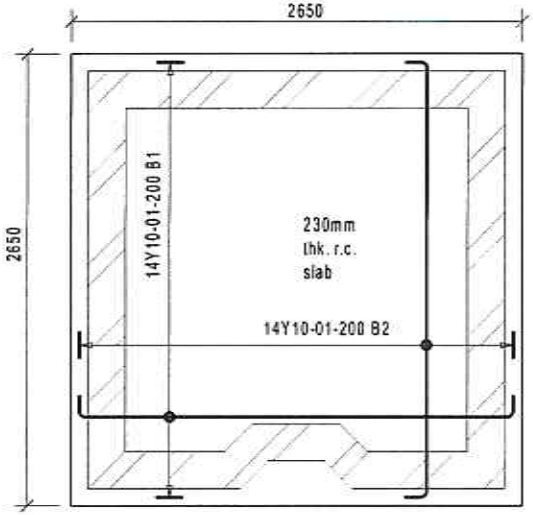
MVAP AFRICA

DESIGNED	M.N.	COMMENTS RECEIVED	SCALE: 1:50 @ A1 / 1:100 @ A3
DRAWN	S.S.		
APPROVED	M.N.		DATE: 2017.07.31

Job number: 447 / 305 — Dwg No: P1

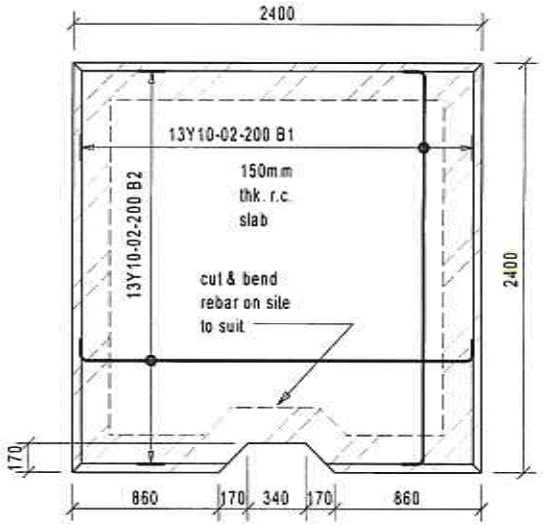


TYPICAL SECTION



PLAN ON FOOTING

50mm cover to reinforcement all round



PLAN ON TANK SUPPORT SLAB

25mm cover to reinforcement all round

JoJo Tank – 'strapping' down specifications

All JoJo tanks are to be strapped down (at each of the 4 stubs on top of the tank) to the supporting concrete base with 2 no. off 4mm diameter fully galvanized stay wires (allow for 'turnbuckles' to tighten each of the 'double strap' stay wires). Each of the 'double strap" stay wires are to be tied to a M12 eye bolt of which is to be drilled and fixed to the 4 corners of the concrete supporting base. The specification for the eye bolt is as follows : galvanised mild steel - M12 eye bolt with 25mm eye inside diameter and with 80mm long shank.

NOTES:
1. SEE ARCHITECTS LAYOUT FOR LOCATION OF TANK.
2. ALL FOUNDATION EXCAVATIONS TO BE COMPACTED TO A MINIMUM OF 93% MOD AASHTO PRIOR TO CONCRETE BEING CAST.
3. MINIMUM 25MPa CONCRETE STRENGTH AT 28 DAYS
4. MINIMUM 14MPa NFX BRICKWORK IN CLASS II MORTAR

PRELIMINARY

REV.	DESCRIPTIONS	BY	DATE
P1	PRELIMINARY	Y.R	06/09/2018

professional person: M.NAIR PrTechEng
registration: 200670211

MEMBER	No OF	BARS PER MEMB	DIA.	LENGTH	TOTAL NUM-BER	MARK	S C	BENDING A
	1	28	Y10	2750	28	01	35	2550
		26	Y10	2500	26	02	35	2300

LDM
Solutions For The Built Environment
WWW.LDM.CO.ZA

MAP AFRICA
CONSULTING ENGINEERS

PROJECT
WIMS NO. 064539
DEPARTMENT OF EDUCATION
WATER & SANITATION PROGRAMME

DATE: 06/09/2018

REVISION: P1

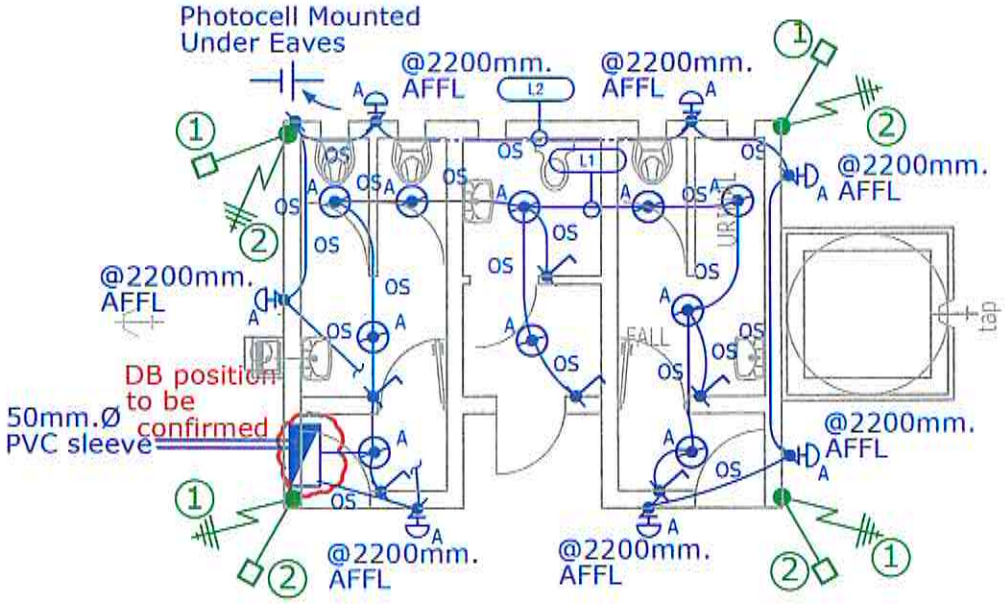
DETAILS
TYPICAL WATER TANK SUPPORT
CONCRETE & REINFORCEMENT
LAYOUT & DETAILS

DRG. No.
447 / 312

LIGHTNING PROTECTION NOTES

1) 25mm.Ø PVC CONDUIT DROPPER BUILT INTO BRICKWORK
2) EARTH SPIKE

Note: Only applicable to schools that have an existing and functional power supply



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FILE NAME:

REV	DATE	BY	DESCRIPTION	SIGN
0	10/5/19	CG	Original Issue	

LDM
Solutions For The Built Environment

DATE	SCALE
23/6/16	1:100
DESIGNED	DRAWN
G.Chetty	C.G

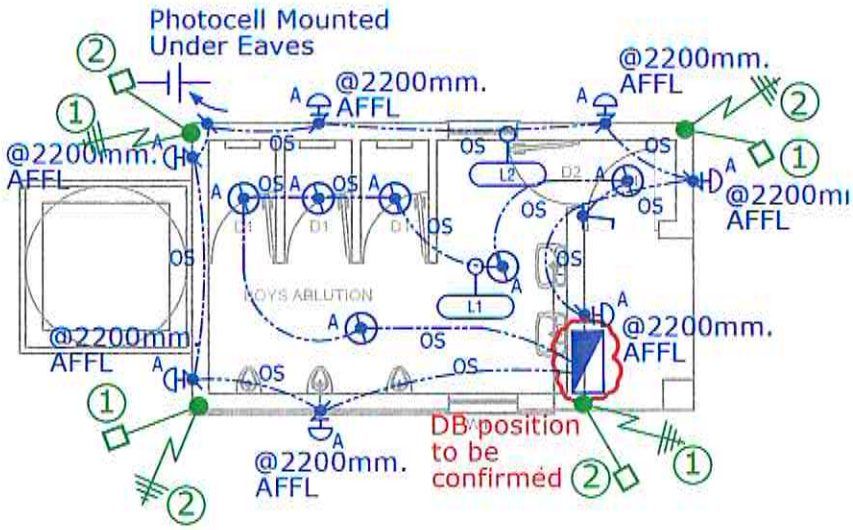
TITLE: WIMS No. 064539: Departmemt of Education Sanitation Programme
Type B-VIP - 2 Seater Girls, 2 Seater Boys, Teacher/Paraplegic Ablution Block Lighting Layout

PROJECT No.	CHKD.
16016	
DRAWING No.: 009	
SHEET No.:	REV. 0

LIGHTNING PROTECTION NOTES

1) 25mm.Ø PVC CONDUIT DROPPER BUILT INTO BRICKWORK
2) EARTH SPIKE

Note: Only applicable to schools that have an existing and functional power supply



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REV	DATE	BY	DESCRIPTION	SIGN
0	10/5/19	CG	Original Issue	

LDM
Solutions For The Built Environment

DATE	23/6/16
SCALE	1:100
DESIGNED	G.Chetty
DRAWN	C.G

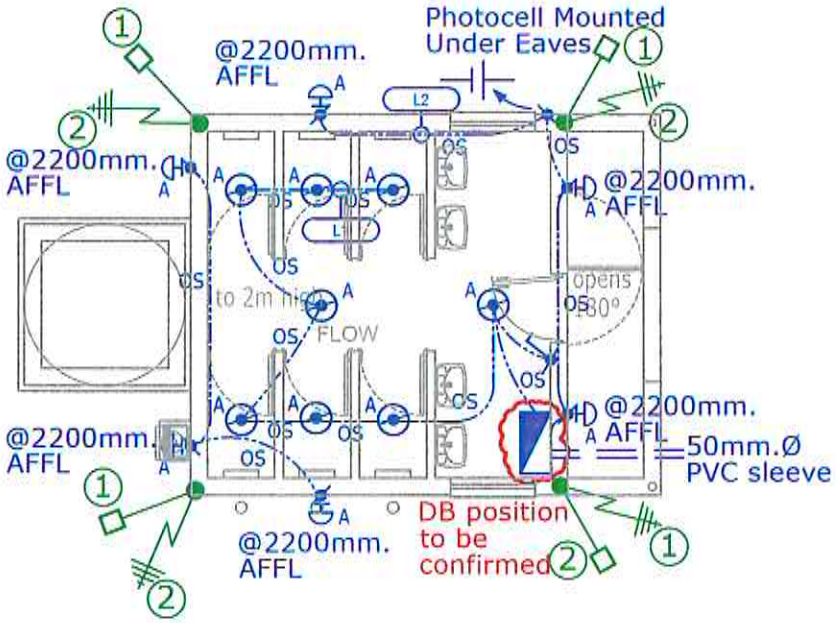
TITLE: WIMS No. 064539: Department of Education Sanitation Programme
Type E-VIP - 6 Seater Boys (3 Pans, 3 Urinals) Ablution Block Lighting Layout

PROJECT No.	16016
DRAWING No.:	012
SHEET No.:	
CHKD.	
REV.	0

LIGHTNING PROTECTION NOTES

1) 25mm.Ø PVC CONDUIT DROPPER BUILT INTO BRICKWORK
2) EARTH SPIKE

Note: Only applicable to schools that have an existing and functional power supply



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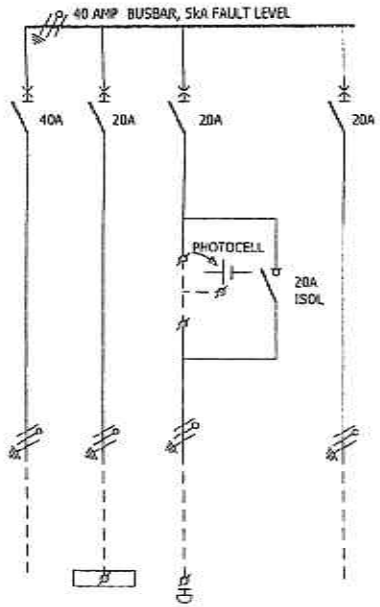
REV	DATE	BY	DESCRIPTION
0	10/5/19	CG	Original Issue

LDM
Solutions For The Built Environment

FILE NAME:	
DATE	23/6/16
SCALE	1:100
DESIGNED	G.Chetty
DRAWN	C.G
TITLE:	WIMS No. 064539: Departmemt of Education Sanitation Programme Type F-VIP - 6 Seater Girls (6 Pans) Ablution Block Lighting Layout
PROJECT No.	16016
DRAWING No.:	013
SHEET No.:	
SIGN	
CHKD.	
REV.	0



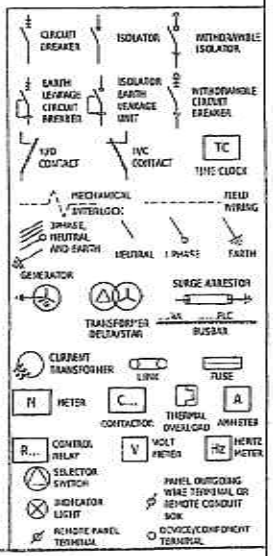
CIRCUIT No./PHASE		1	2	
DESIGNATION	INCOMER	ABLUTION LIGHTING	OUTDOOR LIGHTS	SPARE
WIRING	10mm² 2CORE Cu PVC SWA PVC ECC CABLE	3x2,5mm² PVC INSULATED TWIN AND EARTH CABLE	3x2,5mm² PVC INSULATED TWIN AND EARTH CABLE	
LOAD (AMPS)		XX	XX	
No. OF POINTS		XX	XX	

GENERAL NOTES:

A) DROPPERS/TAILS TO BE RATED FOR 1 LET THROUGH
B) HARNESSED WIRING TO BE DERATED.
C) TUFFMOL DUCTS NOT TO BE USED ABOVE 100A.
D) COPPER BUSBARS TO BE CONTINUOUS RATED.
E) ENCLOSURE TO BE IP65.
F) PHASING R,W,B. TOP TO BOTTOM, LEFT TO RIGHT, BACK TO FRONT.
G) INTERNAL TEMPERATURE TO BE LIMITED TO 5° ABOVE ABOVE AMBIENT - MAX. 40°C.
H) CABLE ENTRIES AND GENERAL ARRANGEMENT TO SUIT INSTALLATION CONSTRAINTS.

ADDITIONAL NOTES:

1. ALL CIRCUIT BREAKERS, ISOLATORS AND EARTH LEAKAGE TO BE TYPE 2 CURVE AND EQUIPMENT TO BE CBI.
2. EARTH LEAKAGE TO BE 60A ISOLATOR WITH INTEGRAL 30mA.
3. SURFACE MOUNTED DB WITH ARCHITRAVE.
4. DB COLOUR TO BE WHITE.
5. DB TO BE TOP AND BOTTOM ENTRY
6. BUSBAR TO BE SHROUDED
7. EARTH & NEUTRAL BAR TO BE EASY ACCESSIBLE.
8. SUFFICIENT SPACE REQUIRED FOR SAFE ACCESS FOR RE-WIRING.
9. ACCESS ZONE REQUIRED THROUGH SHROUD
10. ALL 3 PHASES AND SINGLE PHASE OUTGOING CIRCUIT BREAKERS TO BE LABELLED WITH DESCRIPTION OF SERVICES AND CIRCUIT Nos. AS PER DRAWING.



REV	DESCRIPTION	BY	DATE	CHKD.
0	For Tender	CG	6/9/18	

ENGINEER: G.Chetty | DRAWN: C.G | DATE: June 16 | SCALE: n.t.s | PAPER SIZE: A3 | CHKD.

PROJECT No.: 16016 | DRAWING No.: 005 | SHEET: 1 of 1 | REV.: 0

File Name : Lyr:0:I:A3

TITLE: Wims No. 064539 Department of Education Sanitation Programme

DRAWING TITLE: Typical DB for Toilet Blocks Single Line Diagram

LDM
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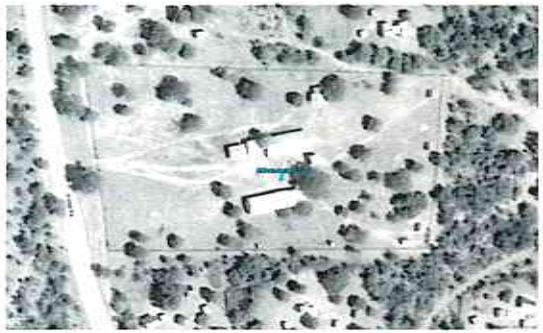
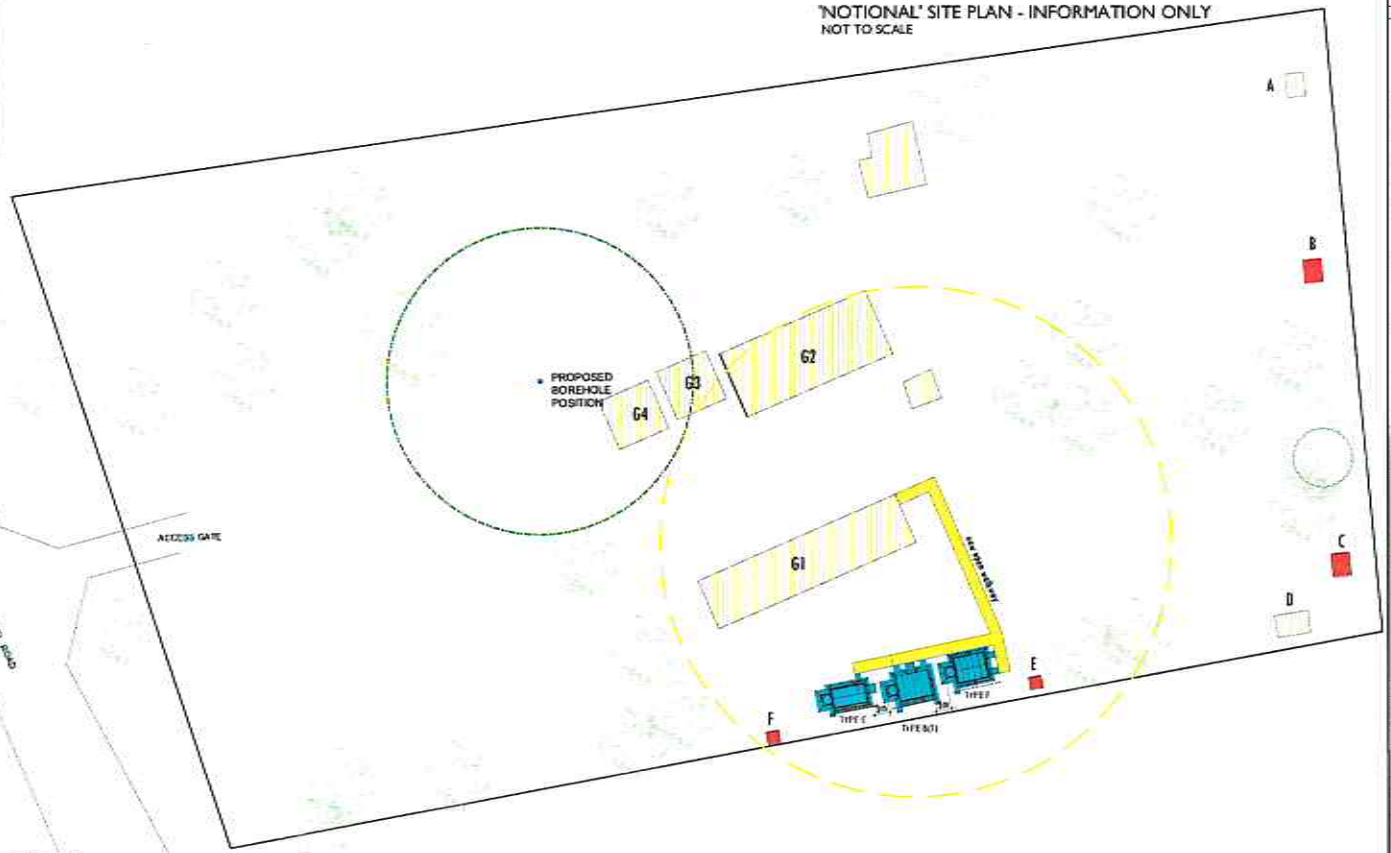
VIP ABLUTION BLOCKS	
TYPE	DESCRIPTION
NEW	2 SEATER FEMALES 2 SEATER MALES 1 PARAPLEGIC
1	4 SEATER BOYS: 2 PAN & 2 URINALS
1	4 SEATER GIRLS: 4 PANS

EXISTING BUILDINGS	
BLOCK	BUILDING TYPE
A	EXISTING GIRLS TOILET BLOCK TO BE DEMOLISHED
B	EXISTING FEMALE STAFF TOILET TO BE DEMOLISHED
C	EXISTING BOYS TOILET BLOCK TO BE DEMOLISHED
D	EXISTING NON FUNCTIONAL BOYS TOILET BLOCK TO BE DEMOLISHED
E	EXISTING MALE STAFF TOILET BLOCK TO BE DEMOLISHED
F	EXISTING NON FUNCTIONAL MALE STAFF TOILET BLOCK TO BE DEMOLISHED
G1-G4	EXISTING ADMIN. & CLASSROOM BLOCKS



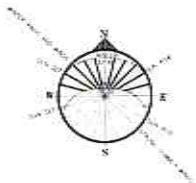
'NOTIONAL' SITE PLAN - INFORMATION ONLY
NOT TO SCALE



KEY
- EXISTING BUILDINGS
- EXISTING ABLUTION TO BE DEMOLISHED
- PROPOSED NEW TOILETS
- PROPOSED WALKWAY 2.2M WIDE
- PROPOSED COVERED WALKWAY 2.2M WIDE
- 50M PARAPLEGIC RADIUS
- 30M BOREHOLE CLEARANCE RADIUS
- APPROX PERCOLATION TEST PIT POINT

EARTHWORKS
MINOR EARTHWORKS

RETAINING WALLS
NO RETAINING WALLS REQUIRED



SITE PLAN
SCALE 1:500
27°32'55"S 32°18'29"E (S27.54861111; E32.30805556)

1. Please note that the site boundaries do not depict ownership boundaries in the 'notional site plan'. These 'notional' boundaries represent nearest fence lines and the layouts is solely for reference information purposes only
2. For accurate and true ownership boundaries, cadastral survey diagrams must be obtained

FOR TENDER

N. FRANCIS

LDM

francisarchitects
architecture + restoration + urban design
think architecture

PROVINCE OF KWAZULU-NATAL
DEPARTMENT OF PUBLIC WORKS

DEPARTMENT OF EDUCATION
SANITATION PROGRAMME
eMkhanyakude District Municipality(dc27)
Mbhanbalala Secondary School

SITE PLAN LAYOUT
TYPE B(1), E, F

n. mokoena	n. francis		
27-11-20	AS SHOWN		
INST-Mbala55	0	T	A1	1/4
063402	580441484		0

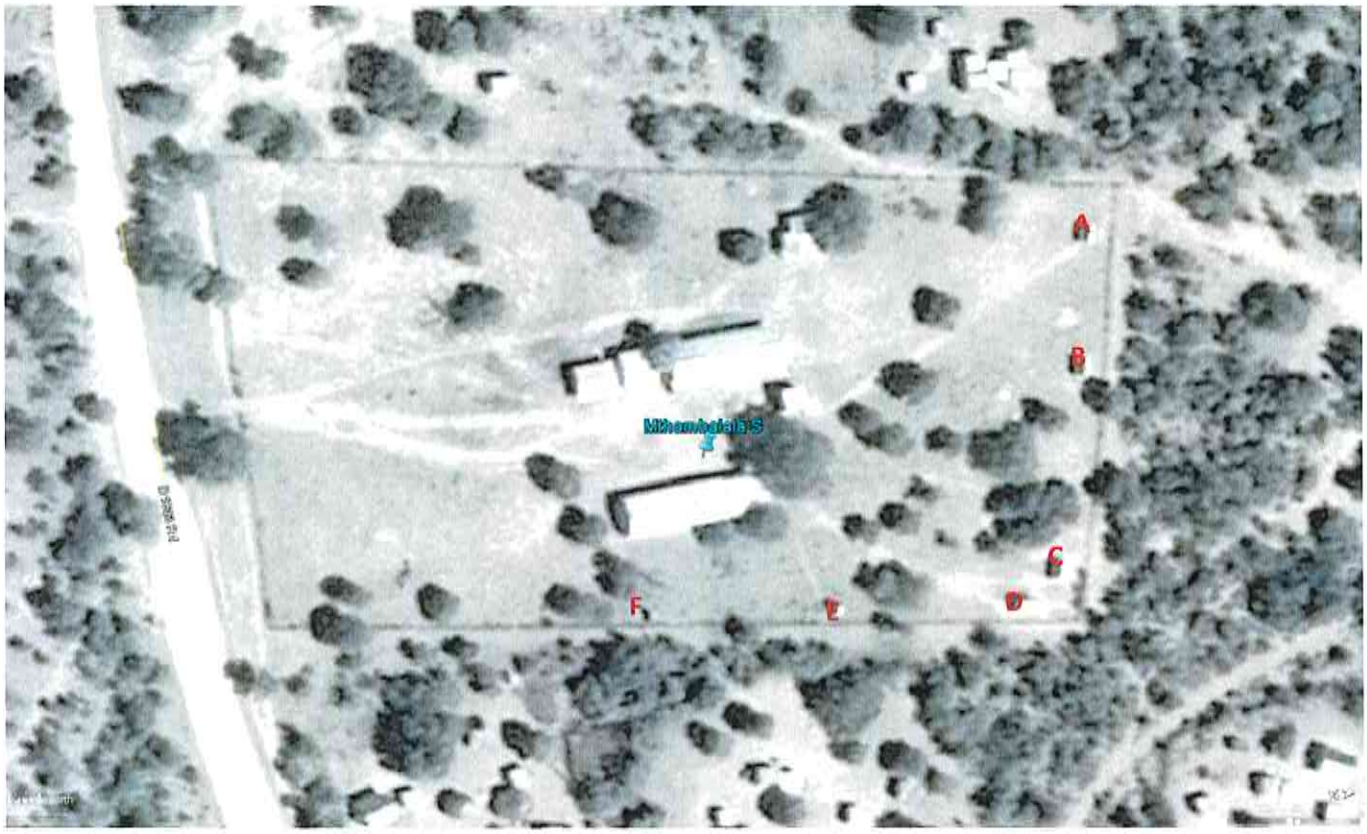
KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

PROVISIONAL SITE PLAN

SITE LAYOUT AND MAP

SCHOOL:	Mthambalala Secondary School
REGION / CLUSTER:	uMkhanyakude District Municipality (Jozini)
CO-ORDINATES:	27°32'55"S 32°18'29"E (S27.54861111; E32.30805556)
SCOPE:	Demolition of existing buildings and construction of new ablutions.



ABLUTION:	EXTENT:
Block A - Girls Toilet	Prefab & Plastered block screen wall - 4.6 x 3.6m
Block B - Female Staff Toilet	Prefab & Plastered block screen wall - 4.6 x 3.6m
Block C- Boys Toilet	Prefab & Plastered block screen wall - 4.6 x 3.6m
Block D- Boys Toilet (Non-functional)	Plastered block screen wall - 6.5 x 4.4m
Block E - Male Staff Toilet	Plastered block screen wall - 2.5 x 2.5m
Block F - Male Staff Toilet (Non-functional)	Plastered block screen wall - 2.5 x 2.5m

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

ANNEXURES

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

ANNEXURE 1

ASAQS MODEL PREAMBLES FOR ALL TRADES (2008)

The Association of South African Quantity Surveyors
Die Vereniging van Suid-Afrikaanse Bourekenaars

MODEL PREAMBLES FOR TRADES 2008

forming part of
the bills of quantities

Project: DPW DOE WATER AND SANITATION PROGRAMME

Contract Reference Number:

Effective date November 2008

ISBN 978-0-620-1663-4

EXPLANATORY NOTES AND INSTRUCTIONS ON THE USE OF THESE MODEL PREAMBLES

1. The document

1.1 This document is published by and is available from the Association of South African Quantity Surveyors, P.O. Box 3527, Halfway House, 1685. Telephone (011) 315 4140. E-mail: administration@asaqs.co.za

1.2 The contents of this document are intended to cover workmanship and materials encountered in a significant majority of projects. If a material is not encountered in a significant majority of projects, its preamble will in all likelihood not be included in this document

1.3 By its very nature, this document is a "Model" document and one that is designed to act as a basis upon which to build. It is anticipated that it will be supplemented by a "Supplementary Preambles" document included in the text of the bills of quantities that will include, *inter alia*, the following:

1.3.1 supplementary clauses of a general nature that practitioners may deem necessary to cover their own individual requirements,

1.3.2 additional clauses pertaining to specific materials incorporated in a project and not covered by the Model Preambles,

1.3.3 amendments to anything contained in the Model Preambles. A clause has been incorporated in the "General" section of the document stipulating that anything contained in the "Supplementary Preambles" which is at variance to that which is contained in the Model Preambles, will take precedence over the Model Preambles and apply to the works in hand

1.4 It is intended that this document will be used by reference only in the text of the bills of quantities and will NOT be bound or reproduced therein

2. The basic philosophy

2.1 Wherever possible, reference has been made throughout the preambles to South African National Standards (SANS) to describe materials and methods respectively. It is therefore incumbent on the users of these preambles to have ready access to the relevant Specifications and Codes. Where such Specifications or Codes do not exist, suitable preambles have been compiled

2.2 These preambles have been designed to assist in abbreviating descriptions in the text of the bills of quantities and practitioners are encouraged to make use of this facility. e.g. The description of a stormwater catchpit would read:

"Brick stormwater catchpit size internally 600 x 400 x 1 200mm deep to invert fitted with and including a 450 x 300mm x 59kg cast iron grating and frame"

2.3 Wherever alternatives exist in respect of materials or workmanship, specific choices have been made in these preambles. Should users require different choices to specific items, these should be referred to in the Supplementary Preambles as outlined in clause 1.3

3. Additional notes in the use of these Model Preambles

3.1 **Concrete, Formwork and Reinforcement**

The Project Specification embodied in these preambles was compiled in collaboration with the Authors of SANS 1200G, which forms the basis for the Concrete, Formwork and Reinforcement model preambles

Users of these preambles are advised to submit a copy of the Model Preambles to the Engineers involved in a project for their scrutiny. Any amplifications, amendments, etc required by individual Engineers would then be incorporated in the Supplementary Preambles referred to in item 1.3

3.2 **Roof Coverings**

The roof coverings included in these Model Preambles are limited in their content and therefore any roofing material not included in these Preambles will need to have its full preamble included in the Supplementary Preambles

3.3 **Structural Steelwork**

The comments made under item 3.1 apply equally to Structural Steelwork

Note that the protective treatment of the structural steel covers only the treatment up to and including the primer (and patching after erection). The finishing coats of paint must be fully described and included either in the "Structural Steelwork" or in the "Paintwork" trade, as the practitioner wishes

MODEL PREAMBLES FOR TRADES

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A. GENERAL

A.1 APPLICATION OF CLAUSES

These Model Preambles for Trades, and any Supplementary Preambles, shall be read in conjunction with and shall form part of the descriptions of items in the bills of quantities

Where descriptions or Supplementary Preambles in the bills of quantities differ from these Model Preambles for Trades, the descriptions or Supplementary Preambles in the bills of quantities shall take precedence. Where supplementary preambles differ from descriptions in the bills of quantities, the descriptions in the bills of quantities shall take precedence

Except where otherwise stated, all preambles contained in any individual Trade Preamble shall apply equally to any work of a similar nature in all other trades

A.2 ABBREVIATIONS

The following abbreviations shall apply:

AASHTO	–	American Association of State Highway and Transportation Officials
AISI	–	American Institute of Steel Industries
BS	–	British Standard
CKS	–	Coordinating Specifications issued by the Central Coordinating Committee under the auspices of the South African Bureau of Standards
CSIR	–	Council for Scientific and Industrial Research
SANS	–	South African National Standards and the number following shall refer to the relevant specification or code of practice as the case may be

A.3 MATERIALS AND WORKMANSHIP

Materials and workmanship shall be the best of their respective kinds. Only new and undamaged materials shall be used in the Works. Materials to be permanently installed into the works shall not be used for any temporary purposes on site. Work shall be to the approval of the Principal Agent and shall be executed in accordance with the relevant manufacturer's written recommendations and instructions where applicable

A.4 PROPRIETARY PRODUCTS

For the purposes of submission of tenders, rates for items described in the bills of quantities by trade names, catalogue references, etc shall be for the particular type and manufacture specified

The approval of the Principal Agent shall be obtained prior to any substitution and where products or materials etc other than those specified are used, adjustments in the rates will be made if necessary

A.5 ASSEMBLING

Rates for manufactured items shall include assembling complete and handing over in proper working order

A.6 REFERENCES IN DESCRIPTIONS

Any references given in brackets at the end of certain descriptions shall refer to the relevant references on the drawings or schedules

A.7 WATER

Water shall be clean and free from injurious amounts of acids, alkalis, organic matter and other substances and shall be suitable for its intended use

A.8 APPLICATION OF THE NATIONAL BUILDING REGULATIONS

All work shall be executed in accordance with the requirements of SANS 10400

A.9 ACCURACY IN BUILDINGS

The dimensional and positional accuracy of the buildings and their component parts shall comply with Grade II requirements of SANS 10155 unless otherwise stated

A.10 REFERENCES TO OTHER DOCUMENTS

References in these "Model Preambles for Trades" to other documents, including SANS, CKS and BS, shall pertain to the latest edition thereof including all amendments thereto at the date for submission of the tender

B. ALTERATIONS

B.1 ALTERATIONS

In taking down and removing existing work the utmost care shall be observed to prevent any structural or other damage to remaining portions of the building. The Contractor shall ensure the stability of all structures during alteration work

Special care shall be exercised during the progress of the work to ensure that any electrical installations, water supply pipes, telephone and other services which may be encountered are not interfered with and notice shall be given to the Principal Agent if any disconnection or alterations become necessary

The Contractor shall take all precautions necessary to prevent any nuisance from dust whilst carrying out the work

B.2 MATERIALS FROM THE ALTERATIONS, CREDIT, ETC

Materials recovered from the alterations (except where described as to be re-used or to be handed over to the Employer) will become the property of the Contractor, who may allow credit in respect thereof where provided for in the bills of quantities. Such materials shall not be re-used in new work without written permission from the Principal Agent

Materials described as "removed" shall be removed from the site immediately.

Materials described as "handed over to the Employer" shall be carefully dismantled where necessary, neatly stored under cover on the site where directed and protected from damage, until required

Materials described as "set aside for re-use" shall be carefully dismantled where necessary, cleaned, neatly stored under cover and protected from damage until required for re-use. Any damage caused to such materials during removal, storage or refixing shall be made good at the Contractor's expense

B.3 DISPOSAL OF DEBRIS ETC

The Contractor shall be responsible for the removal from the site of all materials, debris and rubbish resulting from the alterations

B.4 MAKING GOOD DAMAGED WORK

The Contractor shall make good in all trades to existing work where damaged or disturbed through the alterations with all necessary new materials to match the existing

B.5 FORMING NEW OPENINGS OR ALTERING OPENINGS IN EXISTING WALLS

Where new openings are formed or openings altered in existing walls, the wall above the opening shall be broken out and a new brick, in situ concrete or prestressed concrete lintel inserted, complete with all necessary reinforcement, formwork, turning piece, etc, the jambs and portions of openings as described shall be built up with new brickwork or blockwork properly toothed and bonded to existing, cavities of hollow walls shall be closed where necessary and finishes shall be made good all round and into reveals

B.6 BUILDING UP OPENINGS

Where existing openings are given in number as built up, the existing surfaces all round shall be prepared as necessary, brickwork or blockwork properly toothed and bonded to existing, wedged up to underside of existing lintel and finishes shall be made good on both sides

C. EARTHWORKS

C.1 DEMOLITIONS

C.1.1 Nature and extent

Descriptions of demolitions give a rough guide only as to the scope of the work. Tenderers are therefore advised to visit the site before submitting a tender and to acquaint themselves with the nature and extent of the work to be done and the value of recoverable materials which are not to be re-used or handed over to the Employer. Unless otherwise stated, loose furniture, kitchen and other equipment, apparatus, machinery, etc shall remain the property of the Employer and the removal thereof does not fall within the scope of this Contract

The Contractor shall completely demolish the buildings etc in a careful, skilful, practical and safe manner down to 150mm below ground level

Demolitions shall include breaking up and removing:

all floors and surface beds;

all external screen walls, steps, ramps, aprons, surface water channels, rainwater sumps, gulleys, etc attached to the building to be demolished;

all services, manholes, etc in ground to a point not less than 1m beyond the perimeter of the building including plugging off ends of all remaining pipes, drains, etc, filling in holes where necessary and ramming and levelling to ground level

Where only a portion of a building is to be demolished, it shall be done without damage to the remaining portion of the building. Any such damage shall be made good by the Contractor at his own expense

C.1.2 Notices etc

The Contractor shall, before commencing work, obtain all necessary authorisation for carrying out the work, by whatever means including the use of pneumatic equipment or blasting, give all necessary notices and pay all charges and fees in connection therewith. He shall also comply with all regulations pertaining to rodent extermination and he shall obtain the requisite Rodent Extermination Clearance Certificate and pay all necessary fees. All receipts and certificates shall be left in the safekeeping of the Principal Agent. All the abovementioned charges and fees shall be paid by the Contractor and included in his prices

The Contractor shall give ample notice to the Principal Agent and Local Authorities regarding any disconnections necessary prior to the removal or interruption of electrical or telephone cables, water and sanitary services etc

C.1.3 Loss

After the handing over of the site to the Contractor, the full risk of any loss or damage to buildings to be demolished shall be the responsibility of the Contractor and he shall take such precautions as he deems necessary against such loss or damage

C.1.4 Materials from the demolitions, credit, etc

Materials recovered from the demolitions will become the property of the Contractor, who may allow credit in respect thereof where provided for in the bills of quantities. Such materials shall not be re-used in any new work without written permission from the Principal Agent

C.1.5 Disposal of debris etc

The Contractor shall be responsible for the removal from the site of all materials, rubble, debris and rubbish resulting from the demolitions

C.2 SOIL INSECTICIDES

The application of soil insecticides shall be carried out in accordance with "The application of soil insecticides for the protection of buildings" - SANS 10124

C.3 FILLING ETC

C.3.1 Filling generally

Filling over site shall be spread, levelled, watered and consolidated in layers not exceeding 300mm

Filling under floors and backfilling to excavations shall be suitable inert material, free from clay, vegetable matter, large stones, etc, having a maximum plasticity index of 10, spread, levelled and compacted to a density of at least 90% Mod. AASHTO

C.3.2 Hardcore

Hardcore shall be broken stone or other approved hard material graded from 25mm to 75mm with the finer material on top and shall be spread, levelled and consolidated

C.4 EXCAVATIONS

C.4.1 Classification of excavated material

"Hard rock" shall mean granite, quartzitic sandstone or other rock of similar hardness, the removal of which requires drilling, wedging and splitting or the use of explosives

"Soft rock" shall mean hard material the removal of which warrants the use of pneumatic tools and includes hard shale, ferricite, compact ouklip and material of similar hardness

"Earth" shall mean all ground other than that classified as "hard rock" or "soft rock" and shall include made-up ground and any loose stones or pieces of concrete not exceeding 0,03m^3 in volume

D. CONCRETE, FORMWORK AND REINFORCEMENT

D.1 SPECIFICATION FOR CONCRETE WORK GENERALLY

All in situ concrete work (plain and reinforced) shall comply with SANS 1200G supplemented by the following Project Specification. Where SANS 1200G and the Project Specification are in conflict, the Project Specification shall take precedence

Wherever the term "Engineer" appears in SANS 1200G or in the following Project Specification this shall be deemed to mean the Principal Agent's representative responsible for this section of the Works

PROJECT SPECIFICATION

The following amplifications, additions and amendments to SANS 1200G shall constitute the Project Specification. Clause numbers refer to either the existing clauses in SANS 1200G or to new clauses, which are related to the existing clauses

1. **SCOPE**
This clause is amended to include:

1.1 This specification does not cover the methods by which the finished structure is to be measured for the purpose of payment and the "Standard System of Measuring Building Work" shall apply

2. **INTERPRETATIONS**

2.1 **SUPPORTING SPECIFICATIONS**
Clause 2.1(b) shall not apply

2.2 **APPLICATION**
This clause shall not apply

4. **PLANT**

4.5 FORMWORK

4.5.2 **Finish**
Unless otherwise stated the quality of all formwork shall be such that the finished surface of the concrete is "Rough" in terms of clause 5.2.1(a)

5. **CONSTRUCTON**

5.2 FORMWORK

5.2.1 **Classification of Finishes**

(a) **Rough**. No treatment of the surface of the concrete will be required after the striking of the formwork. The finish of the concrete need not be more accurate than Degree of Accuracy III

(b) **Smooth**. Imperfections such as small fins, bulges, irregularities, surface honeycombing and surface discolorations shall be made good and repaired by approved methods. The finish of the concrete shall be accurate to Degree of Accuracy II

(c) **Special**

(i) **Smooth and fair**

This class of finish requires the highest standard of concrete work, formwork, accuracy and technique

Concrete placed in any one structure to give this finish shall be made from cement and aggregates from the same source. The grading of the aggregate shall be kept constant

Formwork shall be metal, wrot timber or other approved material in new condition designed and constructed to suit the particular job in hand and with shutter bolts and joints between panels in a regular pattern approved by the Principal Agent. Joints between panels shall be watertight, but the use of sealing tape which will mark the concrete shall not be permitted

Designated joints shall be in the position and of the details shown upon the working drawings. Should the Contractor wish to incorporate further construction joints or amend the position of those shown to suit his own requirements or technique, this may be allowed provided that all design considerations are met, that the prior approval of the Engineer is obtained and that any extra costs are borne by the Contractor

In the case of horizontal construction joints, the top edge of the concrete on the smooth and fair finished side shall be struck true and level with a trowel

Special care shall be taken to ensure that forms are clean and free of all pieces of tying wire, nails and other debris at the time of concreting

The standard of finish shall be such that upon removal of the formwork, no further treatment, other than treatment of bolt holes if required, shall be found necessary to provide a straight, smooth and uniform finish of good quality and consistent colour and texture, free of all honeycombing etc. Any defect shall be made good by either removing and replacing the defective concrete or, in certain instances only, by patching

5.5 CONCRETE

5.5.1.6 **Prescribed mix concrete**

Where prescribed mix concrete is specified the proportions of constituents, the maximum size of coarse aggregate and the estimated minimum compressive strength shall be as specified in the following table:

Class of Concrete	Estimated minimum compressive strength in MPa at 28 days	Maximum nominal size of coarse aggregate in mm	Proportions of Constituents		
			Cement (Parts)	Fine aggregate (Parts)	Coarse aggregate (Parts)
A	7	37,5	1	4	8
B	15	19	1	3	5
C	20	19	1	2,5	3,5

Cement shall comply with SANS 50917-1 of strength 32,5N or higher

Should cement and aggregates be mixed by volume, the contents of a 50kg sack of cement shall be taken to be 0,033m^3

Notwithstanding the requirements contained in SANS 1200G, the Principal Agent may permit certain items of non-structural concrete to be mixed by hand

If the concrete is mixed by hand, it shall first be mixed in a dry state on a clean non-absorbent surface until it is of uniform colour and consistency. Just enough water shall then be added to permit mixing and working, at which stage the concrete shall continue to be mixed until it is of uniform colour and consistency

5.5.1.7 **Strength concrete**

Where strength concrete is specified it shall be designated by its specified strength followed by the size of stone used in its manufacture, eg 30 MPa/19mm

The water/cement ratio shall be as Table 5 of clause 5.5.1.5 for moderate exposure conditions

5.5.1.8 **"No-Fines" concrete**

"No-fines" concrete shall consist of one part cement to eight parts aggregate graded from minimum 6mm to maximum 13mm size

The quantity of water used shall be just sufficient to form a smooth grout which shall completely coat every particle of aggregate and also to ensure that the grout is just wet enough to form a small fillet at each point of contact between the stones. "No-fines" concrete mixed with excessive water, which results in a thin grout, which drops off the aggregate, will be rejected

"No-fines" concrete shall be placed in its final position within 20 minutes of mixing and shall be placed in continuous horizontal layers. Concrete shall be spade worked sufficiently to ensure that it fills the forms but vibrating, tamping or ramming will not be permitted

5.5.3.2 **Ready-mixed concrete**

The use of ready-mixed concrete and the acceptability of test results from a central concrete production facility shall be subject to the written approval of the Engineer

6. **TOLERANCES**

Degree of Accuracy II shall apply for all work unless otherwise stated

7. **TESTS**

7.1 FACILITIES AND FREQUENCY OF SAMPLING

7.1.2 **Frequency of sampling**

7.1.2.5 The frequency of sampling shall be as directed by the Engineer, but not less than one set of cubes from every 50m³ cast

8. **MEASUREMENT AND PAYMENT**

This clause shall not apply

D.2 AGGREGATES OF LOW DENSITY

Aggregates of low density shall comply with SANS 794

D.3 HOLLOW BLOCKS, PREFABRICATED BLOCK BEAMS AND PLANKS, ETC

Blocks, block beams, planks, etc shall be fixed and supported in such a manner that no movement can take place before or during the casting of concrete. No broken components shall be used

D.4 SUPERVISION

A competent and experienced foreman shall superintend personally the whole of the concrete construction and pay special attention to:

(a) The quality, testing and mixing of materials,
(b) The placing and compaction of concrete,
(c) The construction and removal of formwork and
(d) The sizes and position of reinforcement

The Contractor shall obtain the permission of the Principal Agent before commencing concreting of foundations or reinforced structure

No inspection, approval, authorisation to proceed, comment or instructions following from such an inspection, or failure of the Principal Agent to comment on any particular aspect of the work, shall be deemed to relieve the Contractor in any way from his obligation to ensure through his own supervision that the work is constructed in every way in accordance with the Drawings, Specification and Conditions of Contract, nor relieve him from his obligations to make good any fault or defect, nor shall it be deemed that there is any obligation on the Principal Agent to inspect all or any part of the Works or that such inspection is necessarily complete in every respect

D.5 GENERAL

Concrete

Rates for concrete work shall include all "construction joints" other than "designated joints" as defined in SANS 1200G clause 2.4.3 which are measured separately, and for the design of strength concrete mixes and all testing of concrete and materials other than compressive strength testing of concrete samples taken from concrete being placed in the Works. The Contractor shall only be entitled to payment for those samples and compressive strength tests called for by the Engineer and which pass the test requirements

Surface beds cast in panels shall be cast in panels approximately $9m^2$

Formwork

Formwork to slabs and beams shall be cambered where required
Rates for formwork to soffits shall include propping not exceeding 3,5m high unless otherwise described.
Formwork to walls and columns is not exceeding 3,5m high above bearing level unless otherwise described

Reinforcement

Standard welded steel fabric reinforcement shall be as included in Table 1 of SANS 1024 and shall have 300mm wide laps.

The mass of binding wire is not included in the mass of the reinforcement and the cost thereof shall be included in the rates for the reinforcement

E. PRECAST CONCRETE

E.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Precast concrete paving slabs SANS 541

Cement, water, aggregates and reinforcement shall be as described under D. CONCRETE, FORMWORK AND REINFORCEMENT

E.2 CONCRETE

Concrete shall be as described under D. CONCRETE, FORMWORK AND REINFORCEMENT and unless otherwise stated shall be prescribed mix concrete Class C but with coarse aggregate of an appropriate size

E.3 MOULDS

Before each casting, moulds shall be coated with a suitable release agent which will not in any way discolour the surface of the finished product or impair its strength. Where items are described as "finished smooth from the mould" or as "precast terrazzo", moulds shall be made to a high degree of accuracy and shall be such as to leave even and smooth surfaces

E.4 FINISHES TO BLOCKS

Where described as "precast terrazzo", such surfaces shall have a facing of terrazzo described under O. PLASTERING. The facing shall be poured into the moulds in a wet state (not dry pressed) and thoroughly worked up against finished faces to ensure that it finishes smooth from the mould

Projections shall be rubbed off and faces shall be of even colour and free from blemishes, cracks and other imperfections. Salient angles shall be arris rounded

E.5 CASTING ETC

Items shall be suitably cured, shall not be handled whilst still green and shall not be built in within 21 days of casting

E.6 REINFORCEMENT

Unspecified reinforcement required for manufacturing, handling and erection purposes and for reinforcing projecting and other unwieldy portions of blocks shall be provided by the Contractor at his discretion

E.7 BEDDING, JOINTING AND POINTING

Blocks shall be bedded and jointed solidly in Class I mortar as described under F. MASONRY and shall be pointed with slightly keyed joints

Blocks finished with "precast terrazzo" shall have joints raked out and pointed with slightly keyed joints in tinted waterproofed mortar composed of one part cement and three parts sand to match terrazzo facing

E.8 GENERAL

Precast concrete work shall include reinforcement required for manufacturing, handling and erection purposes, steel rod or wire hooks and/or mortices for lewis bolts required for handling and transporting, any necessary temporary propping and strutting and bedding, jointing and pointing

F. MASONRY

F.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Burnt clay masonry units	SANS 227
Limes for use in building	SANS 523 {Slaked (hydrated) limes}
Aggregates from natural sources – fine aggregates for plaster and mortar	SANS 1090
Concrete masonry units	SANS 1215
Prestressed concrete lintels	SANS 1504
Burnt clay paving units	SANS 1575
Metal ties for cavity walls	SANS 28
Common cement	SANS 50197-1 (Class 32,5N)
Masonry cement	SANS 50413-1 (Class 22,5X)
Concrete masonry construction	SANS 10145
The structural use of masonry	SANS 10164-1
Masonry walling	SANS 10249
Concrete floors	SANS 10109-1&2

F.2 SAND

Sand shall be washed where necessary and screened through a 2,4mm mesh sieve

F.3 BURNT CLAY BRICKS

Burnt clay bricks shall be of nominal size 222 x 106 x 73mm unless otherwise stated

Common bricks shall be General Purpose bricks

Extra hard burnt bricks shall be General Purpose (Special) bricks

Facing bricks shall exhibit a liability to efflorescence not in excess of "Slight" and water absorption when tested in conformity with the requirements of SANS 227 shall not exceed 14%

Particular care shall be taken to preserve arrisses and faces of facing and paving bricks during transit and handling

F.4 CONCRETE BRICKS

Concrete bricks shall have a nominal compressive strength of 8 MPa

F.5 QUARRY TILES ETC

Quarry, cement and similar tiles shall be of approved manufacture, even in shape and size, free from cracks, twists or blemishes and uniform in colour

F.6 WIRE TIES

Wire ties shall be of galvanized steel of the single wire type for solid walls and either the "Butterfly" or Modified PWD type for hollow walls. Ties shall be of sufficient length to allow not less than 75mm of each end to be built into brickwork or embedded in concrete

F.7 BRICKWORK REINFORCEMENT

Brickwork reinforcement shall be manufactured from hard drawn steel wire conforming to BS 785 and shall consist of two 2,8mm diameter main wires with 2,5mm diameter cross wires at 300mm centres welded at intersections

Brickwork reinforcement shall be lapped not less than 300mm at end joints and for a length equal to the width of the widest reinforcement at intersections

F.8 MORTAR

Mortar shall comply with the following table:

1	2	3	4
Mortar Class	Minimum compresive strength MPa	Cement:sand (common cement)	Cement:sand (masonry cement)
I	10	1:4 or 50kg to 130 litres	1:3 or 50kg to 100 litres
II	5	1:6 or 50kg to 200 litres	1:5 or 50kg to 170 litres
III	1,5	1:9 or 50kg to 300 litres	1:6 or 50kg to 200 litres

Mortar shall be Class II unless otherwise specified

Mortar plasticizers may only be used with the approval of the Principal Agent

The materials shall be mixed dry until of uniform colour, water added and the mixture turned over until the ingredients are thoroughly incorporated

Mortar shall be produced in such quantities as can be used before commencement of set and no mortar that has set shall be used

F.9 COMPO MORTAR

Compo mortar shall be Class III mortar in accordance with clause F.8 but with a lime content of 80 litres

The lime and sand shall be mixed dry until of uniform colour, water added and the mixture turned over until the ingredients are thoroughly incorporated. Immediately before use, the cement shall be mixed in and the requisite amount of water added. Compo mortar shall be produced in such quantities as can be used before commencement of set and no compo mortar that has set shall be used

F.10 BRICKWORK

Wherever practicable, brickwork shall be built in stretcher bond. Unless legitimately required to form bond, no false headers shall be used. English bond shall only be used where specifically so indicated or where stretcher bond is not practicable

Brickwork, unless otherwise described, shall be built in Class II mortar

Bricks shall be laid on a solid bed of mortar and all joints shall be grouted up solid

The brickwork shall be carried up in a uniform manner, no part being raised more than 1,2m above adjoining work

Where necessary, bricks shall be wetted before being laid and the course of bricks last laid shall be well wetted before laying a fresh course upon it

Walls in thicknesses of more than one skin shall have at least five wire ties per square metre. Linings to concrete, unless otherwise specified, shall be tied to the concrete with at least five wire ties per square metre

Hollow walls, unless otherwise specified, shall be built of two half brick skins with cavity between, tied together with at least five wire ties per square metre. The cavities shall be kept free of all rubbish, mortar droppings and projecting mortar. Mortar joints to brickwork shall be not less than 8mm or more than 12mm thick

F.11 BLOCKWORK

Unless otherwise described, all blockwork shall be built in stretcher bond. Whole blocks shall be used except where bats or closers are required to form bond. Blockwork, unless otherwise described, shall be built in Class II mortar

Solid blocks shall be laid on a solid bed of mortar and all joints shall be grouted up solid

Hollow blocks shall be laid in shell bedding, ie only the inner and outer shells of the blocks shall be covered with mortar. Vertical joints shall be similarly formed

The blockwork shall be carried up in a uniform manner, no part being raised more than 1,2m above adjoining work

Clay blocks shall be wetted before being laid and the course of blocks last laid shall be well wetted before laying a fresh course upon it

F.12 CENTRES AND TURNING PIECES

Centres and turning pieces to soffits of arches and lintels shall be left in position for not less than 14 days

F.13 FACE BRICKWORK

Face brickwork shall be built in stretcher bond, unless otherwise specified, to a true and fair face. Perpends shall be vertically aligned

Facing bricks shall be mixed to ensure that the proper blending of bricks within the colour range of each facing brick being used is obtained

F.14 PAVINGS, SILLS, COPINGS, ETC

Clay bricks and tiles shall be wetted before fixing and shall be solidly bedded and jointed in Class I mortar and pointed with slightly keyed joints

G. WATERPROOFING

G.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Bituminous damp-proof courses	SANS 248 (Type FV)
Polyolefin film for damp- and waterproofing in buildings (walls, sills, etc)	SANS 952 (Type B)
Polyolefin film for damp- and waterproofing in buildings (floors and basements)	SANS 952 (Type C)
Mastic asphalt for roofing	SANS 297
Mastic asphalt for damp-proof courses and tanking	SANS 298
Bituminous roofing felt	SANS 92 (Type 60)
Polyolefin film for damp- and waterproofing in buildings (flat roofs)	SANS 952 (Type A)
Chloroprene rubber sheet (for waterproofing)	SANS 580
Sealing compounds for the building industry, two-component, polysulphide base	SANS 110 (Type 2 - Gun Grade)
Sealing compounds for the building and construction industry, two- component, polyurethane base	SANS 1077
The waterproofing of buildings (including damp-proofing and vapour barrier installation)	SANS 10021

G.2 WATERPROOFING TO ROOFS, BASEMENTS, ETC

Waterproofing to roofs, basements, etc shall be carried out by workmen who are experienced in this type of work

G.3 DAMP-PROOF COURSE TO WALLS

All joints in damp-proof course to walls shall be lapped a minimum of 150mm except at junctions and corners where the lap shall equal the full thickness of the wall

H. ROOF COVERINGS ETC

H.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Concrete roofing tiles	SANS 542
Clay roofing tiles	SANS 632
Sawn softwood timber battens	SANS 1783-4
Fibre-cement sheets (flat and profiled)	SANS 685
Aluminium alloy corrugated and troughed sheets	SANS 903
Continuous hot-dip zinc-coated carbon steel sheet of commercial, lock-forming and drawing qualities	SANS 3575
Continuous hot-dip zinc-coated carbon steel sheet of structural quality	SANS 4998
Polyolefin film for damp- and waterproofing in buildings	SANS 952
Metal roofing tiles	SANS 1022
Glass-reinforced polyester (GRP) laminated sheets (profiled or flat)	SANS 1150
Fasteners for roof and wall coverings in the form of sheeting	SANS 1273
Materials for thermal insulation of buildings	SANS 1381-1&4
Expanded polystyrene thermal insulation boards	SANS 1508
Fixing of concrete interlocking roofing tiles	SANS 10062
Roof and side cladding	SANS 10237
Sheet zinc	BS 849
Sheet lead	BS 1178
Sheet aluminium	BS 1470
Sheet copper	BS 2870

H.2 GALVANIZED STEEL PROFILED SHEETS ETC

Galvanized steel profiled sheets, ridge and hip coverings, etc shall be coated with a minimum of 275 g zinc per m^2 and shall be free of white rust

H.3 GALVANIZED SHEET IRON

Galvanized sheet iron shall be rolled steel sheet coated on both sides with a minimum of 275 g of zinc per m^2 and shall be free from white rust

H.4 NAILING AND SCREWING

Where nailing and screwing is required:

- galvanized iron nails and screws shall be used for galvanized sheet iron and sheet zinc
- copper or copper alloy nails and screws for sheet copper and sheet lead
- aluminium alloy or stainless steel nails and screws for sheet aluminium

H.5 LAPS

Sheet metal flashings shall have minimum 100mm laps and linings to valleys, secret gutters, etc minimum 225mm laps

H.6 GENERAL

Rates for profiled sheet roofing and rolled edges, ridge and hip coverings, flashing pieces, etc of metal, fibre-cement, plastic, etc shall include fixing accessories

I. CARPENTRY AND JOINERY

I.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Sawn softwood timber : General requirements	SANS 1783-1
Sawn softwood timber : Stress-graded structural timber and timber for frame wall construction	SANS 1783-2
Sawn softwood timber : Brandering and battens	SANS 1783-4
Softwood flooring boards	SANS 629
Hardwood furniture timber	SANS 1099
Hardwood block and strip flooring	SANS 281
Wooden ceiling and panelling boards	SANS 1039
Laminated timber (glulam)	SANS 1460
Gypsum plasterboard	SANS 266
Fibreboard products	SANS 540
Wood-wool panels (cement bonded)	SANS 637
Fibre-cement sheets (flat and profiled)	SANS 685
Fibre-cement boards	SANS 803
Plywood and composite board	SANS 929
Wooden ceiling and panelling boards	SANS 1039
Particle boards	SANS 50312-1to7
Decorative laminates	SANS 4586
Wooden doors	SANS 545
Fire doors	SANS 1253
Materials for thermal insulation of buildings	SANS 1381-1,2,4&6
Expanded polystyrene thermal insulation boards	SANS 1508
Mild steel nails	SANS 820
Metal screws for wood	SANS 1171
Wood-preserving creosote	SANS 539

Softwood shall bear the relevant SABS mark and shall be ordered in the sizes in which it will be used as no scantlings of marked timber will be allowed. Should SABS marked timber be unavailable, the Principal Agent's prior permission shall be obtained before using unmarked timber

I.2 HARDWOODS

All hardwoods shall be specially selected, well seasoned, free from sapwood and well kiln dried. Meranti shall be Red or Medium Brown Meranti, even in grain and colour, selected from "Standard and Better" quality from Malaysia

I.3 INFECTION AND PRE-TREATMENT OF TIMBER

All timber used on the site, whether for permanent or temporary work, shall be free of borer or other beetle and termite infection. If the work under this contract falls within an area designated under Government Notice R2577 of 197812-29, permanent softwood fixed in the building shall be treated against borer etc in accordance with Government Notice R451 of 1969-03-28 using Class B or C preservative

When treated timbers are cut, the cut surfaces shall be effectively brushed with at least two coats of preservative solution

I.4 CONSTRUCTION IN GENERAL

Where applicable, construction methods shall comply with SANS 10082. Wood and laminate flooring shall be installed in accordance with SANS 10043. Roof trusses shall be manufactured, erected and braced in accordance with SANS 10243

I.5 STRUCTURAL TIMBER

Timbers generally shall be in single lengths and jointing of timbers will only be permitted when the required length is unobtainable. Only the absolute minimum of joints to obtain a particular length will be permitted and such joints are to be evenly spaced along the length of the timber

Finger-jointing of structural timber will be permitted, in which case it shall be manufactured in accordance with SANS 10096

I.6 PLATE NAILED TIMBER ROOF TRUSSES

Plate nailed timber roof trusses shall be of approved design and manufacture and constructed with softwood structural timber by a truss Fabricator holding a current Certificate of Competence awarded by the Institute of Timber Construction

Each roof truss shall have all its members accurately cut and closely butted together and rigidly fixed by CSIR approved patented galvanized metal spiked connectors, precision pressed on both sides of each intersection by an approved method, all in accordance with the manufacturer's instructions

The design, manufacture and transportation of the roof trusses, bracing, etc shall be under the control of a registered Structural Engineer in accordance with SANS 1900, SANS 10160 and SANS 10163, who shall, after erection, provide a certificate confirming that the design, manufacture, transportation, erection and bracing has been carried out in accordance with this specification

The design shall include for all live loads, wind loads and for dead loads imposed by roof covering, purlins, ceilings, etc

Fully detailed shop drawings of all trusses etc, indicating sizes, bracing, loading, etc, shall be submitted to the Principal Agent for approval prior to fabrication

Unless specific erection instructions are given, erection shall be carried out in accordance with the procedures and recommendations of the manual "The Erection and Bracing of Timber Roof Trusses" published by the Institute for Timber Construction and the Council for Scientific and Industrial Research or as detailed by the designer

Roof trusses and bracing shall include design and preparation of shop drawings

I.7 TONGUED AND GROOVED BOARDING

Tongued and grooved boards for floors, panelling, etc shall be in long varying lengths with joints tightly cramped up and secret nailed. Flooring boarding shall be flush jointed with staggered heading joints and machine sanded after fixing

I.8 JOINERY

Skirtings, cornices, rails, etc shall be in single lengths wherever practicable and shall have splayed heading joints where
necessary. Skirtings shall be trenched at back

All horns of door frames shall be checked and splayed back where frames are fixed projecting or flush with surface and built in

Heads of screws in exposed faces of hardwood joinery shall be sunk and match pelleted

Joinery shall have arris rounded angles and shall be blocked and planted on

I.9 VENEERS

All face veneers shall be of kiln dried timber, free from knots, cracks, patchwork, sapwood and other defects, selected and glued, dried and machine-sanded to a smooth finish. All veneers shall be applied under hydraulic pressure

I.10 DOORS

Flush doors shall have solid timber edge strips with concealed edges. Where doors are to be finished with a transparent finish, the veneer and the edge strips shall be timber of the same species and as far as possible of matching colour. Unless otherwise described all flush doors shall be of interior quality, but where exterior quality doors are specified the glue used shall be of the WBP type

Framed and ledged batten doors described as filled in with V-jointed boarding shall be filled in flush on one side with tongued and grooved vertical boarding, V-jointed on one or both sides and of the thickness stated. The boarding shall be in narrow widths, closely cramped up, rebated or tongued on outer edges and housed to grooves in stiles and rails and twice countersunk brass screwed at each intersection with ledges and braces and the inner edges of the abutting stiles and rails shall be chamfered to form a V-joint at junction with the board

Unless otherwise described double doors shall have rebated meeting stiles

I.11 FIXING

All nails and screws shall be of the size, length and type appropriate to their respective uses. All screws for hardwood joinery work shall be brass

Items described as "plugged" shall be screwed to fibre, plastic or metal plugs at not exceeding 600mm centres. Where items are described as "bolted", the bolts have been given separately

I.12 ADHESIVES

Adhesives shall comply with BS 1204 and 4071 where applicable. Adhesives used in the manufacture of external joinery exposed to excessive moisture (eg kitchen and laboratory worktops) shall be of the WBP type

J. CEILINGS, PARTITIONS AND ACCESS FLOORING

J.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Gypsum plasterboard	SANS 266
Fibreboard products	SANS 540
Gypsum cove cornice	SANS 622
Wood-wool panels (cement-bonded)	SANS 637
Sawn softwood timber : Brandering and battens	SANS 1783-4
Sawn softwood timber : Timber for frame wall Construction	SANS 1783-2
Fibre-cement boards	SANS 803
Plywood and composite board	SANS 929
Wooden ceiling and panelling boards	SANS 1039
Materials for thermal insulation of buildings	SANS 1381-1&4
Expanded polystyrene thermal insulation boards	SANS 1508
Raised access flooring	SANS 1549

J.2 TONGUED AND GROOVED BOARDING

Tongued and grooved boarding for ceilings shall be in long varying lengths, V-jointed one side and with joints tightly cramped up and secret nailed

J.3 CEILINGS ETC

J.3.1 Brandering

Brandering for ceilings and eaves soffit coverings shall be symmetrically arranged with necessary smaller panels. Main branders shall be at right angles to roof timbers, with cross branders cut in between and branders shall be fixed with galvanized wire nails driven in on skew alternately in opposite directions

J.3.2 Ceiling boards

Ceiling boards shall be in long lengths symmetrically arranged with necessary smaller panels, closely butted and secured at 150mm centres to brandering with galvanized or cadmium-plated clout-headed nails

J.4 GYPSUM SKIM PLASTER

Gypsum skim plaster shall be pure gypsum plaster finished with a steel trowel

J.5 EXPOSED TEE-SYSTEM SUSPENDED CEILINGS

The ceiling panels shall be as described in the items and the panels shall be stiffened at back as recommended by the manufacturer to prevent bowing or sagging

The exposed surfaces of all ceiling panels and supporting members shall be uniform in colour and free from surface blemishes

The suspension grid system shall be an approved patent suspension system comprising 38mm galvanized steel main and cross tee bearers spaced in both directions at centres to suit sizes of ceiling panels used, with the cross bearers fitted between and notched to form flush fit with main bearers. The exposed flange of the tees shall be 25mm wide, covered with a rolled aluminium cap painted a low sheen satin white. Cornices etc shall be as described in the items and shall be finished to match the exposed tees

The main tee bearers shall have holes for cross tees at 300mm centres and holes for hangers at 50mm centres. In addition, main and cross tee bearers shall be holed as necessary for and provided with timber wedges or steel clips where recommended by the manufacturer to prevent ceiling panels from lifting

The web of the exposed cross tee bearers shall extend to form a positive interlock with the main tee bearers and the lower flange shall be cut back to provide a joint free appearance

All hangers shall be galvanized and shall be at centres to meet the requirements of the specification with one end fixed to the suspension grid main bearers and the other end fitted with suitable galvanized fixing cleat securely fixed to the structure. Fixing points shall be agreed to by the Principal Agent before any power shot fixings are made. Hangers shall not be suspended from air-conditioning ducts. Where recommended by the manufacturer, hangers shall be of the rigid type

Component parts and fixings shall be non-corrosive and able to withstand atmospheric pollution. Surfaces of aluminium which are in contact with other materials when fixed, particularly metals, shall be suitably insulated to prevent electrolytic corrosion

Ceilings shall comprise hangers, suspension grid system and ceiling panels, shall be constructed in a manner suitable for carrying air-conditioning diffusers and light fittings in the positions required, shall be set out to layouts approved by the Principal Agent and shall have the standard suspension systems modified as necessary to work around any pipes or light fittings

J.6 FLUSH PLASTERED SUSPENDED CEILINGS

Gypsum plasterboard panels of the specified thickness generally in 1200mm widths and in long lengths shall be fixed grey side down with self-tapping screws to the suspension system with the joints between boards loosely butt jointed and covered with 50mm wide strips of self-adhesive fibre tape

The plasterboard panels shall be finished with gypsum skim plaster trowelled to a smooth polished surface to the thickness etc recommended by the manufacturer

The suspension system shall be an approved patent concealed suspension system consisting of galvanized mild steel bearers suspended on approved non-rusting metal hangers spaced generally at 1200mm centres or to suit layout of air-conditioning ducts and other services etc above ceiling with one end bolted to the bearer and the other end fitted with a galvanized fixing cleat securely fixed to the structure as required

Fixing points shall be agreed to by the Principal Agent before any power shot fixings are made. Hangers shall not be suspended from air-conditioning ducting

Ceilings shall comprise hangers, suspension system, ceiling panels and plaster finish, shall be constructed in a manner suitable for carrying air-conditioning diffusers and light fittings in the positions required, shall be set out to layouts approved by the Principal Agent and shall have the standard suspension system modified as necessary to work around any pipes or light fittings

K. FLOOR COVERINGS, WALL LININGS, ETC

K.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Semi-flexible vinyl floor tiles	SANS 581
Resin modified vinyl floor tiles	SANS 586
Flexible vinyl flooring	SANS 786
Hardwood block and strip flooring	SANS 281
Wood mosaic flooring	SANS 978
Textile floor coverings (pile construction)	SANS 1375
Textile floor coverings (needle-punched construction)	SANS 141
Carpet underlays	SANS 1419
The installation of wood and laminate flooring	SANS 10043
The installation of resilient thermoplastic and similar flexible floor covering materials	SANS 10070
The installation of textile floor coverings	SANS 10186
Sheet linoleum (calendered types), cork, carpet and linoleum tiles	BS 810
Solid rubber flooring	BS 1711
Felt backed linoleum	BS 1863

K.2 LAYING OF MATERIAL

Floor tiles shall be laid with continuous joints in both directions

Patterned floor coverings shall be matched at joints

K.3 GENERAL

Floor coverings, wall linings, skirtings, nosings, etc shall include all preparatory work to screeded or plastered surfaces etc, priming coats and adhesives

Floor coverings and wall linings shall be dressed around and into corners. Wood block and wood mosaic flooring shall be sanded with a sanding machine and sealed with a coat of approved penetrating sealer

Plastic handrails shall have welded and polished butt joints

L. IRONMONGERY

L.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Locks, latches and associated furniture for doors. (Domestic type)	SANS 4
Kitchen cupboards: Built-in and free-standing	SANS 1385
Single action closers	SANS 1510
Padlocks	SANS 1533
Fasteners	SANS 1700
Chalk writing boards for schools	CKS 36

L.2 KEYS

Locks shall have the minimum possible number of interchangeable keys. Cylinder locks and locks described as "en suite" shall be clearly marked with consecutive numbers and each key shall be punched with the corresponding number of the relative lock

L.3 FIXING

Unless otherwise described, ironmongery is to be fixed to wood

Items described as "plugged" shall be screwed to fibre, plastic or metal plugs

Screws, bolts, etc for fixing of ironmongery shall be of matching metal and finish, except for aluminium ironmongery or ironmongery fixed to aluminium in which cases stainless steel screws may be used

All necessary preparation of pressed steel door frames for the fixing of ironmongery to the frames has been included with the pressed steel door frames

L.4 KITCHEN CUPBOARDS

Steel cupboards shall be finished with baked enamel. Tops of floor cupboards shall have laminated plastic covering

Cupboards shall be fitted with all necessary hinges, handles, catches, etc. Cupboards shall be securely fixed with all necessary screws and fibre, plastic or metal plugs

Where cupboards are described as a "series", tops shall be continuous and cupboards shall be bolted or screwed together, including bolts, screws, holes, etc

M. STRUCTURAL STEELWORK

M.1 SPECIFICATION

All structural steelwork shall comply with SANS 1200H or 1200HA as applicable. Structural fasteners shall comply with
SANS 1700

Whenever the term "Engineer" appears in SANS 1200H or 1200HA or in the following Project Specification this shall be deemed to mean the Principal Agent's representative responsible for this section of the Works

M.2 PROJECT SPECIFICATION INCORPORATING AMPLIFICATIONS, ADDITIONS AND AMENDMENTS TO SANS 1200H AND 1200HA

The following amplifications, additions and amendments to SANS 1200H and SANS 1200HA shall apply and clause numbers refer to either the existing clauses in the relevant SANS or to new clauses which are related to the clauses therein

SANS 1200H

3.1.1 **Weldable structural steel**

Weldable structural steel shall comply with SANS 1431

5.1.2 **Contractor provides shop details**

The Contractor shall be responsible for the preparation of all shop detail drawings

5.1.3 **Engineer provides shop details**

This clause shall not apply

5.3.9 **Protective treatment**

Structural steelwork shall be cleaned and prepared by wire brushing in accordance with SANS 10064 and all surfaces shall be primed as specified to a minimum dry film thickness of 30 micrometres before leaving the workshop. Upon delivery to the site and again after erection all bared surfaces shall be made good with similar primer

8. **Measurement and payment**

This clause shall not apply

SANS 1200HA

5.2.10 **Protective treatment**

Structural steelwork shall be cleaned and prepared by wire brushing in accordance with SANS 10064 and all surfaces shall be primed as specified to a minimum dry film thickness of 30 micrometres before leaving the workshop. Upon delivery to the site and again after erection all bared surfaces shall be made good with similar primer

5.3.7 **Repairs to paint and site painting**
This clause shall not apply

8. **Measurement and payment**

This clause shall not apply

N. METALWORK

N.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Fasteners	SANS 1700
Expanded metal	SANS 190-1&2
Windows and doors made of rolled mild steel sections	SANS 727
Hot-dip galvanized zinc coatings on fabricated iron and steel articles	SANS 121
Strongroom and vault doors	SANS 949
Anodized coatings on aluminium (for architectural applications)	SANS 999
Steel door frames	SANS 1129
Mushroom- and countersunk-head bolts and nuts	SANS 1143
Welding of metalwork	SANS 1044
Adjustable glass-louvred windows	CKS 413
Aluminium sheet and strips	BS 1470
Aluminium extruded tube and hollow sections	BS 1474
Aluminium bars and sections	BS 1476

N.2 STEEL

Steel shall be mild steel of approved commercial quality. Steelwork shall be cleaned and prepared by wire brushing in accordance with SANS 10064 and given one coat of primer as specified before leaving the workshop

N.2.1 **Galvanizing of steel**

Steelwork described as "galvanized" shall be galvanized by means of the hot-dip process after fabrication. Where welding on site is unavoidable, such welded joints shall be cleaned down and cold galvanized to approval

N.3 STAINLESS STEEL

Stainless steel shall be AISI Type 304 stainless steel and shall be buffed to an even satin finish. Stainless steel screws shall be used for fixing stainless steel

N.4 ALUMINIUM

Aluminium extrusions shall be of 6063-T6 alloy and temper. Aluminium sheet and strips shall be of 1200-H4 alloy and temper.
Joints in all aluminium members shall be formed in an approved manner so that the joints are practically invisible. Screw heads, pins, rivets, etc shall be concealed as far as possible. 300 Series stainless steel screws and bolts shall be used for jointing and fixing aluminium work

The surfaces of all aluminium which are in contact with other materials when fixed shall be suitably insulated with a non-absorbent insulating material to prevent corrosion. All aluminium work shall be suitably protected against damage, deterioration or discolouration caused by mortar droppings, paint, etc by taping with removable tape, covering with temporary casings or by covering with motor oil

N.4.1 **Anodizing of aluminium**

Aluminium described as "anodized" shall be treated with Grade 25 coating thickness for exterior use or Grade 15 for interior use as specified, to the required finish. All alloys to be anodized shall be suited to anodizing

N.5 BOLTS AND NUTS

Nuts shall be of at least the strength grade appropriate to the grade of bolt or other threaded element with which they are used

N.6 SCREWING OF METALWORK TO STEEL, WOOD, CONCRETE, ETC

Metalwork described as "screwed" to steel, wood, etc or "plugged" to brickwork, concrete, etc shall be fixed at not exceeding 500mm centres, with necessary holes, countersinking, threading, screws, set screws, self-tapping screws and fibre, plastic or metal plugs

N.7 BOLTING OF METALWORK

Where metalwork is described as "bolted" to steel, wood, brickwork, concrete, etc the bolts are measured elsewhere

N.8 WELDING OF METALWORK

All welds shall be cleaned and filed or ground off smooth to approval. All welded joints shall be continuous

N.9 METALWORK GENERALLY

Metalwork shall have all sharp edges ground smooth. Tubular and pipe work shall include running joints. Rails etc described as "continuous" shall be in long lengths with welded joints

N.10 PRESSED STEEL DOORS, FRAMES, ETC

N.10.1 Door frames

Frames shall project not less than 20mm into floor finish. Except where described as galvanized, frames shall be primed as specified before leaving the factory. Frames are to jambs and heads of openings. Frames for single doors shall be provided with two 100mm steel butt hinges and an adjustable striking plate for a mortice lock and frames for double doors shall be provided with four 100mm steel butt hinges. Butt hinges shall be steel butts with loose pins, welded to frames. Where necessary mortar caps shall be welded to frames and back plates shall be welded on behind tappings for screws

N.10.2 Cupboard door frames

Cupboard door frames shall be as described in N.10.1, but with thresholds of unequal channel section, two 100mm steel butt hinges to hanging stiles, two 75mm steel butt hinges to hanging stiles above transoms, necessary striking plates for mortice locks and keeps for barrel bolts

N.10.3 Combination doors and frames

Combination doors and frames shall be manufactured of 1,6mm thick steel plate. Frames shall be as described in N.10.1. Doors shall be standard design and required profile, with a 44mm wide edge all round, vertical reinforcing ribs pressed in and with two reinforcing rails welded on. The door shall be provided with two lever mortice lock with lock box welded to inside. Doors shall be welded to steel butts

N.10.4 Transformer room doors and frames

Transformer room doors and frames shall be manufactured of 1,6mm thick steel plate. Frames shall be as described in N.10.1. Doors shall be of standard design with a 44mm wide edge all round, vertical reinforcing ribs pressed in and with three reinforcing rails welded on. Single doors shall be fitted with a padlock cleat and two 100mm brass pintle hinges and double doors shall be fitted with a padlock cleat, two 150mm bolts and four 100mm brass pintle hinges. Each leaf shall be fitted with a louvered ventilation panel of standard design backed with 6mm mesh galvanized wire vermin proof screen

N.10.5 Sizes

The frame widths given refer to unfinished wall thicknesses

N.10.6 Glazing beads

Where specified, glazing beads shall be 12 x 12mm standard metal glazing beads mitred at angles and countersunk screwed on at not exceeding 300mm centres with self-tapping screws

N.11 STEEL WINDOWS, DOORS, ETC

N.11.1 Windows, doors, etc

All fittings to windows, doors, etc shall be chromium plated. Fixed lights and opening sashes shall be in single squares. Windows etc of single unit construction shall have weather bars at transoms above opening sashes

Composite windows not of single piece construction shall be coupled with standard coupling mullions and transoms that correspond with the window section used

Kicking plates and panels shall be 1,6mm metal plate fixed with standard metal glazing beads mitred at angles and countersunk screwed on at not exceeding 300mm centres with self-tapping screws

Except where described as galvanized, windows, doors, burglar bars, etc shall be primed as specified before leaving the factory

N.11.2 Burglar bars and flyscreens

Where windows are described as fitted with burglar bars or flyscreens, these shall be standard type fitted over opening sashes

N.12 ADJUSTABLE LOUVRE UNITS

Adjustable louvre units shall be suitable for hand or longarm operation

Louvre units shall include glass louvres with polished edges and installation, including holes, screws, rivets, preparation of openings, etc

N.13 ALUMINIUM WINDOWS AND DOORS

The foregoing preambles "N.4 – ALUMINIUM" shall apply to aluminium windows, doors, etc in all respects in so far as they are applicable. Aluminium windows and doors shall be manufactured from extruded aluminium members of 6063T6, 6261-T6 or 6082-T6 alloy and temper

Ancillary members such as sills, flashings, infill panels and the like formed from flat sheet material shall be of an appropriate alloy selected from 1200, 3004 or 5251 complying with BS 1470 of a temper suitable for the method of forming and a composition suitable for anodizing or painting as required

Windows, doors, etc shall be of an approved standard system, manufactured by an approved firm experienced in this type of work, and shall meet with the minimum recommended performance requirements as set out by the Association of Architectural Aluminium Manufacturers of South Africa (AAAMSA) in the latest edition of the Selection Guide

The fittings for all opening sashes shall be substantial and, unless otherwise described, shall be of high quality aluminium alloy finished to match the windows, doors, etc on which they occur. Samples of all fittings shall be supplied to the Principal Agent for approval

Top, side and bottom hung opening sashes shall be hung on two aluminium hinges with 300 Series stainless steel pins, nylon bushes and stainless steel washers. Side hung sashes shall have fasteners and sliding stays, top hung sashes shall have peg stays and bottom hung sashes shall have spring catches and concealed arms

Projected out sashes shall have aluminium fasteners and concealed arms of a non-corrosive material compatible with aluminium

The frames which are to be built into openings in brickwork shall be fitted with the manufacturer's standard type fixing lugs, not less than 20 x 3 x 150mm long, screwed to frame and placed one near each corner and intermediately not more than 450mm apart to sides, top and bottom and where fixed to concrete reveals, wood sub-frames or to preformed openings in brickwork shall have countersunk holes for screws, one near each corner and intermediately not more than 450mm apart to sides, top and bottom

N.13.1 Glazing beads

Where so described, openings and sashes of windows and doors shall be fitted with approved channel section aluminium glazing beads sufficient in size and profile to suit the method of glazing employed, finished to match the windows, doors, etc and neatly mitred. Screws where necessary shall be of aluminium or 300 Series stainless steel and have pan or raised heads finished to match the beads

N.13.2 Finishes

Windows, doors, etc described as "anodized" shall be treated with Grade 25 coating thickness. Windows, doors, etc described as "factory painted" shall have an electrostatically applied oven baked polyester paint coating not less than 25 micrometres thick

N.13.3 General

Aluminium windows, doors, etc shall include glass as described, fixing in position, sealing and protection against damage, deterioration or discolouration by taping with removable tape or covering with temporary casings or motor oil and removing same on completion

N.14 STRONGROOM AND RECORD ROOM DOORS

Strongroom and record room doors shall not be built in as the work proceeds, but shall be fixed later in the openings provided. The Contractor shall ensure that the lock or other important parts of the door are not tampered with. Should any such tampering occur, the Contractor will be held responsible and at the Principal Agent's discretion shall provide a new door or lock and keys at his own expense. The keys shall not be delivered together with the doors to the building site. The Contractor shall arrange for the manufacturer to send the keys direct to the Principal Agent per registered post. If these instructions are not complied with, a new lock and keys shall be provided by the Contractor at his own expense

N.15 STEEL ROLLER SHUTTERS

Roller shutters shall be of approved manufacture comprising curtain, vertical channel guides and top mechanism. The curtain shall be constructed of 1mm thick machine-rolled galvanized interlocking slats with mild steel end locks spot welded to alternate strips. The bottom shall be provided with a galvanized rail riveted on and vertical edges shall slide in galvanized channel guides formed of steel not less than 2,5mm thick bolted to sides of openings

The mechanism shall be covered in a galvanized sheet iron box. The ungalvanized sections shall be primed as specified before leaving the factory

O. PLASTERING

O.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Common cement	SANS 50197-1(Class 32,5N)
Masonry cement	SANS 50413-1(Class 225X)
Limes for use in building	SANS 523 {Slaked (hydrated) limes}
Aggregates from natural sources – Fine aggregates for plaster and mortar	SANS 1090

O.2 PREPARATORY WORK

Surfaces shall be clean and free of oil and thoroughly wetted directly before any plastering or other in situ finishes are commenced. Concrete surfaces shall be slushed with a mixture of one part cement and one part coarse sand or otherwise treated to form a proper key. Preparatory coats shall be thoroughly scored and roughened to form a proper key

O.3 FINISH

All coats of paving and plastering shall be executed in one operation without any blemishes

O.4 SCREEDS

Screeds shall be composed of one part cement and four parts sand

O.5 CEMENT RENDER

Cement render shall be composed of one part cement and three parts sand finished with a steel trowel to a smooth polished surface and cured for at least seven days after laying

Cement render finish shall be divided into panels not exceeding $6m^2$ with V-joints and deep trowel cuts

O.6 GRANOLITHIC

Granolithic shall be composed of one part cement, one part fine sand, two parts coarse sand and one part granite or other approved stone aggregate that will pass through a 5mm sieve, finished with a steel trowel to a smooth polished surface and cured for at least seven days after laying

Coloured granolithic shall be carried out in two coats in one operation and shall be tinted to the required colour with approved colouring pigment mixed into the finishing coat. Under no circumstances is the pigment to be sprinkled on and trowelled in after the granolithic is laid

Granolithic shall be divided into panels not exceeding $6m^2$ with V-joints and deep trowel cuts

O.7 TERRAZZO

Terrazzo shall be applied in two coats. The undercoat shall be composed of one part cement and three parts sand and shall be finished with a wooden float. The finishing coat shall be composed of one part cement and two parts marble or stone aggregate of a colour and size to obtain the required colour and texture and shall be at least 12mm thick, and applied before the undercoat has dried out. The finishing coat shall be compacted by tamping or rolling until superfluous water has been expelled, finished with a steel trowel and cured for at least seven days after laying. The finished surface shall show at least 80% of the aggregate

Surfaces described as "polished" shall be polished by machine using various grades of abrasive and grouting with tinted cement as necessary between polishings

Surfaces described as "polished" shall be polished by machine using various grades of abrasive and grouting with tinted cement as necessary between polishings

Surfaces described as "brushed" shall be brushed with a steel wire brush on the day the terrazzo has been laid to expose the aggregate as required

Where required, brass or other dividing strips shall be embedded in the undercoat to finish flush with the finished surface

Three sample blocks, each size 300 x 300mm, as separately measured shall be prepared for approval by the Principal Agent and kept in an accessible place on the site until the completion of the contract

O.8 SKIRTINGS

Skirtings shall not exceed 25mm thick and shall have a fair edge with arris or rounded external angle at top edge or V-joint to finish flush with plaster and coved or square junction with floor finish

O.9 THICKNESS OF PLASTER

All plaster, other than skim plaster, shall be not less than 10mm and not more than 20mm thick

O.10 CEMENT PLASTER

Cement plaster shall comply with the following table:

1	2	3
Plaster Class	Cement:sand (common cement)	Cement:sand (masonry cement)
I	1:4 or 50kg to 130 litres	1:3 or 50kg to 100 litres
II	1:6 or 50kg to 200 litres	1:5 or 50kg to 170 litres
III	1:9 or 50kg to 300 litres	1:6 or 50kg to 200 litres

O.11 COMPO PLASTER

Compo plaster shall be composed of one part cement, two parts lime and nine parts sand

O.12 GYPSUM SKIM PLASTER

Gypsum skim plaster shall be pure gypsum plaster finished with a steel trowel

O.13 TWO COAT PLASTER WITH GYPSUM FINISH

Two coat plaster with gypsum finish shall comprise an undercoat of Class II cement plaster finished with a wooden float and a finishing coat of gypsum skim plaster

O.14 ROUGH-CAST PLASTER

Rough-cast plaster shall be applied in two coats. The undercoat shall be composed of one part cement and five parts sand finished with a wooden float. The finishing coat shall be composed of one part cement and three parts stone aggregate that will pass through a 4mm sieve. The finishing coat shall be flicked on with a machine before the undercoat has set to obtain an even texture

O.15 FINE ROUGH-CAST PLASTER

Fine rough-cast plaster shall be as for rough-cast plaster but the finishing coat shall be composed of one part cement and three parts coarse sand

0.16 GENERAL

Rates for plastering described as being on vertical surfaces of brickwork or blockwork shall include concrete columns, beams and lintels flush with the face of the wall

P. TILING

P.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Glazed ceramic wall tiles and fittings	SANS 22
Ceramic wall and floor tiles	SANS 1449
Common cement	SANS 50197-1(Class 32,5N)
Masonry cement	SANS 50413-1(Class 22,5X)
Aggregates from natural sources – Fine aggregates for plaster and mortar	SANS 1090
The design and installation of ceramic tiling	SANS 10107

P.2 TILES, MOSAICS, ETC

Tiles, mosaics, etc shall be even in shape and size, free from cracks, twists or blemishes and uniform in colour

P.3 PREPARATORY WORK

Surfaces shall be clean and free of oil and thoroughly wetted directly before any tiling is commenced. Concrete surfaces shall be slushed with a mixture of one part cement and one part coarse sand or otherwise treated to form a proper key

P.4 CERAMIC WALL AND FLOOR TILING

Where tiles are fixed to plaster or screeds with an adhesive, the adhesive shall be as recommended by the manufacturer of the tiles. Joints shall be straight, continuous and flush pointed with an approved grouting compound

P.5 GENERAL

Tiling described as "on walls" is on brick walls or block walls unless otherwise stated and shall include concrete columns, beams and lintels flush with the face of the wall

Q. PLUMBING AND DRAINAGE

Q.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Sheet metal	
Sheet zinc	BS 849
Sheet aluminium	BS 1470
Sheet copper	BS 2870
Rainwater systems	
Unplasticized poly(vinyl chloride) (PVC-U) components for external rainwater systems	SANS 11
Pipes and fittings	
Steel pipes : Pipes suitable for threading and of nominal size not exceeding 150mm	SANS 62
Plain-ended solid drawn copper tubes for Potable water	SANS 460
Malleable cast iron fittings threaded to ISO 7-1	SANS 4
Polyethylene (PE) pipes for water supply – Specifications	SANS 4427
Cast iron fittings for asbestos cement pressure pipes	SANS 546
Vitrified clay sewer pipes and fittings	SANS 559
Reinforced concrete pressure pipes	SANS 676
Concrete non-pressure pipes	SANS 677
Cast iron pipes and pipe fittings for use above ground in drainage installations	SANS 746
Unplasticized poly(vinyl chloride) (PVC-U) sewer and drain pipes and pipe fittings	SANS 791
Fibre-cement pipes, couplings and fittings for sewerage, drainage and low-pressure irrigation	SANS 819
Pitch-impregnated fibre pipes and fittings and jointing	SANS 921
Unplasticized poly (vinyl chloride) (PVC-U) pressure pipe systems	SANS 966-1
Unplasticized poly(vinyl chloride) (PVC-U) soil, waste and vent pipes and pipe fittings	SANS 967
Rubber joint rings (non-cellular)	SANS 974-1
Copper-based fittings for copper tubes	SANS 1067-1&2
Fibre-cement pressure pipes and couplings	SANS 1223
Polypropylene pressure pipes	SANS 1315
Non-metallic waste traps	SANS 1321-1&2
Vent valves for drainage installations	SANS 1532
Heavy duty cast iron pipe fittings for drainage and gas and water supplies	BS 78

Lead pipes	BS 602
Cast iron pressure pipes for use in drainage and gas and water supplies	BS 1211
Stainless steel pipes for use with compression fittings	BS 4127
Sanitary fittings etc	
Stainless steel sinks with draining boards (for domestic use)	SANS 242
Stainless steel wash-hand basins and wash troughs	SANS 906
Stainless steel sinks for institutional use	SANS 907
Stainless steel stall urinals	SANS 924
Acrylic sanitary ware : Baths	SANS 1402-1
Glazed ceramic sanitary ware	SANS 497
WC flushing cisterns	SANS 821
Flush valves for WC flushing cisterns	SANS 1509
Taps, valves etc	
Water taps (metallic bodies)	SANS 226
Water taps (plastic bodies)	SANS 1021
Single control mixer taps	SANS 1480
Float valves	SANS 752
Plastic floats for ball valves	SANS 1006
Functional control valves and safety valves for Domestic hot and cold water supply systems	SANS 198
Cast iron gate valves for waterworks	SANS 664
Automatic shut-off flush valves for water closets and urinals	SANS 1240
Check valves (flanged and wafer types)	SANS 1551-1&2
Fire extinguishers	
Portable refillable fire extinguishers	SANS 1910
Portable rechargeble fire extinguishers : Halogenated hydrocarbon type extinguishers	SANS 1151
Water heaters and fire hose reels	
Fixed electric storage water heaters	SANS 151
Fire hose reels (with semi-rigid hose)	SANS 543
Drainage covers, gratings, etc	
Cast iron surface boxes and manhole and inspection covers and frames	SANS 558
Cast iron gratings for gullies and stormwater drains	SANS 1115
The installation of polyethylene and poly (vinyl chloride) (PVC-U and PVC-M) pipes	SANS 10112
Water supply and drainage for buildings	SANS 10252-1&2

Cast iron step irons BS 1247

Q.2 GENERAL

Q.2.1 Excavations

Excavations shall be deemed to be in "earth". Backfilling to excavations shall be executed in 300mm thick layers, watered and compacted. Surplus excavated material shall be spread and levelled over site as directed

Q.2.2 Concrete

Unreinforced concrete shall be Class B prescribed mix concrete and reinforced and precast concrete shall be Class C prescribed mix concrete

Q.2.3 Brickwork

Brickwork shall be of extra hard burnt bricks built in Class I mortar

Q.2.4 Plaster

Plaster shall be 1:3 cement plaster finished smooth with a steel trowel. All angles shall be rounded

Q.2.5 Diameters of pipes etc

Diameters stated for pipes, traps, valves, etc are internal diameters except PVC, polyethylene, stainless steel and copper pipes and traps for which external diameters are stated

Q.3 SHEET METAL WORK

Q.3.1 Galvanized sheet iron

Galvanized sheet iron shall be rolled steel sheet coated on both sides with Class Z275, unless otherwise specified, zinc coating complying with SANS 3575/4998. Sheets shall be free from white rust

Q.4 EAVES GUTTERS

Q.4.1 Galvanized sheet iron gutters

Galvanized sheet iron gutters shall have beaded edges and all joints shall be riveted and soldered. Angles shall be strengthened with 50 x 0,6mm galvanized sheet iron strips soldered on over the internal faces of mitres

Gutters shall be fixed with falls to outlets on 30 x 3mm galvanized mild steel brackets, bent to the shape of gutters, with front ends taken up to the underside of beaded edge of gutter and each screwed to roof timbers or bolted to fibre-cement fascias with 6mm galvanized gutter bolts. Gutters shall be bolted to brackets at front with 6mm galvanized gutter bolts, one to each bracket

Brackets shall be positioned at joints of gutters and intermediately at not exceeding 1,25m centres

Q.4.2 Fibre-cement gutters

Fibre-cement gutters shall have spigot and socket joints. Gutters shall be fixed with falls to outlets on standard aluminium alloy brackets, screwed or bolted to roof timbers or fascias

Q.4.3 Unplasticized polyvinyl chloride (UPVC) gutters

Gutters shall be fixed with falls to outlets on brackets as supplied by the manufacturer, screwed or bolted to roof timbers or fascias

Q.4.4 Aluminium gutters

Aluminium gutters shall be roll formed on site to required lengths and profiles from 3003H14-3SH4 alloy strip not less than 0,7mm thick factory coated on both sides with baked enamel and two coats of silicone modified polyester to a total minimum thickness of 20 micrometres. Angles, stopped ends, etc shall be prefabricated units pop riveted to gutters with joints sealed with mastic. The guttering shall be in continuous lengths between angles, stopped ends, etc

Q.5 RAINWATER PIPES

Q.5.1 Galvanized sheet iron pipes

Galvanized sheet iron pipes shall have seams at the back and shall be jointed with soldered slip joints. Pipes shall be fixed to walls etc with galvanized mild steel holderbats spaced at not exceeding 2m centres with tails driven in or cut and pinned in 1:3 cement mortar

Q.5.2 Fibre-cement pipes

Fibre-cement pipes shall have spigot and socket joints. Pipes shall be fixed to walls etc with standard aluminium alloy holderbats with tails driven in or cut and pinned in 1:3 cement mortar

Q.5.3 Unplasticized polyvinyl chloride (UPVC) pipes

Pipes shall be fixed to walls etc with patented UPVC or aluminium clips and holderbats as supplied by the manufacturer of the pipe

Q.5.4 Aluminium pipes

Aluminium pipes and fixing straps shall be formed from 3003H14-3SH4 alloy strip not less than 0,7mm thick factory coated on both sides as described for aluminium gutters. Pipes shall be in continuous lengths with formed angles, offsets, shoes, etc. Pipes shall be fixed to walls etc with 20 x 0,6mm straps at not exceeding 1,5m centres screwed to 25 x 75 x 100mm hardwood chamfered and oiled blocks plugged to walls

Q.6 STORMWATER CHANNELS

In-situ concrete stormwater channels shall be constructed of unreinforced concrete with segmental channel formed in top. Channels shall be laid to falls on a well rammed earth bottom and finished smooth on exposed surfaces

Precast concrete channels shall be of 25 MPa concrete, generally in 1m lengths, finished smooth from the mould on exposed surfaces, laid to falls on a well rammed earth bottom, jointed in 1:3 cement mortar and pointed with keyed joints

Q.7 JOINTS

Joints of pipes not covered by SANS shall be as follows:

Pipes	Joints
Fibre-cement, concrete, pitch-impregnated fibre and vitrified clay pipes for use under ground in non-pressure pipe lines	Flexible joints in accordance with the manufacturer's instructions
Cast iron for use above ground	Spigot and socket joints with tarred rope yarn and caulking compound or Plain ended joints with stainless steel couplings with neoprene rubber sleeves
Cast iron for use below ground	Spigot and socket joints with tarred rope yarn and caulking compound
Galvanized mild steel	Joints of screwed galvanized steel sockets or bolted galvanized iron flanges Screwed joints with plastic jointing tape or hemp Flanged joints which shall be bolted and provided with rubber gaskets and with flanges screwed to pipes
Joints between pipes of different materials shall be as follows:	
Between cast iron and mild steel	Spigot and socket joints with tarred rope yarn and caulking compound
Between cast iron and clay	Spigot and socket joint with semi-dry cement caulking and 1:2 cement mortar fillet
Between mild steel or copper and clay	Spigot and socket joint with either bitumen or semi-dry cement caulking and 1:2 cement mortar fillet

Q.8 FIXING OF PIPES

Pipes shall be fixed as follows:

Q.8.1	Galvanized mild steel (except those stated in Q.8.3)	To walls with galvanized mild steel brackets for pipes not exceeding 80mm diameter and with galvanized cast iron hinged holderbats with brass pins or bolts for pipes exceeding 80mm diameter; both types with tails cut and pinned in 1:3 cement mortar To woodwork with screw-on type galvanized mild steel holderbats
Q.8.2	Copper and stainless steel	To walls with brass holderbats or screw-on type two- piece spacing clips for pipes not exceeding 75mm diameter and with purpose made holderbats for pipes exceeding 75mm diameter; both types with tails cut and pinned in 1:3 cement mortar To woodwork with screw-on type brass holderbats
Q.8.3	Cast iron and galvanized mild steel for soil, waste and vent pipes	To walls with hinged cast iron holderbats with brass bolts and with tails cut and pinned in 1:3 cement mortar To woodwork with screw-on type galvanized mild steel holderbats
Q.8.4	Polyethylene, polypropylene and patented UPVC or unplasticized polyvinyl chloride	To walls, woodwork, etc with aluminium clips and holderbats as supplied by the manufacturer of the pipes
Q.8.5	Fibre-cement	To walls with aluminium alloy holderbats with tails cut and pinned in 1:3 cement mortar

Q.8.6	Pipes fixed to ceilings	Fixed with holderbats and standard or purpose made hangers, with extended hangers for pipes to falls

Q.9 PIPES LAID IN GROUND

Q.9.1 Water pipes etc

Water pipes, gas pipes, etc laid in ground shall be at least 400mm deep from the crown of the pipe to the finished surface

Q92 Drain pipes

Excavations taken out too deep shall be filled in with selected soil and compacted. Backfilling to sides and up to 300mm above plastic pipes shall be free from stone or hard substances which will not pass a 10mm mesh

Q.10 CLEANING EYE LIDS

Cleaning eye lids for drain pipe fittings shall be fixed and sealed as follows:

Pipe fittings	Method of sealing and fixing
Fibre-cement	Sealed with synthetic rubber or bituminous mastic packing and fixed with screws
Vitrified clay	Polypropylene lid sealed with synthetic rubber packing and pressed into position
Polypropylene and unplasticized polyvinyl chloride	Sealed with synthetic rubber packing and screwed on or pressed into position
Cast iron	Sealed with tallow or putty and fixed with non-ferrous metal screws
Galvanized malleable cast iron and cast brass	Sealed with synthetic rubber packing and screwed in

Q.11 CLEANING EYES

Cleaning eyes shall consist of cast iron frames and lids with letters "CE" (or "SO") cast in lids. The lids shall be secured with non-ferrous metal screws. Frames shall be jointed to vertical drain pipes. Cleaning eyes shall be encased in unreinforced concrete taken up to ground level and plastered on exposed surfaces

Q.12 INSPECTION EYE MARKER SLABS

Inspection eye marker slabs shall be 350 x 350 x 50mm thick precast concrete finished smooth from the mould, with letters "IE" (or "IO") formed in top and placed flush in ground or paving

Q.13 GULLEYS

Gulleys shall be built up of traps, vertical piping and gulley heads with loose gratings, all encased in unreinforced concrete to finish flush with gulley head top and taken up to at least 50mm above surrounding finished surfaces. The outer top edge of the concrete encasing shall be splayed and the exposed surfaces plastered

Q.14 DISHED GULLEYS

Dished gulleys shall be built up of traps, vertical piping and gulley heads with loose gratings, all encased in unreinforced concrete and with dished unreinforced concrete hopper size 450 x 450mm overall around gulley head with rounded kerb 50mm wide to front and sides and 25mm wide at back, 100mm high above top of dishing and the hopper plastered on exposed surfaces. Top of hopper shall be taken up to at least 50mm above surrounding finished surfaces

Q.15 SUMPS, CATCHPITS, INSPECTION CHAMBERS, ETC

Q.15.1 Rainwater sumps

Rainwater sumps shall be built with half-brick sides on 100mm thick unreinforced concrete bottom, plastered internally on walls and with 80mm high unreinforced concrete kerb at top rebated for grating or cover and plastered on exposed surfaces

Q.15.2 Stormwater catchpits and inspection chambers

Brick catchpits and inspection chambers shall be built with one-brick sides on 150mm thick unreinforced concrete bottom projecting 100mm beyond walls all round, plastered internally on walls and with 100mm thick reinforced concrete cover slab with opening rebated for frame of grating or cover and plastered on exposed surfaces

Precast concrete catchpits and inspection chambers shall be constructed in accordance with the applicable details shown on Drawing LE-1 of SANS 1200LE. Precast concrete manhole sections and slabs shall comply with SANS 1294 and pipes shall be SC type and in accordance with SANS 677

Q.15.3 Sewer inspection chambers

Brick inspection chambers shall be built as for brick stormwater inspection chambers and with the bottom of the chamber well benched around half round channels, bends, junctions, etc up to sides of chamber in unreinforced concrete finished smooth

Precast concrete inspection chambers shall be constructed in accordance with the applicable details shown on Drawing LD-5 of SANS 1200LD. Precast concrete manhole sections and slabs shall comply with SANS 1294 and the pipes shall be SC type in accordance with SANS 677

Q.15.4 Stormwater drain junction boxes

Junction boxes shall be formed of 150mm thick unreinforced concrete bottom and sides to suit the various sizes of the drain pipes and built after the pipes have been laid, with the sides taken up slightly higher than the highest pipe and finished level on top for and covered with a 75mm thick loose precast concrete slab

Q.15.5 Step irons

Where inspection chambers exceed 1,2m deep, cast iron step irons shall be provided, built into the wall at 300mm centres and staggered regularly in vertical rows spaced at 200mm centres horizontally

Q.16 STOPCOCK AND METER BOXES

Stopcock and meter boxes shall be built with half-brick sides with a cast iron box and lid complying with SANS 558 set in 75mm wide unreinforced concrete kerb for the full depth of the cast iron box and plastered on exposed surfaces

Q.17 VALVE CHAMBERS

Valve chambers shall be built with half-brick sides with 100mm thick unreinforced concrete kerb to top with rebate for cover and frame to finish flush with adjacent paving or finished ground level and plastered on exposed surfaces

Q.18 CAST IRON COVERS, GRATINGS, ETC

All cast iron covers, gratings, frames and surface boxes shall be coated with preservative solution. Frames shall be cast into concrete. Covers, except covers to stormwater drainage or electrical cable inspection chambers, shall be set in grease

Q.19 CONCRETE ENCASING

Concrete encasing for pipes, bends, traps, gulleys, grease traps, etc shall be unreinforced concrete not less than 100mm thick all round

Q.20 SANITARY FITTINGS

Q.20.1 General

Glazed ceramic, acrylic and porcelain enamelled sanitary fittings and component parts shall be white. Accessories for sanitary fittings shall be chromium plated brass

Waste outlets for baths, basins, etc shall comprise chromium plated brass waste union with grating, rubber washers and locknut, fitted with rubber or vulcanite plug on a chromium plated brass chain and stay

Q.20.2 Stainless steel sanitary fittings

Stainless steel sinks and draining boards, basins, wash troughs and urinals shall be AISI Type 304 satin finished stainless steel. All stainless steel fittings shall be treated on the back with a vermin proof sound deadening coating. Sinks, basins and wash troughs shall be provided with 40mm diameter screwed waste outlets

Q.20.3 Precast concrete wash troughs

Reinforced precast concrete wash troughs shall have a sloping front with ribbed rubbing surface and shall be finished smooth on exposed faces with top edges and inner angles rounded. Each compartment shall be fitted with a 40mm diameter waste outlet. Wash troughs shall each be supported on two reinforced precast concrete pedestals finished smooth on exposed faces

Q.20.4 Steel baths

Steel baths shall be porcelain enamelled internally and painted externally and fitted with waste outlet and overflow grating with coupling

Q.20.5 Acrylic resinous baths

Acrylic resinous baths shall be fitted with waste outlet and overflow grating with coupling

Q.20.6 Acrylic resinous wash hand basins

Acrylic resinous wash hand basins and vanity units shall have a smooth high gloss finish, with outlet openings, soap recesses, tap-holes and integral overflow and shall be fitted with waste outlet and overflow grating with coupling

Q.20.7 Glazed ceramic sanitary fittings

Sinks shall be provided with integral weir overflows

Washdown closet pans shall have washdown action and be provided with smooth finished injection moulded polypropylene heavy duty double flap seats fixed with non-ferrous bolts. Urinal channels shall be provided with outlet gratings fitted in bitumen

Q.20.8 Flush and sparge pipes

Flush pipes for high level cisterns shall be of plastic or drawn galvanized steel

Flushpipes for low level cisterns shall be of plastic

Flush and sparge pipes for urinals with high level cisterns shall be of chromium plated copper piping and of the sizes recommended by the manufacturer of the urinal

Q.21 INSTALLATION OF SANITARY FITTINGS

Sanitary fittings shall be installed as follows:

Q.21.1 Precast concrete wash troughs

Precast concrete wash troughs shall be bedded on top of pedestals which shall be bedded on floors in 1:3 cement mortar

Q.21.2 Stainless steel wash troughs and wash hand basins

Stainless steel wash troughs and wash hand basins shall be fixed to walls on a pair of galvanized mild steel gallows brackets bolted to wall with 6mm diameter expanding bolts

Q.21.3 **Acrylic resinous wash hand basins**

Acrylic resinous wash hand basins shall be fixed to walls on a pair of standard painted cast iron brackets screwed to underside of basin and bolted to wall with 6mm diameter expanding bolts

Q.21.4 **Ceramic wash hand basins**

Ceramic wash hand basins shall be fixed to walls on a pair of standard painted steel or cast iron brackets bolted to wall with 6mm diameter expanding bolts

Q.21.5 **Acrylic resinous baths**

Acrylic resinous baths shall be bedded in 1:5 cement mortar on three cross rows of bricks or bedded solid on a layer of dry river sand and fixed to wall with galvanized steel brackets under edges (in the middle of the sides against walls) bolted to wall with 6mm diameter expanding bolts and sealed along top against wall finishes with patent mildew resistant silicone rubber

Q.21.6 **Washdown closet pans and cisterns**

Washdown closet pans shall be bedded on floors in 1:3 cement mortar. Cisterns shall be fixed to walls with 6mm diameter expanding bolts

Q.21.7 **Ceramic urinals**

Ceramic stall and slab urinals shall be bedded on floors and against walls in 1:3 cement mortar. Slabs, channels, treads, etc shall be jointed in 1:3 cement mortar and pointed in white cement

Ceramic bowl urinals shall be fixed to walls on standard steel brackets bolted to wall with 6mm diameter expanding bolts. Cisterns shall be fixed to walls on standard brackets bolted to wall with 6mm diameter expanding bolts

Q.21.8 **Stainless steel urinals**

Stainless steel stall and slab urinals shall be bedded on floors in 1:3 cement mortar and with backs and sides against walls filled in with fine unreinforced concrete. Cisterns shall be fixed as cisterns for ceramic urinals

Q.22 FIRE HOSE REELS

Fire hose reels shall each be fitted with a 30m long hose of internal diameter not less than 19mm with a 4,8mm internal diameter chromium plated brass nozzle

Q.23 FIRE EXTINGUISHERS

All fire extinguishers shall be fully charged

Q.24 TESTS

Sewerage pipe lines, sanitary plumbing including fittings and hot and cold water supply and fire service shall be tested to the approval of the Principal Agent and Local Authority

The Contractor shall provide all testing apparatus, material and labour required for the tests and inspections

R. GLAZING

R.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Glass in building	SANS 50572-1 to 5
Glazing putty for wooden and metal window frames	SANS 680
Silvered glass mirrors for general use	SANS 1236
Safety and security glazing materials for buildings	SANS 1263-1 to 3
Sealing compounds for the building industry, one Component, silicone-rubber based	SANS 1305
The installation of glazing materials in buildings	SANS 10137
Work on glass for glazing	SANS 1817

R.2 PUTTY ETC

Glazing putty shall be Type I for wooden sashes and Type II for steel sashes. Putty for glazing to unpainted hardwood shall be tinted to match the colour of the wood

Back putty shall not exceed 3mm thick. Putty shall not be painted until it has formed a surface crust, and if the putty does not form a surface crust it shall be replaced

Butyl putty shall be used where glass is to be fixed in aluminium sashes with glazing beads

Non-setting compounds shall be used where laminated glass is fixed in sashes with glazing beads

S. PAINTWORK

S.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Decorative paint for interior use	SANS 515
Decorative high gloss enamel paints	SANS 630
Primers for wood (for external work)	SANS 678
Primers for wood (for internal work)	SANS 678
Zinc phosphate primer for steel	SANS 1319
Undercoats for paints (except emulsion paint)	SANS 681
Aluminium paint	SANS 682
Varnish for interior use	SANS 887
Emulsion paints	SANS 1586

Materials for paintwork shall be delivered to the site in unopened containers and applied in accordance with the manufacturer's instructions. Materials shall be suitable for application to the surfaces concerned. Undercoats shall be as
recommended by the manufacturer of the finishing coats

S.2 PREPARATORY WORK

S.2.1 **Plastered surfaces etc**

Plastered surfaces shall be thoroughly inspected and, if necessary, washed down and brushed in order to remove any traces of efflorescence and allowed to dry completely before any paint finish is applied. Before any paint is applied, holes, cracks and irregularities in plaster and other surfaces shall be filled with a suitable filler and finished smooth. Unfinished concrete surfaces shall have all projections rubbed off and shall be thoroughly cleaned with a spirits-of-salts solution (1 part concentrated spirits-of-salts to 4 parts water)

S.2.2 **Metal surfaces**

Metal surfaces shall be sanded, where necessary, washed with a suitable cleaning agent and left smooth

Protective coatings applied by manufacturers to galvanized metal surfaces shall be removed with a suitable agent and the surfaces washed down

Rust, grease and defective factory primers on metal surfaces, as well as pitch on cast iron pipes, shall be removed

S.2.3 **Wood surfaces**

Knots in woodwork shall be treated with knotting. Minor blemishes shall be filled with a suitable filler. Wood surfaces shall be sanded smooth

S.3 APPLICATION OF PAINT

Primers to wood surfaces shall be applied by brush. Primers to other surfaces may be applied by roller with the approval of the Principal Agent. Undercoats and finishing coats may be applied by brush or roller

Paint shall not be sprayed on except in the case of cellulose and other special paints where spray painting is the accepted method of application

Before subsequent coats of paint are applied the previous coat shall be properly dry and shall be sanded down where necessary

S.4 COLOUR SCHEME

A colour scheme comprising colours and the blending of colours approved by the Principal Agent shall be used for the paintwork. The tints of the undercoats shall closely match the finishing coat but nevertheless differ sufficiently to indicate the number of undercoats. Colour samples of the finishing coats shall be provided in all cases

S.5 GENERAL

Paintwork shall include the preparation of surfaces, filling, stopping, sanding and priming of nail heads and screws. Where windows, sashes, etc are to be painted, the rebates of the openings to be glazed shall be primed

T. PAPERHANGING

T.1 PREPARATORY WORK

Plaster surfaces to be papered shall be dry, thoroughly cleaned down, filled with a suitable filler as necessary to obtain a smooth surface and painted thereafter with a single coat of emulsion paint

Wood surfaces to be papered shall be knotted, stopped and sanded

T.2 PAPERHANGING

Wallpaper shall be hung in vertical long lengths. Vertical joints shall be close-fitted and plumb and the paper shall be tightly fitted to skirtings, ceilings, door frames, windows, etc. Horizontal joints will not be allowed

U. EXTERNAL WORKS

U.1 GENERAL

U.1.1 Excavations

Excavations shall be deemed to be in "earth"

U.2 LANDSCAPING

U.2.1 Topsoil

Topsoil shall vary between sandy loamy soil and sandy clayey soil with an ideal composition of 15% to 25% clay, 10% silt/sludge and 65% to 75% sand, with a minimum ratio of organic material of 2%. All material shall be free of harmful deposits as well as unwanted seeds

U.2.2 Compost

Compost shall be composed of properly decayed organic material, free from harmful deposits, salts, seeds and other waste material and shall have a pH of more than 4 and less than 7

U.2.3 Mulch

Mulch shall be approved organic material free from small particles of bark residue, fungus, disease, etc

U.2.4 Lime

Lime shall be agricultural lime of an approved manufacture

U.2.5 Fertilizer

Fertilizer shall be of the type specified, mixed thoroughly into the soil as prescribed. No fertilizer shall be added more than two weeks prior to planting

U.2.6 Backfilling

Backfilling in plant and tree holes shall be composed of two parts topsoil to one part compost mixed thoroughly together and compacted by foot in 100mm layers. Fertilizer shall only be added if prescribed

U.2.7 Pebbles

Pebbles shall be smooth with a uniform colour and form and ranging in size from 50mm to 75mm diameter. Removal of pebbles from river beds shall be done selectively to avoid any major disruption to the ecology of the river and environment

U.2.8 Plant material

U.2.8.1 General

All plant material (plants, shrubs, trees, etc) shall be obtained from a registered nursery and shall be free from damaged parts, parasites, fungus, other plant diseases or insects. No container-bound plants will be acceptable

U.2.8.2 Trees

The height of trees described in the bills of quantities shall be measured from the top of the root ball to the top of the tree. Where trees are pruned, such prune wounds shall not be more than 25mm in diameter and be sealed with an approved sealing compound

U.2.8.3 Shrubs and small plants

Shrubs and small plants shall meet the requirements for height and spread as specified. Thin or sparsely branched plants shall not be accepted. Branches shall be well spread with ample young branches and the plant as a whole shall be growing well

U.2.8.4 Groundcover

Groundcover shall be dense and healthy and shall comply with the minimum requirements for leaf density as specified

Formal grass shall be planted as runners in 50mm deep drills at 150mm centres unless otherwise described

U.2.9 **Cultivation and preparation of planting areas etc**

All surface rocks and stones larger than 50mm shall be removed before commencing cultivation and preparation. The entire area shall be ripped and rotavated using approved machinery by breaking up the earth to a depth of 300mm at 600mm centres in both directions, unless otherwise described, and then levelled. Where fertilizer or compost is specified, it shall be worked into the topsoil after ripping and rotavation to a depth of 300mm and finished to final levels

All fertilizer to areas to be grassed shall be strewn on the final layer before final finishing is commenced and worked mechanically into the top 150mm soil

U.2.10 **Planting procedure**

Holes for shrubs and groundcover shall be as follows:

Shrubs – 500 x 500 x 500mm deep

Groundcover – 300 x 300 x 300mm deep (if not planted in drills)

Holes for trees shall be square, of adequate size to accommodate the root system and suitable for the height of the tree

All plant material shall be watered thoroughly before careful removal from the container and planted in the prescribed planting medium with the top of the soil in the container finishing level with the surrounding area. Water dams size 800mm diameter x 150mm deep and 500mm diameter x 150mm deep shall be formed around trees and shrubs respectively and all planting material shall be watered immediately after planting. Trees, shrubs, etc shall be properly staked or stayed, depending on their size, on the prevailing windy side with patent tree ties

U.2.11 **Maintenance**

All planted areas shall be maintained for a period of three months after practical completion as defined in the contract with the exception of hydroseeded areas which shall be maintained for 12 months after an acceptable cover has been obtained

This maintenance shall consist of keeping clear of weeds and litter, loosening soil where necessary every two weeks, replacing damaged, diseased or dead plants, pruning, cutting and mowing as necessary and watering so as to keep the plant material in a healthy growing condition

U.3 ROADWORK

U.3.1 **Filling**

Filling under roads etc shall be of inert material having a maximum plasticity index of 10, free from large stones etc spread, levelled, watered and compacted in layers not exceeding 200mm thick to a density of 98% Mod AASHTO

U.3.2 **Preparation of sub-grade**

The sub-grade shall be prepared by scarifying for a depth of 150mm and compacting to a density of 98% Mod. AASHTO, including trimming to the correct levels and grades

U.3.3 **Base course**

The base course shall consist of crusher run stone compacted to a density of 98% Mod. AASHTO and finished to the correct levels and grades

U.3.4 **Weed killer**

The completed sub-grade shall be treated with an approved total weed killer

U.3.5 **Bituminous premix road surfacing**

Before spreading the premix material, the base course shall be swept clean and free from all dust, dirt and loose particles, lightly wetted and sprayed with a prime coat of cutback bitumen complying with SANS 308 at the rate of 1 litre/m^2

The material shall consist of semi-gap graded crushed stone aggregate having the following grading:

Sieve size (mm)	% By mass passing sieve
13,2	100
4,75	45-60
2,36	42-55
1,18	40-52
0,3	25-45
0,075	5-12

The aggregate shall be mixed with bituminous road tar binder complying with SANS 748 at the rate of 1m3 of stone to 120 litre of emulsion at atmospheric temperature

The binder shall be added to the stone and mixed until the stone is uniformly coated. Thereafter 5% of clean, dry quartzitic sand shall be added and mixed until evenly distributed through the mixture

The premix shall be applied only after the primer has dried out completely and shall be spread immediately after mixing and rolled on the same day

Spreading shall be done evenly over the prepared base course to a loose depth sufficient to ensure the consolidated thickness specified

Rolling shall commence as soon as the binder has set sufficiently, followed after three days by a final rolling

U.3.6 Precast concrete block road surfacing

Paving blocks shall be precast concrete blocks complying with SANS 1058

Blocks shall be laid to true levels and grades on and including a 25mm thick layer of river sand with joints exceeding 2mm and not exceeding 6mm wide

After laying, the paving shall be compacted by means of a vibrating plate compactor, with joints between the blocks filled in, after compaction, by sweeping in fine sand

Infill areas at edges of paving constituting less than 25% of a full block unit and of 25mm minimum dimension shall be filled with Class C prescribed mix unreinforced concrete with top surface trowelled smooth to match blocks. Smaller areas shall be filled with 1:4 cement mortar

U.3.7 Precast concrete kerbs and channels

Precast concrete kerbs and channels shall comply with SANS 927, generally in 1m lengths and finished smooth from the mould on exposed surfaces. Kerbs and channels shall be bedded on and jointed in 1:3 cement mortar and pointed with keyed joints. Bases to kerbs shall be Class B prescribed mix unreinforced concrete

U.3.8 Process control tests

The Contractor shall be responsible for carrying out all necessary process control tests on the density and moisture content of the compacted sub-grade, base course, etc to ensure that the required compaction is being attained

U.4 FENCING ETC

U.4.1 Materials

Materials and workmanship shall comply with the following specifications and requirements :

Wooden poles, droppers, guardrail posts and spacer blocks	SANS 457-2&3
Zinc-coated fencing wire	SANS 675
Prefabricated concrete components for fencing	SANS 1372
Chain-link fencing and its wire accessories	SANS 1373

Fasteners	SANS 1700
Anti-intruder fences	CKS 451
Metal droppers and standards	CKS 451

U.4.2 **Galvanized wire**

All galvanized wire shall be zinc coated wire with Class B zinc coating. Straining wire shall be 4mm diameter galvanized mild steel wire. Tie wire shall be 1,6mm diameter galvanized mild steel wire

U.4.3 **Plastic coated wire**

Plastic coated straining wire shall be 3,15mm diameter Class C galvanized mild steel wire plastic coated to an overall diameter of 3,95mm

Plastic coated tie wire shall be 1,8mm diameter Class C galvanized mild steel wire plastic coated to an overall diameter of 2,5mm

U.4.4 **Galvanized barbed wire**

Galvanized barbed wire shall be 2,5mm diameter mild steel double strand reverse twist zinc coated barbed wire with Class A zinc coating

U.4.5 **Galvanized wire mesh**

Galvanized wire mesh shall be 50mm mesh chain link netting of 2,5mm diameter Class C galvanized mild steel wire

U.4.6 **Plastic coated wire mesh**

Plastic coated wire mesh shall be 50mm mesh chain link netting of 2,5mm diameter Class C galvanized mild steel wire plastic coated to an overall diameter of 3,25mm

U.4.7 **Galvanized welded wire mesh**

Galvanized welded wire mesh shall be fabricated from pre-galvanized wires to rectangular pattern welded together at each intersection using a welding method which forms a zinc oxide protective coating at each intersection

U.4.8 **Razor wire**

Razor wire shall be fabricated from 2,5mm diameter galvanized high tensile steel wire fitted with razor barbs formed of 0,5mm galvanized steel strip clipped on at 37,5mm centres

U.4.9 **Metal droppers and standards**

Droppers shall be of ridged T-section mild steel with a mass of not less than 0,55kg/m. Standards shall be of I- section mild steel with a mass of not less than 3kg/m or of ridged edge Y-section mild steel with a mass of not less than 2,5kg/m, and shall be driven 600mm deep into the ground

Droppers and standards shall have either galvanized, sprayed metal or painted finish as described in the items and in accordance with CKS 451. In addition, those surfaces of standards embedded in the ground shall be coated with bitumen

U.4.10 **Metal posts and stays**

Posts and stays shall comply with CKS 451 and shall be of black galvanized mild steel tubing as specified

Straining posts shall be of 108mm outside diameter x 3mm wall thickness tubing, each with a 300 x 300 x 5mm thick mild steel sole plate and a steel cap welded on

Intermediate posts shall be of 50mm outside diameter x 2,5mm wall thickness tubing, each with a 230 x 230 x 5mm thick mild steel sole plate and a steel cap welded on
Stays for straining posts shall be of 50mm outside diameter x 2,5mm wall thickness tubing, each with a 230 x 230 x 5mm thick mild steel sole plate welded on and fixed raking with top end flattened, bent, holed and bolted to straining post with and including a 5mm diameter galvanized mild steel bolt with nut and washer

Posts and stays shall have either galvanized or painted finish as described in the items and in accordance with CKS 451. In addition, sole plates and portions of posts and stays embedded in ground shall be coated with bitumen

U.4.11 **Timber posts, stays and droppers**

Timber posts shall be 125mm diameter, timber stays shall be 100mm diameter and timber droppers shall be 30mm diameter

U.4.12 **Prestressed concrete posts and stays**

Prestressed concrete posts and stays shall be finished smooth from the mould and uniformly stressed by means of high tensile longitudinal prestressing wires with concrete cover to wires of not less than 20mm

Corner and straining posts shall be 100 x 100mm and intermediate posts and stays shall be 75 x 75mm. Stays shall be fixed raking with top end splayed and glued to posts with a suitable epoxy compound

U.4.13 **Bolts, nuts and washers**

Straining eye bolts, hinge bolts, bolts, nuts and washers shall be galvanized

U.4.14 **Precast concrete fencing**

Precast concrete fencing over sloping terrain shall be stepped to suit terrain, including the use of increased lengths of posts as necessary, excavation, etc

U.4.15 **Concrete bases**

Bases in ground for posts, stays, etc shall be of Class B prescribed mix concrete with tops 100mm below surface of ground

Sizes of concrete bases for posts, stays, etc shall be as follows:

Straining and gate posts	–	450 x 450 x 700mm deep
Intermediate posts	–	300 x 300 x 600mm deep
Stays	–	600 x 300 x 500mm deep

U.4.16 **Security overhangs**

Where fencing is described as having a security overhang, the posts and standards shall have angular (single arm) extension arms

Extension arms shall be attached to the posts and standards by welding in the case of steel and by spiking in the case of timber

Concrete extension arms shall be cast integrally with the post or standard

Barbed wire to security overhangs shall be tightly strained and wired at each intersection with extension arms and shall have barbed wire braces at 450mm centres between standards, posts, etc wired onto the barbed wire and the top straining wire

U.4.17 **Gates**

Gates shall be formed of 40mm outside diameter x 2,5mm wall thickness mild steel tubular framework with welded joints, strongly braced as necessary and filled in with wire mesh as described above, properly strained and securely bound to framework with tie wire

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

ANNEXURE 2

GENERAL ELECTRICAL SPECIFICATIONS

GENERAL ELECTRICAL SPECIFICATION

(ALL IN CONTRACTS)

1. CONDUIT AND CONDUIT ACCESSORIES

1.1 Conduit

Conduit shall be of steel galvanised internally and externally, either solid drawn, or welded and not less than 20 mm diameter, with all rough edges removed. All tube ends removed. All tube ends are to be reamed. With screwed conduit one threaded end is to be fitted with a coupling and the other end is to be protected against damage.

UPVC conduit may only be used if permitted by the Head : Works and only in those areas which he may specify. In this case this conduit shall be according to SABS 950.

Conduit accessories, which are secured to the conduit by means of lugs, screws or setscrews, are not acceptable.

General requirements of conduiting to SABS IEC 60614 (1).

Metal conduits shall be fully in accordance with SABS 1065 PART I.

1.2 Conduit Accessories

All conduit accessories shall be galvanised both internally and externally and comply with SABS 1065 – PART II.

All screwed conduit fittings shall be of malleable cast iron.

Where fittings are fitted with covers, the covers shall be of galvanised pressed steel secured with brass screws.

1.3 Flexible Conduit

Flexible conduit shall be of the plastic covered metal type complete with brass connectors to the approval of the Head : Works.

2. INSTALLATION OF CONDUIT

2.1 General

Except where cables are specified for certain circuits, the installation(s) shall be tubed throughout in steel conduit. Split conduit is not permitted. All conduits shall, wherever possible, or unless otherwise specified or agreed, be concealed in the structural work.

Except where agreed or otherwise specified or indicated on the drawings, all conduit to points shall run via the ceiling and floor slabs or roof space. In damp situations and where exposed to the weather, the conduits shall be so installed as to avoid, as far as possible, the condensation of moisture within them. All running joints are to be painted with an approved metal primer.

Mechanical and Electrical continuity must be maintained throughout the installation. Each length of conduit and every conduit fitting must be inspected for defects and all sharp edges or burrs must be removed before it is installed. All joints are to be tightly fitted together.

Running joints with long threads, where used, are to be fitted with a lock nut and the running thread shall not be longer in length than a coupling and lock unit.

In conduits smaller than 32 mm elbows and normal bends are not to be used but conduits are to be set to the required angles.

Flexible connections between conduit and appliance or other equipment shall be by means of flexible tubing (see Par 1.3).

No wiring shall be drawn into conduits until the conduits have been installed.

Where more than one socket outlet is connected on a circuit, the conduit shall be looped from the one outlet box to the following outlet box.

All switch-boxes, socket outlet boxes and any other purpose made metal box including distribution board trays shall be suitable treated against corrosion before installation with "Rustodian" or other approved metal primer.

All conduits shall be securely fixed into chases, and all flush switch and socket outlet boxes must be firmly embedded in cement mortar.

The Contractor shall make himself familiar with the positions of all fittings, such as blackboards, pinning boards, cupboards, shelving, worktops, etc, before commencing the conduit installation. The position of switches and socket outlets as indicated on the drawings are approximate only. The Contractor must verify that the final position of these will not be covered by the installation of the fittings referred to above, or come midway between the junction of any dados and upper wall finishes.

No extras will be entertained for moving switches or socket outlets as a result of the Contractor's failure to verify the final positions of the fittings or type of wall finish.

2.2 **<u>In Roof Spaces</u>**

The conduit in roof spaces shall be installed parallel or at right angles to the roof truss members and shall be secured at centers not exceeding 1,2 m by means of galvanised saddles nailed to the timbers with galvanised clout nails. Crampets will not be allowed.

Crossing of conduits is to be avoided wherever possible. Where unavoidable, one conduit must be neatly set over the other. Where a number of conduits have to run back to the distribution board or switchboard, they shall run parallel to the distribution board or switchboard, and at saddle distance to each other wherever possible.

Conduit runs from distribution boards shall terminate in fabricated sheet steel draw boxes installed in the roof above the distribution boards. Each draw box shall be fabricated from 1,6 mm galvanised sheet steel with welded corners and

suitably treated against corrosion with "Rustodian" or other approved primer and finished in aluminium paint.

Each draw box is to be fitted with slip-on lid with a 13 mm skirt. The box shall be 75 mm deep, shall be rectangular in shape and the size of conduits entering or leaving the box. Conduits shall be fixed to the box by means of couplings and brass male bushes or lock nuts and brass bush-nuts.

Conduit droppers shall be neatly cut into timber wall plates and set to face the right direction. All sets must be uniform. Conduits may be set at angles only where droppers or ceiling points are within 230 mm of roof members.

No conduits are to be run over the top of gangplanks or trapdoors.

Draw-in boxes with metal covers shall be provided where required and shall be installed near the gangplanks, if any. All inspection conduit fittings in open roof spaces shall face upwards to facilitate wiring and to permit easy inspection. Three-way conduit boxes shall be used for tee-off purposed in open roof spaces. Inspection tees are not to be used except where otherwise agreed or specified.

All conduits extended into a roof space with a roof clearance of more than 900 mm shall be set onto the beam and extended into the roof for a distance where there is sufficient clearance. Under flat roofs or where there is less than 900 mm clearance, the conduit shall be installed as specified for tubing in concrete slabs, right angle bends should be kept to a minimum and the shortest route taken.

Where false ceilings occur they shall be tubed as called for in the detailed specification. Conduits in restricted spaces and run as for concrete slabs must however, be installed in a neat and orderly manner.

Conduits to ceiling points for all types of fittings must be firmly supported and shall terminate in a back entry conduit box. The conduit box shall be taken through to the face of the ceiling and finish flush. Where the ceiling brandering interferes with the installation of the ceiling point specified, the Contractor must trim the brandering to allow the conduit box to be taken through to the face of the ceiling as specified. Luminaires must be bonded to the conduit box by means of metal threaded screws.

2.3 In Concrete Slabs

In order not to delay building operations, the Contractor must ensure that all conduits and conduit fittings, which are to be cast in concrete, are laid in good time. The Contractor shall have a competent Electrical Artisan standing by during casting of concrete, etc, to ensure that the conduit boxes are not damaged during casting of concrete.

Draw boxes, expansion joints boxes and round conduit boxes are to be provided where necessary.

Deep type conduit boxes shall be used for side entering conduits and normal shallow boxes may be used for back entry conduits. No elbows, bends or sharp sets will be allowed in concrete slabs except in cases of conduits of 40 mm diameter or when larger sweeping bends will be permitted.

Common drawn and/or inspection boxes shall be used where there is more than one circuit involved. They shall be installed in lavatories, storerooms, or other inconspicuous places. Covers shall be of hardboard neatly finished to match the finished ceiling or wall surface, and shall be fitted parallel to the wall or ceiling.

All boxes, etc. are to be securely fixed to the shuttering to prevent displacement when concrete is cast. All conduits must be laid off the deck, supported and secured at regular intervals and installed as close as possible to the neutral axis of concrete beams and slabs.

Expansion joints shall be shown on layout drawings and shall consist of a metal box in which one conduit is fixed and the other capable of movement with the building's expansion and contraction. Earth continuity of these joints shall be maintained by means of stranded copper conductors bonded to the conduits in the box as shown on the drawing.

Earth conductors and clamps buried in concrete are not permitted.

Conduits must be spaced sufficiently apart to allow for proper concreting. All joints shall be painted with an approved metal primer after completion of the tubing installation, prior to the concreting. All exposed parts of the conduit installation shall be suitably, protected against corrosion at the discretion of the Head : Works.

Before any concrete slab is cast, all conduit droppers to switchboards shall be neatly spaced and rigidly fixed.

2.4 **Surface Work**

All conduit must be plumbed and leveled and only straight lengths shall be used.

In cases where doorframes are out of plumb, or fittings, beams etc, are out of level, the conduit shall be run parallel with the doorframes, fittings, beams etc.

No threads shall be visible when the conduit installation is complete, except on running couplings.

Running couplings shall only be used where unavoidable and shall be fitted with a sliced coupling as a lock nut.

No inspection or normal bends are to be used on surface work, except with the approval of the Works Inspector and where conduits of 32 mm diameter or larger are used. Conduits shall be set uniformly and inspection couplings shall be used where necessary.

Fittings, tees, boxes, couplings, etc, are to be cut into the surface to allow the conduit to fit flush against the surface or alternatively spacer bar saddles may be used. Conduit is to be bedded into any irregularities to avoid gaps between the surface and the conduit.

Double sets, where used, shall be parallel with no twists and shall be as short as possible. All conduits, which terminate at metal trays, boxes, industrial switches and plugs shall do so by means of couplings and male bushes. No couplings will be permitted in droppers of lengths less than 3.6 m.

Where crossings of conduits is unavoidable, purpose made metal boxes shall be used. The length of the box is to be 8 times the diameter of the largest conduit, the width one and half times the sum of the diameter of al the conduits, and the depth one and half times the diameter of the largest conduit with a minimum depth of 50 mm. The box shall be fitted with a neatly fitting cover and the finish shall be in keeping with the general layout.

Where a number of conduits are to be installed in parallel they shall be evenly spaced and grouped under one purpose made saddle. Conduit spacing shall not exceed 10 mm. The purpose made saddle shall be made of 25 x 2 mm galvanised steel strip or other approved material, formed to suit the curvature of the various conduits and shall be drilled and fixed by means of screws between. Saddles shall be spaced at intervals not exceeding 1.8 m, except for conduit droppers, which shall be saddled centrally between ceiling and accessory box. All saddles are to be secured to the wall by means of black japan or brass rounded head screws. Distribution boards, draw boxes, industrial switches and plugs, etc, shall be neatly recessed into the surface of plastered walls to avoid double sets or alternatively spacer bar saddles may be used. On face brick walls the conduit shall be tightly set into the switch or plug.

In situations where there are not ceilings, the conduits are to be run along the wall plates and tie beams.

No wiring is to be carried out until the tubing has been inspected and approved.

Where spacer bar saddles are used, these shall be installed at centers of 1 m for horizontal and 1.5 m for vertical runs.

All conduits shall be painted with an approved enamel paint to match the background colour.

2.5 Future Extensions

In roof spaces with a minimum clearance of 900 mm, switch and plug drips for future use are to be set 300 mm in the correct direction and shall be threaded and fitted with plugged couplings. Where the roof over a slab is to be removed for future expansions, conduits for future use are to terminate 40 mm above tie beams and shall be threaded and fitted with plugged couplings.

Where future extensions are to be below slabs, all switch, socket outlet and other conduit droppers are to terminate 130 mm below slabs or beams with conduit ends threaded and fitted with plugged couplings.

Where provision is made for future extensions to a concrete slab, all conduits required for future use are to project 130 mm from the slab. Conduit projections are to be painted with an approved anti-corrosive paint and must be fitted with plugged couplings.

All switch, plug and other outlet boxes required for future use shall be fitted with approved blank cover plates.

Unused lighting outlet boxes are to be fitted with round hardboard or plastic covers with brass cover screws, which shall fit flat on the finished ceiling.

2.6 **Fixing of Conduits**

Conduits shall be fixed to switch and socket outlet boxes by means of couplings and brass male bushes or lock nuts and brass bush nuts. Couplings and male bushes to be used on all surface work.

2.7 **Chases and Building Work**

Except where otherwise specified conduits, switch boxes, plug boxes and distribution boards are to be built into the brick walls by the Contractor. It will, however, remain the responsibility of the Contractor to ensure that the above-mentioned boxes and distribution boards are correctly built in and are firmly bedded and cemented into the walls, plumb and square.

The Contractor shall, unless otherwise specified, do all necessary chasing and cutting of bricks. All electrical materials (e.g. conduits up to 40 mm for UG cables, conduits, conduit boxes, distribution boards etc) must be supplied by the Contractor who must arrange to have these on site, and positioned when required for the building work. A competent Electrical Artisan must be in attendance and ensure that the conduits etc are correctly installed and positioned.

The Contractor is to ensure that tubing installed in chases is securely nailed and covered by a layer of 5:1 mixture of coarse sand and cement, finished flush with brickwork and that switch and plug boxes finish flush with the finished wall surface.

The Contractor is to ensue that below distribution boards connected by means of under-ground cables, a 230 mm wide by 115 mm deep cavity in the wall from the cable pipe to the distribution board is to be provided by the Contractor, or alternatively, cable sleeves as specified.

3. **PLUGGING OF WALLS**

Only approved plastic plugs shall be used to secure conduit or equipment up to 5kg mass. The use of round-headed screws only will be permitted.

Heavier equipment shall be secured by means of approved expansion bolts.

Wood plugs and any plugs in the joints in brick walls are not permitted.

4. **FIXING TO CONCRETE CEILINGS**

Ceilings mounted equipment other than luminaires shall be secured to concrete ceilings by means of expansion bolts, shot bolts or "Robot" tools bolts or as expressly specified for the service.

5. WIRING

5.1 PVC Insulated Single Core Medium Voltage Conductor

The conductor is to be of high conductivity copper wire insulated with Polyvinyl Chloride. The cable shall be finished in the required colours and shall be in accordance with SABS 1507 and 1574.

Circuit wiring shall be of the Loop-in system and no wiring joints in the conduit or conduit fittings will be permitted. Not more than two conductors of a kind will be allowed at any outlet point. the end strands of cables, whether single or looped which have to be connected to terminals of switched, plugs, lamp-holders, fittings and distribution boards, etc, are to be tightly twisted together. Cutting away of wire strands of any cable will not be allowed. Only one circuit in any one conduit will be permitted unless otherwise specified.

Conductor sizes shall be as follows except where otherwise specified:

Lighting circuits	1,5 mm^2	
Bells circuits	1,5 mm^2	
Clock circuits	1,5 mm^2	
Incinerator circuits	2,5 mm^2	
Ironing circuits	2,5 mm^2	with 2,5 mm^2 insulated earth wire
Plug circuits	4,0 mm^2	with 2,5 mm^2 insulated earth wire
Geyser circuits	4,0 mm^2	with 2,5 mm^2 insulated earth wire
Heater circuits	4,0 mm^2	with 2,5 mm^2 insulated earth wire
Stove	10 mm^2	with 6,0 mm^2 insulated earth wire
Motor circuits		
Up to 4kW single phase	4,0 mm^2	with 2,5 mm^2 insulated earth wire
Up to 11kW three phase	4,0 mm^2	with 2,5 mm^2 insulated earth wire

To avoid deformation of PVC insulated cables at temperatures in excess of 57° C, they shall not be brought directly on to the terminals of appliances such as electric heaters, or any other electrical appliances or apparatus (including luminaires) which have a temperature in excess of 57° C. They shall terminate in a suitable terminal box as near to the appliance or fittings as possible and connect up from thereon, with heat resistant conductor.

6. MOUNTING AND POSITIONING OF LUMINAIRES

Luminaires and installation to comply with SABS 1464 Parts 1 to 22 and IEC 598-1 and IEC 60598 as applicable.

The contractor shall, in the case of board and acoustic tile ceilings (i.e. as opposed to concrete slabs), ensure that the luminaires are symmetrically positioned with regard to the ceiling pattern.

The layout of the luminaires as indicated on the drawings shall be adhered to as far as possible. The exact positions must be confirmed on site with the Head : Works.

Except where otherwise specified, pendant luminaires are to be mounted with the bottom of the fittings 2,5 m above finished floor level, mounted on either metal discs or wood blocks.

Under no circumstances shall cover strips be cut to accommodate wood blocks. Wood blocks must be neatly slotted to fit over cover strips and are to be secured by a minimum of two screws, which shall penetrate at least 25 mm into solid wood. Ceiling cover strips shall be neatly cut to accommodate fluorescent luminaires.

Where ceilings are raked, all incandescent luminaires are to be mounted on shaped leveling wood blocks securely fixed to the ceiling. Batten holders shall be secured to woodblocks by suitable brass screws. Fluorescent luminaires are to be mounted direct on raked ceiling without leveling blocks.

Fluorescent luminaires to be mounted on concrete ceilings shall be screwed to the outlet boxes and additionally supported by means of 50 x 6 mm expansion bolts. The bolts are to be ¾ of the length of luminaires apart.

Where a number of luminaires are installed end to end, outlet points must be provided after every second luminaire unless otherwise indicated on the drawing.

The luminaires are to be joined together by means of 20 mm conduit nipples, lock nuts and male brass bushes, and the wiring led through the channels of the luminaires. The Contractor shall ensure that all such rows are correctly lined up and that the rows are parallel with the relevant building line.

The luminaires are to be jointed together by means of 20 mm conduit nipples, lock nuts and male brass bushes, and the wiring led through the channels of the luminaires. The Contractor shall ensure that all such rows are correctly lined up and that the rows are parallel with the relevant building line.

Incandescent luminaires are to be screwed directly to outlet boxes in concrete slabs and in board ceilings. In board ceilings the conduit box and the conduit shall be secured to the timberwork of the ceiling in such a manner that it shall support any incandescent luminaire, which is designed to be fixed to a normal conduit box.

Fluorescent luminaires shall be secured to board ceilings by means of the conduit box and 6 mm bolts passing through the boards and brandering.

7. BATTEN HOLDERS

B.C. batten holders shall be of brass or moulded plastic reinforced type complete with shade ring. The batten holders shall comply with SABS IEC 60238 and SABS IEC 61184. All lamp holders are to have brass terminals with screw type connection.

8. LAMP HOLDERS

Edison screw lamp holders	:	SABS IEC 60238
Bayonet lamp holders	:	SABS IEC 61184
Lamp holders for tubular fluorescent lamps	:	SABS IEC 60400

B.C. screwed lamp holders shall be of brass 20 mm E.T. complete with shade ring and shall comply with SABS IEC 60238 and SABS IEC 61184 with screw type connection terminals.

9. SWITCHES AND SOCKET OUTLETS

Switches SABS IEC 60669 as applicable and socket outlets SABS IEC 60884 as applicable shall be of the most modern manufacture and bear the SABS mark.

Flush switch and plug cover plates shall, unless otherwise specified, be of anodized aluminium of thickness not less than 0,9 mm, satin or other approved finish as directed and otherwise to be fully in accordance with SABS IEC 1084 for cover plates and SABS 1085 for wall boxes.

10. POSITIONS OF SWITCHES AND SOCKET OUTLETS

Except where otherwise specified, lighting switches and socket outlets are to be installed 1,4 m above finished floor level.

All mounting heights specified are to be measured from finished floor level to the bottom of the outlet box.

Where the lower portion of the wall consists of face brickwork and the upper portion of plastered finish, switches and socket outlets are to be mounted in the plastered surface, provided that the lower edge of the plasterwork does not exceed a height of 1,5 m above finished floor level in which case the switches or socket outlets are to be installed in the face brick dado.

Where socket outlet and switch boxes have been installed with fixing lugs below finished wall surface, only approved distance pieces required to compensate for the recess shall be used. The lengths of distance pieces are not to exceed 15 mm.

Unless otherwise approved, light switches adjacent to doors are to be installed at the lock side of the door. Where the lock position is not indicated on the drawings, its position shall be ascertained before the switch box is installed. Switches are to be installed 150 mm from the reveal, or centrally if there is a fitting near the door.

All switch and socket outlet boxes shall be installed plumb, and built into the wall with a 1:1 mixture of cement and sand.

Industrial type switches and socket outlets shall be neatly recessed into the surface of plastered walls to avoid sets or alternatively spacer bar saddles may be used.

Deep type boxes may be used where switches or socket outlets are back to back, but where one side only is to be utilized at the time and the other is for future use, the side for future use shall be suitably covered with a metal cover plate.

11. LOW TENSION SWITCHBOARDS

Low Voltage switch gear and control gear to comply with SABS 1473 and SABS IEC 60947 and SABS 60349.

Where switchboards are to be installed in switch rooms or switch cupboards, the Contractor must ensure that the boards are manufactured to suit the dimensions of the rooms or cupboards.

Low tension switchboards shall be specified in detail for each service, but shall generally conform to the following:

They are to be of strong and rigid construction, with suitable angle, channel or folded steel framework. They are to be flush fronted and totally enclosed with sheet steel panels suitably formed at the edges and reinforced to prevent distortion. Unless otherwise directed, all front panels must be at least 2 mm thick and all other panels at least 1.6 mm thick. Panels are to be secured to the framework with studs and chromium plated dome nuts (self-tapping and similar screws are not permitted).

Switches, etc, are to be mounted on metal frames within the boards to give flush front panels. Equipment of normally surface mounted types such as energy meters, time switches and contractors, are to be mounted on inner metal trays behind hinged front panels. In the case of supply authority meters the hinged front panels must have transparent inserts.

All metal work of the boards must be thoroughly degreased, primed with PA 10 self etching primer and finished with one coat of undercoat and two coats of electrical orange high gloss enamel, unless otherwise specified.

All accessible current carrying parts, bus-bars, connecting strips, collector bars, etc, are to be adequately insulated in phase colours and suitably braced to withstand projected fault currents.

Connecting strips and collector bars must be of sufficient cross sectional area to carry full rated current of the switches served, irrespective of the fuse of trip rating.

The complete distribution board including bus-bars must be suitably constructed to withstand fault currents specified.

Connections to bus-bars are to be made by means of lugs suitably bolted and locked with high tensile bolts and connections to lugs must be effected by means of a crimping tools.

Incoming and outgoing bus-bar studs, where required, must be suitably insulated where they pass through panels of the board, and firmly supported within the board.

Where applicable, incoming and outgoing collector bars for cables in parallel must so arrange that the multiple cable ends can be connected to the bars with reasonably short tails which do not have to cross.
Cable supports must be placed at suitable heights having regard to the bending radius of the cables concerned and convenience in making off.

Wall-mounting and floor-standing back to wall type boards must be provided with full easy access to all equipment and wiring without any necessity of disconnecting or removing of any of the equipment mounted in the board.

Clear visible indication of all switch positions must be provided and the switches must be clearly labeled as directed by the Head : Works.

The details of construction proposed, and the Head : Works must approve all equipment of switchboards: Works before manufacture is commenced.

12. DISTRIBUTION BOARDS

12.1 Approval

The Head : Works must approve the details of construction proposed and all equipment within distribution boards: Works before manufacture is commenced.

12.2 Flush Mounting Distribution Boards

These shall be generally manufactured in accordance with SABS 1765. The board shall consist of two panels fitted side by side with common bonding tray and attached to a common architrave. One panel shall accommodate all single phase MCB's and the second panel shall accommodate the main isolator, main bus-bars and the triple pole MCB's. Chassis shall be of rigid channel section rust proofed steel with clip-on trays for the single pole MCB's. The main isolator is to be mounted at the bottom of the second panel with the triple pole circuit breakers above.

12.3 Surface Mounting Distribution Boards

These shall be generally manufactured in accordance with SABS 1765, with two panels as for flush boards.

12.4 Single Phase Distribution Boards

Single Phased boards shall be generally constructed as three phase boards except they shall have a single panel. Single phase boards shall be mounted with the bottom of the architrave 1,5 m above finished floor level unless specifically directed otherwise.

12.5 Distribution Board – In Roof Spaces

Where distribution boards are installed below a roof space, a minimum of 2 x 20 mm and 1 x 25 mm spare conduits are to be run from the distribution board into the roof space.

13. METER BOXES

The meter box shall be mounted with the top 1,7 m above finished ground level. Surface mounted meter boxes shall be secured by at least 4 x 10 mm expansion bolts.

Service cables entering the meter box shall be protected by means of a suitably sized galvanised pipe extended 450 mm below the ground surface and securely saddled to the wall and bonded to the meter box.

14. CONNECTIONS TO OUTLETS

14.1 General

Where connectors are used to connect to the wiring of luminaires and other appliances, the connectors shall comply with SABS Specification 1239.

14.2 Connection to Stoves

14.2.1 General

The connection to an electric stove, unless otherwise specified shall consist of 2 x 10 mm^2 conductors and a 6 mm^2 insulated earth wire in 25 mm conduit. The stove shall be controlled by a 60 Amp micro gap switch of approved make and the connection shall be by means of a 45 Amp 3 pin stove plug of the "Cape Town" type. Cable ends, which are to be connected to the stove, shall be equipment with suitable soldered or crimped lugs. The connection between the stove plug and stove shall be by means of flexible conduit.

Except for high school domestic science unit kitchens (see Clause 14.2.2), the conduit shall be chased into the wall and fitted with a switchbox for housing the micro gap switch and a 25 mm circular conduit box over which the stove plug will be mounted. The stove plug shall be fitted with an adaptor plate and shall be screwed directly to the conduit box by means of round head metal screws. The plug outlet shall face downward.

The stove plug and switch shall be mounted 430 mm and 1,4 m respectively above finished floor level unless otherwise specified or indicated on the drawings.

14.2.2 Stove Connections in High School Domestic Science Unit Kitchens

Connections to stoves in High School Domestic Science Unit Kitchens, where the stoves are situated in front of a fitting, shall be generally as specified in Clause 14.2.1 except that the 25 mm diameter conduit shall be run in the floor slab, from the distribution board to a position to the right of the stove. A pedestal, which is complete with a 45 Amp 3 pin "Cape Town" type cooker plug, mounted on the back, shall be fitted over the conduit and securely bolted to the floor by means of expansion bolts. The plug circuit, which passes through the pedestal, is to be on a separate circuit.

14.3 Connections to Hot-water Cylinders

The connections to hot-water cylinders not exceeding 3kW loading shall consist of 2 x 4 mm^2 PVC conductors and 1 x 2,5 mm^2 earth wire in a 20 mm diameter conduit from the distribution board. The conduits shall be chased in the wall and shall terminate at the side of the cylinder in a box over which is to be mounted a double pole isolator with pilot light.

The final connection between the isolator and cylinder shall be by means of silicone heat resistant conductors in 20 mm diameter flexible conduit.

Connections to roof mounted hot-water cylinders shall generally be as specified above with an isolator with pilot light mounted adjacent.

14.4 **Connections to Power Points**

Connections to electric motors and fixed apparatus to vibration shall, unless otherwise specified or indicated on the drawings, have final connections consisting of conduit and flexible tubing or reinforced hose in accordance with Clause 1.3 of this specification and PVC cables and earth wire of the required size.

An isolator shall protect all fixed apparatus and where necessary a starter fitted with a no-volt coil and overload protection adjacent to such apparatus.

Power points for connection of fixed apparatus to be installed by others, shall terminate in an approved type wall mounted switch unless otherwise specified.

The minimum conductor size for all power points shall be 4 mm^2 unless otherwise specified.

14.5 **Underground Service Connection**

This clause refers to underground service connections not provided by the Supply Authority.

The service cable and earth wire to be connected at the supply point in accordance with Clause 15.8 of this specification, and unless otherwise specified, shall be aid 600 mm below ground level throughout and otherwise fully in accordance with Clause 15 and all applicable sub-clauses thereof. Cable entries to meter boxes shall be in accordance with Clause 13 and other entries shall be by pipe or duct as directed.

14.6 **Connections to Outbuildings**

Connections to outbuildings shall be made by means of underground cable only, laid in accordance with Clause 15 and all applicable sub-clauses.

Where the cable is run from the roof space of the main building, it shall be enclosed in suitably sized galvanised pipe built into the wall or run surface as directed. Surface run pipes shall be securely saddled at 1,8 m centers. Where the cable connects to the conduit in the roof space, a suitable joint box shall be provided or alternatively the cable may be taken through the roof space, a suitable joint box shall be provided or alternatively the cable may be taken through the roof space with fixings at regular intervals, and down to the main board. At the outbuildings, the cable shall be enclosed in a suitably sized galvanised sleeve pipe built into the wall or run surface and terminated in the distribution board tray.

14.7 **Connection and Mounting of Cable Fed Street/Site Lighting**

Street/site lights shall in all cases, except where otherwise specified, be fed by underground cable. Unless otherwise directed, a suitable terminal board shall be provided in the base of the lighting pole for the connection of the incoming and outgoing cables, the feeds from the terminal board to the fitting shall be as specified.

"Surfix" cable and compression glands shall be installed between terminal board and cross arm/bracket mounted luminaires. The terminal board shall also accommodate a miniature circuit-breaker in the phase connection to the fitting. Poles intended for mounting directly in ground are to be provided with a 300 x 300 mm base plate.

15. UNDERGROUND CABLES

1000 volt PVC SWA and 110 Volt PILCA cable and accessories shall be in accordance with the relevant SABS specifications to SABS 1507.

The storage, transportation, handling and laying of underground cables shall be according to the manufacturer's requirements and the Contractor shall have adequate and suitable equipment and labour to ensure that no damage is done to cables during such operation. All cable pipes and ducts entering buildings are to be sealed against the ingress of vermin, water, etc.

15.1 Trenching

Cables, unless otherwise specifically directed, shall be laid at a depth of 600 mm below ground level. Trenches shall not be less than 300 mm wide for one to three cables, and the width shall be increased where more than three cables are to be laid together so that the cables may be placed at least 75 mm throughout the run.

The Contractor shall take all necessary precautions to prevent trenching work being in any way a hazard to the public and to safeguard all structures, roads, sewer works, or other property from risk of subsidence and damage.

15.2 Cable Joints

Joints in underground cable runs will not be permitted unless unavoidable and at the discretion of the Head : Works. Where cable joints are unavoidable, the cable jointer is to work efficiently and cleanly and so that each end of the cables to be joined may have a minimum of 0,9 m of slack disposed in a loop without stress. Back-filling under joints must be firmly tamped to prevent any subsequent settling.

15.3 Bedding

In trenches made in intermediate, hard rock, or boulder material, the cables shall be laid on a 75 mm thick bed of earth and be covered with a 150 mm layer of earth before the trench is filled in. The Contractor to supply all earth required for trench filling.

15.4 Laying

Cables shall be removed from the cable drum in such a way that no twisting, tension or mechanical damage is caused, and must be adequately supported at short intervals during the whole operation. Particular care must be exercised where it is necessary to draw cables through pipes and ducts, to avoid abrasion, elongation or distortion of any kind. The ends of such pipes and ducts shall be sealed to approval after the drawing in of the cables.

15.5 **Back Filling**

Back filling after bedding (see Clause 15.3) is to be carried out with a proper grading of the material to ensure settling without voids, and the material is to be tamped down after the addition of every 150 mm. The surface is to be made good a required.

Back filling of cable trenches must not be commenced until after the cable trenches and laid cable(s) have been inspected by the Head : Works. Where a Contractor fails to observe this requirement he may, at the discretion of the Head : Works, be required to re-open such cable trenches for inspection at his own expense.

15.6 **Protection of Cables**

Where so directed by the Head : Works, concrete or other warning covers shall be placed over cables above the top bedding layer. Cable pipes when directed are to be installed at road and other crossings.

15.7 **Marking of Cables**

Cable marking tape is to be supplied by the Contractor and is to be laid 150 mm below ground over a cable run and as may be directed by the Head : Works to give early indication of underground cable runs.

15.8 **Joints and Termination of Cables**

Joints in underground cables and terminations shall be made by means of "Scotch Cast" or other approved epoxy-resin pressure type jointing kits. Low tension PVC cables are to be made off with sealing glands and materials designed for this purpose, which must be of approved make.

15.9 **Sealing of Paper Insulated Cable Ends**

Where cables are cut and not immediately made off, the ends must be sealed without delay. If cables are cut and the ends not immediately made off or sealed, the cable may be rejected and the Contractor will be required to replace it at his own expense.

15.10 **Earth Wires**

Except where specifically directed otherwise, earth continuity conductors are to be run with all underground cables constituting part of a low tension distribution system. Such earth continuity conductors shall be bare copper wire of a cross sectional area in accordance with the Code of Practice 0142 but shall not be less than 4 mm^2 nor more than 70 mm^2. The earth continuity conductor is to be bonded to the cable armouring, and to the lead sheath if any, at each termination, as well as to the local earth bard. The earth wire must be secured to the cable at 1,8 m centers.

15.11 Opening Up of Existing Cables

Where it is necessary to expose existing buried cables for any purpose, or to excavate in the vicinity of existing buried cables, pipes, etc, every care is to be exercised and only labourers experienced in such work, and duly warned by the Contractor, shall be employed thereon.

15.12 Definitions for Classifying of Excavation

(a) Soft Excavation – shall be excavation in material that can be efficiently removed by a back-acting excavator of flywheel power approximately 0,10kW per millimeter of tinned-bucket width, without the assistance of pneumatic tools such as paving breakers, or that can be efficiently loaded without prior ripping or stockpiling by a rubber tyred front-end loader approximately 15T mass and a flywheel power of approximately 100kW.

(b) Intermediate Excavation – shall be excavation in material that requires a back-acting excavator of flywheel power exceeding 0,10kW per millimeter of tinned-bucket width and the assistance of pneumatic tools prior to removal by equipment equivalent to that specified in (a) above.

(c) Hard Rock Excavation – shall be excavation in material that cannot be efficiently removed without blasting or without wedging and splitting prior to removal.

(d) Class A Boulder Excavation – shall be excavation in materials containing more than 40% by volume of boulders of sizes between 0,03 cubic meter and 20 cubic meter in a matrix of softer material or smaller boulders.

Note: (1) Excavation of solid boulders or lumps of size exceeding 20 cubic meter will be classified as hard rock excavation.

(2) Excavation of fissured or fractured rock will not be classed as boulder excavation but as hard rock intermediate excavation according to the nature of the material.

(e) Class B Boulder Excavation – shall be excavation of boulders only in a material containing 40% or less by volume of boulders of size between 0,03 cubic meter and 20 cubic meter in a matrix of softer material or smaller boulders.

Note: Those boulders that required individual drilling and blasting in order to be loaded by a back-acting excavator as specified in (a) above, or by a track type front-end loader, will each be separately classed as Class B Boulder Excavation.

16. EARTHING

16.1 Main Earthing

The type of main earthing shall be as required by the Supply Authority, if other than the Head : Works and in any case as directed by the Head : Works who may require additional earthing to meet test standards.

Where required, an earth mat is to be provided, the minimum size, unless otherwise specified, being constructed from copper straps 950 x 25 x 3 mm at 230 mm centers and braced at all intersections. Alternatively or additionally earth rods or trench earths may be required, as the Head : Works may direct, and installed according to his instructions.

All earth electrodes and connections thereto must be approved "in-situ" by the Head : Works before back-filling.

The electrical installation shall not be earthed by means of the lightning arrester earth electrode, if such is included in the installation, but may be bonded thereto.

16.2 Earthing in Installations

The installation shall be effectively earthed in accordance with the relevant sections of the Code of Practice 0142 and the requirements of the Supply Authority.

All hot and cold water and waste pipes are to be effectively bonded by means of 12 x 1,5 mm solid copper tape (perforated tape or wire will not be permitted), clamped by means of brass bolts and nuts. Bonding tapes exceeding 75 mm in length must be fixed to the wall by means of No. 6 x 20 mm brass screws and plastic plugs not exceeding 150 mm centers. Main earth copper tapes where installed less than 2,5 m from ground level, must be run in 20 mm diameter conduit securely saddled to the wall.

Gutters and down pipes are to be bonded by means of 6 mm round headed brass bolts, with nuts and washers. Self-tapping screws are not permitted.

Connections from the earth bar or terminal on the main board must be made to a visible cold water main, the incoming service conductor, if any, and the earth mat or plate (where such is required) by means of either 12 x 1,5 mm solid copper tape or bare 25 mm^2 copper wire, or such larger conductor as the Head : Works may direct. From each distribution board separate earth conductors are to be taken to the main earth bar or terminal on the main board. Each conductor shall consist to stranded copper conductors drawn into the conduit together with the distribution board feeders. The size of the earth conductors to be in accordance with the requirements of the Code of Practice 0142 or as specified.

Earthing clips shall be made of not less than 0,9 mm thick copper strips not less than 12 mm wide. They are to be complete with 25 x 7,7 mm brass bolts, washers and nuts and must be constructed so that the clips will fit firmly to the conduit without any additional packing.

Adjustable earth clips are not permitted.

17. EXISTING BUILDINGS

17.1 Occupied Buildings

Where work is to be carried out in occupied buildings the Contractor must arrange to carry out the installation with as little interruption to services and discomfort to the occupants as possible.

17.2 Temporary Connections

Temporary connections shall be provided where necessary for continuity of services, and as directed by the Head : Works. The contractor must ensure that such connections are both electrically safe and free from physical hazard.

17.3 Old Materials

Unless otherwise specified all existing materials removed by the Contractor shall remain the property of the Head : Works and are to be handed to the Head : Works.

17.4 Making Good

Any damage which may be done to the plaster work, floors, ceilings, wood and paint work, furniture and other equipment in the building, etc, during the progress of the electrical installation shall be repaired and made good by the Contractor to the satisfaction of the Head : Works.

18. COMPLETION

18.1 Balancing of Load

The Contractor is required to balance the load as equally as possible over multi-phase supplies.

18.2 Tests

The installation shall be tested by the Contractor as the service progresses or as required by the Head : Works and upon completion, for earth continuity and insulation. The final test before the taking over of the installation shall be made in the presence of the Head : Works.

The mandatory "Certificate of Compliance" shall be issued by the Contractor to the Supply Authority, with a copy to the Head : Works prior to first delivery being taken.

18.3 **Labelling**

All circuits and apparatus on switchboards shall be suitably correctly labeled by means of engraved plastic labels (white lettering on black), which are to be either bolted or screwed to the equipment panel, or fitted in channeling provided below the switch gear.

Sub-circuits are to be numbered and a legend detailing the circuits is to be framed and fitted to the door of the distribution board.

All other equipment is to be individually labeled to indicate the function.

All switchboards are to be fitted with a label on which the designation of the board is clearly indicated.

A separate engraved label depicting the origin and cable/conductor size shall be fixed below the main switch.

18.4 **Finishes**

Covers for all boxes, expansion boxes, etc, shall be finished to match the paint work of the ceiling or wall surface or as specified.

18.5 **Site Drawing**

On all completed new work or where specifically called for in the Tender Document, the Contractor shall, on completion of the works, submit to the Head : Works, a marked up site plan indicating the exact underground cable reticulation.

19. **POWER DUCTING FOR SCHOOL SCIENCE LABORATORIES**

The ducting shall be "Ductline 3" supplied by Messrs. Lascon Lighting, 102 Malbourne Road, P.O. Box 2479, Durban 4000: Telephone 031-2075081 or other approved.

20. **SPEAKER AND MICROPHONE OUTLETS**

Speaker and microphone outlets are to conform to the following details:

1. Speaker outlet – To have one flat and one round pin.

2. Microphone outlet – To have one round pin only.

Both female and male parts to be supplied and installed by the Contractor.

21. **BELLS AND BUZZERS**

21.1 **Bells**

Bells for schools and hostels shall be 220 Volt AC or 24 Volt DC as specified for the service. They are to be of robust construction encased in a sturdy cast metal weather-proof case. They are to operate on the frequency of the supply. They shall have an adjustable stabilizing spring, gold-silver contact points and 150 mm gongs.

21.2 **Doorbells, Buzzers and Bell Transformers**

These will be as specified for each service.

21.3 **Bell Pushes**

Except where otherwise specified, bell pushes shall be of the flush type suitable for mounting in a standard 100 x 50 mm box. They shall be clearly marked as a bell push and shall be fitted with satin finished anodized aluminium cover plates.

22. **SIGNAL TIMERS**

22.1 **Primary Schools**

The timer shall be designed to automatically signal the start and finish of school periods by the switching of a bell circuit and is to comply with the following specification:

1. The mechanism may be synchronous motor or quartz movement driven with a 24 hour dial or digital time read-out suitable for operation on a 220V 50Hz supply and is to be provided with a spring or battery reserve of a least 24 (twenty four) hours.

2. The unit is preferably to have minute to minute timing for a 24 (twenty four) hour period although 5 (five) minute intervals are acceptable, and is to be provided with Weekend lockout. Signal periods shall be adjustable from 5 – 45 seconds.

3. The unit shall be housed in a metal or plastic case with detachable front cover suitable for wall mounting.

4. Timers with punch tape programming are not acceptable.

22.2 **High Schools and Colleges**

Timers for these institutions shall generally be as for Primary Schools but are to have at least 3 (three) separate programmes and be fitted with three push buttons for independent manual operations for testing of each programme, plus an on/off switch for each programme, which does not affect the running of the clock.

23. **CLOCKS**

Electric clocks shall be of the quartz electronic battery operated type, with a dial of 250 mm diameter. The dial shall be white, with distinctive minute markings and chapters shall be black Arabic figures. Time adjustment shall be simple. Where mains operated electronic clocks are specified, these shall be of the synchronous self starting type, suitable for a 200 – 250 V 50 Hz AC supply

24. **TIME SWITCHES**

The time switch shall consist of a single pole switch with silver to silver or other approved contacts operated by a quartz movement with a 24 hour reserve.

A suitable 24 hour, night and day dial, with hour indicator and two adjustable strikers, one OFF and one ON must be provided. The whole mechanism is to be totally enclosed in a dust proof case.

The current rating shall be required and the switch is to be suitable for operation on 220 volt 50 Hertz AC supply. Time switches used for under floor heating are to be fitted with weekend cut-out.

25. **MOULDED CASE CIRCUIT BREAKERS (INCLUDING MINIATURE)**

Circuit breakers shall be of the size and type as directed and specified for the service. They shall comply with SABS Specification 156 and SABS IEC 60947-2.

26. **SWITCHES: ON-LOAD FAULT MAKING (CIRCUIT BREAKER TYPE) WITHOUT TRIPS**

The switches shall be triple pole, hand operated, panel mounting air break type, having continuous current rating as specified and suitable for operation of 380 – 440 Volt 50 Hz AC system.

The contacts are to be of silver alloy and the switch mechanism shall be of the quick-make, quick-break type.

27. **SWITCHBOARD EQUIPMENT**

Switchboard equipment such as switches, circuit breakers, etc, shall be as directed and specified in the detail specification for the service.

Circuit breaker equipment of SABS IEC 60934.

28. **FUSE-SWITCH UNITS (WITH HRC FUSES)**

The fuse-switch unit is to be of the double pole, or triple pole or triple pole with neutral link type, and of the required current rating, as specified for the service and must be in accordance with BS EN 60947-3.

The fuse links must be fully isolated when the switch is in the open position, and interlocks must be provided to prevent the switch being operated with the cover open.

The fuse links shall comply with SABS Specification 172 and SABS IEC 60269-1 to 4.

29. **BUS-BAR COPPER**

Bus-bar copper must be fully in accordance with Tables A1 and A2 of SABS 1473-2 and SABS IEC 60439-2.

30. **SPECIFICATION COMPLIANCE**

The complete installation shall comply with the requirements of this specification. Should any differences or contradictions exist between this Specification and the detailed requirements for a specific installation, then the detailed requirements shall take precedence.

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

ANNEXURE 3

LIGHTNING PROTECTION SPECIFICATIONS

LIGHTNING PROTECTION INSTALLATION

GENERAL SPECIFICATION

1. SATISFACTORY INSTALLATION

The whole of the installation shall be carried out in accordance with:

(a) The latest S.A.B.S. Code of Practice for the Protection of Structures against Lightning - S.A.B.S. 03 ; SABS IEC 61024 (1) , 61024 (1 -1); SABS IEC 61312 (1) ; SABS IEC 61662 & NRS 042.

(b) The KwaZulu-Natal Department of Works General Electrical Specification.

(c) The Municipal By-Laws and any other special requirements as deemed necessary by the Local Supply Authority;

(d) Local Fire Regulations.

2. S.A.B.S. APPROVED DRAWINGS

SABS Approved drawings are not required for this project.

3. TEST ON COMPLETION

Upon completion of the lightning protection system, the following tests shall be witnessed by an appointed representative of the Employer. The results shall be recorded on suitable test certificates which must be signed by both the Contractor and the Employers representative. A sketch must be included on each test certificate indicating the positions of each earth electrode in relation to some permanent reference point. It must also indicate the positions at which tests were carried out, the type of test and the results of these tests.

3.1 Earth Resistance Test

The Earth Resistance Test shall involve measuring the resistance to earth of each rod-type electrode, or group of rod-type electrodes, or trench earth which would normally be connected to one down-conductor or earth terminal. This test must be made with the electrodes completely disconnected from any part of the structure or lightning protection system.

3.2 Electrical Continuity Tests

(a) **External Down-Conductors**

Electrical continuity between the lower ends of external down-conductors which must all be disconnected from the earthing system during the test shall not exceed 1 (one) ohm.

(b) Metallic Services

Electrical continuity between any metallic structures of services (e.g. rainwater pipes) which form an integral part of the lightning protection system shall not exceed 1 (one) ohm. These tests should be carried out with all other components of the lightning protection system disconnected from the component being tested.

4. DESCRIPTION OF MATERIAL

4.1 Air Terminals and Down-conductors

All conductors must be in accordance with the requirements of BSS 1474 or American Standards Specification 6063. All aluminium conductors shall have a cross-section area of not less than 30 mm² (domestic dwelling only) or 50 mm² for all other applications. The dimensions of flat section conductors to be 20 mm x 3 mm. Where conductors are mounted in stand-off guides, the cross-section area of the conductor must be not less than 70 mm² to give adequate mechanical strength.

4.2 Conductor Guides

The conductor must be mounted in aluminium alloy guides conforming with the material specification given in 4.1 above. The guides must allow for free longitudinal movement of the conductor to cater for expansion and contraction of the system caused by temperature variation. The minimum thickness of any part of the guide shall not be less than 3 mm. The guides must be securely attached to the structure using two stainless steel screws and plugs, the use of plated screws is not permitted.

The conductor system shall be supported in guides so that an air gap exists at all times between the aluminium and the surface of the structure, the guides being seated upon plastic or other similar insulating material. Should conductors be installed directly upon the surface of concrete or cement plaster, an insulating strip is to be installed over its whole length to prevent contact between the two surfaces. Guides shall be installed to support the conductor at intervals not exceeding 1,2 metres horizontally or 1,5 metres vertically.

N.B.: No part of an aluminium conductor system must be allowed to come into direct contact with concrete or cement plaster as this may cause the aluminium to corrode.

4.3 Expansion Loops

Where conductors are installed horizontally without deviation from a straight line over long distances, expansion loops must be provided at distances not exceeding 30 metres. These expansion loops must have a cross-sectional area which is at least equal to that of the conductor.

4.4 Protection of Down-conductors

Where external down-conductors are installed in areas which are readily accessible to the public, the lower ends of the conductors shall be enclosed in a semi-rigid insulating material. In the case of a circular section conductor this shall comprise a 2 metre length of 20 mm diameter P.V.C. conduit. This conduit shall be securely attached to the wall by means of galvanized steel saddles fixed with stainless steel screws and plugs, spaced at intervals not exceeding 1 m. Where a flat section conductor is used this shall be covered by a similar length of 25 mm P.V.C. conduit. The lower end of the conduit shall be positioned as close as practicable to ground level, i.e. immediately above an aluminium to copper joint. The ends of the conduit shall not be sealed.

4.5 Earthing Electrodes

Earthing electrodes must consist of either copper-clad steel rods not less than 12 mm in diameter and having a minimum copper thickness of 0,20 mm driven into the ground, or a 50 mm² (35 mm² for domestic dwellings) bare copper conductor buried in a trench, or a combination thereof. Where copper clad steel electrodes are used they must have a suitable bond between the steel core and copper exterior to prevent moisture ingress between the two metals. Where it is necessary to extend earth rods, an electrolytically compatible corrosion resistant, coupling device, which prevents ingress or moisture into the joint shall be used. The copper conductor below the down-conductor joint shall be covered by a semi-rigid P.V.C. conduit for a distance of approximately 200 mm above ground and 400 mm below ground.

4.6 Joints Above Ground

Circular section aluminium conductors shall be jointed by aluminium ferrules or lugs which are securely crimped into place. Aluminium lugs must be bolted together using 10 mm diameter aluminium bolts and washers. The material specification for these components must conform with that laid down in paragraph 4.1. Alternatively heavily tinned copper lugs and ferrules may be used. The lugs should be joined together by means of 10 mm diameter copper, brass or bronze bolts and washers. Care should be taken to inhibit corrosion where dissimilar metals are used by thoroughly cleaning the surfaces of the metal before assembly and subsequently sealing the joint with an inert tenacious compound or tape.

Flat section aluminium conductors shall be joined by double riveting, using aluminium rivets which comply with the material specification laid down in 4.1. Alternatively 2 x 6 mm diameter stainless steel bolts, nuts and washers may be used. Fold over type bends will not be permitted.

Down-conductors are to be terminated approximately 200 mm above finished ground level. Circular section aluminium is to be jointed to a 50 mm^2 (35 mm^2 in the case of domestic dwellings) stranded copper conductor by securely crimping in place two heavily tinned lugs and bolting these together using 10 mm diameter copper, brass or bronze nuts, bolts and washers.

N.B. : Under no circumstances shall aluminium conductors be buried in the ground.

4.7 Joints Below Ground

A joint in the stranded copper conductor which forms part of the earthing system must be made by using a crimped copper ferrule clamping (not lugs) using two copper line taps of suitable dimensions, or exothermic welding. The copper earth conductor must be joined to an earth rod by either clamping, using a standard earth rod clamp or copper line tap or by exothermic welding. Joints which are made between dissimilar metals (i.e. copper conductor to galvanized steel water main), must be thoroughly cleaned before assembly. They shall be rendered watertight using waterproof adhesive tape on a suitable compound for a minimum distance of 200 mm in all directions from the joint.

4.8 Bonds

Where it is necessary to bond the aluminium conductor to any other metallic surface, this must be done by bolting or riveting. When attaching aluminium to a dissimilar metal the joints are to be thoroughly cleaned and sealed to prevent corrosion.

5. GENERAL INSTALLATION PROCEDURE

5.1 Air Terminals for Non-metallic Pitched Roofs

Aluminium conductors are to be installed along all ridges of roofs and projections such as dormer windows, etc., terminating at the ends with conductors running downwards over the surface of the roof and the eaves. Non-metallic chimneys must be protected by means of a finial of sufficient length to cover the chimney within a 45° angle struck downwards from its point. Alternatively it should have a conductor installed in the form of a closed loop upon the upper surface. The conductors are to follow the outer contour of the stack and must be bonded at a convenient point to the nearest component of the air terminal system.

N.B. : This bond may run in a horizontal or downward direction, but under no circumstances must any part of it run above horizontal.

Conductors may be dead-ended (i.e. have one end free and unbonded), providing that the length of such a conductor does not exceed 10 metres and that the unbonded end is either at the same level or higher than the bonded end. This technique may be used where ridge conductors are installed over dormer windows, etc.

In all cases where metallic gutters have been installed along the eaves of a pitched roof, these must be bonded to the air terminal system. Where metallic gutters do not exist, however, a conductor must be installed over the surface of the roof at eaves level to which the remainder of the air terminal system is to be bonded, with the following exceptions :

(a) Where the maximum distance from the ground level to the eaves of the building is less than 4 metres and the pitch of the roof is more than 1 in 2 (27° from the horizontal).

(b) Where the maximum distances from ground level to the eaves is less then 7 metres and the pitch of the roof is more than 1 in 1,5 (34° from the horizontal).

(c) Where the distance from the ground level to the eaves is more than 7 metres and the pitch of the roof is more than 1 in 1 (i.e. the included angle at the apex of the roof is less than 90°).

Under these circumstances eaves conductors need not be installed.

Any non-metallic objects which protrude above the general roof lines, such as Cape Dutch gable ends, must be protected as described above with a suitable air terminal system. Any metallic objects which protrude above the general roof line, such as hot water expansion pipes must be bonded as directly as possible to the nearest eaves conductor, gutter or other part of the lightning system.

N.B. : These bonding conductors must run in a horizontal or preferably a downward direction, from the vent pipe, etc., to the lightning protection system.

5.2 Air Terminals for Metallic Pitched Roofs

Buildings with roofs covered with electrically continuous metal sheets do not require separate air terminals but must be earthed via down conductors generally as described in 5.6 and 5.7. Any non-metallic objects projecting above the general roof line must be separately protected as described in 5.1 and bonded to the metal roof covering.

5.3 Air Terminals for Non-metallic flat or Mono-pitched Roofs

For flat or mono pitched roofs of non-metallic construction the air terminal system must consist of aluminium alloy conductors installed around the outer perimeter of each section of the roof structure. These conductors must be installed on top of parapet walls if these exist. Lift motor rooms, tank rooms, penthouses, etc., which protrude above the general roof line must have air terminal conductors installed around the outer perimeter of each roof slab or parapet wall. Any metallic objects which protrude above the roof line, such as expansion pipes, signs, flag poles, handrails, etc., must be bonded directly to the nearest component of the lightning protection system as described in 5.1.

N.B. : It is not permissible for the ends of conductors to be bonded directly to the perimeter air terminal system if the latter is installed upon a parapet wall having a height exceeding 500 mm above roof slab level. In these circumstances the conductors are to be bonded directly to the down conductors.

5.4 Air Terminals for Metallic flat or Mono Pitched Roofs

Metallic flat or mono pitched roofs do not require separate air terminal conductors, providing that there is electrical continuity between the metallic roofing sheets, (see 5.2). A metallic roof surrounded by a non-metallic parapet wall shall have conductors installed at the top of the parapet wall and these must be bonded to the metallic roof at intervals not exceeding 20 metres. If the parapet wall is clad with metal over its upper surface or a handrail is installed which affords good electrical continuity, separate air terminal conductors need not be installed. Under these circumstances the metal handrail or cladding must be bonded to the metal roof covering at intervals not exceeding 20 metres.

All non-metallic covering such as slates, tiles, asbestos cement sheeting, etc., supported by a steel structure being electrically continuous throughout may be treated as being of a complete metal construction. In these circumstances no separate air terminal system need be installed providing the steel roof structure is bonded to earth at intervals given in 5.5.

5.5 Down Conductors for Non-metallic Structures

Down conductors must be installed at regular intervals around structures and to run as directly as possible between the air terminal and earthing system. They must, where practicable, be positioned at the external corners of the structure. The maximum separating distance between down conductors around the perimeter of the structure must not exceed 30 metres. In the case of very tall buildings having a slender base (i.e. chimney stacks, water towers, etc.), a minimum of two down conductors must be installed.

The lower ends of down conductors are to be terminated and bonded to the earthing system approximately 200 mm above finished ground level. Under no circumstances must aluminium conductors be buried underground. Test joints must be provided between the down conductors and earthing system. Down conductors must run vertically between the air terminal and earthing systems. Where this is impracticable, their course may be deviated to run at any angle up to and including horizontal.

Where it is necessary to run conductors horizontally over the upper surface of a structural protrusion, such as an exposed concrete slab, the conductor may run down vertically over the edge of the slab and return to the main structure, so that the distance between the upper and lower conductors exceeds one third of the length of the horizontal run. Looped down conductors are not permitted. Down conductors must not run over the underside of large overhangs which are less than 6 metres above ground level, or other areas where people are likely to be present during a thunderstorm.

External or internal metallic rainwater pipes may be used as down conductors providing these are of substantial section and are jointed by screwing one length into another or welding. Thin gauge galvanized steel pipes whose sections are held together by friction, rivets or screws must not form part of a lightning protection system.

5.6 Down conductors for reinforced concrete framed structures

The steel reinforcement of this type of structure may be used in place of down conductors. Where the reinforcing system is used, the air terminal system must be bonded to it at a maximum of 30 metre intervals using steel clamps. This bond may be achieved by clamping, with a steel clamp, a steel conductor to a selected reinforcing bar, the opposite end of this conductor must terminate at a corrosion resistant metallic terminal such as Grade 316 stainless steel.

The reinforcing system of prefabricated concrete buildings must not be used unless special provision is made for bonding the various prefabricated sections together.

The terminals should be mounted flush with the face of the concrete. An aluminium alloy bond must then be taken from the air terminal system and be connected to the stainless steel terminal by means of a heavily tinned crimp lug for circular section aluminium, or a suitable bi-metallic joint in the case of flat section aluminium. A similar system must be used to bond the reinforcing system at ground level to the earthing system at points directly below the air terminal bonds. Here copper conductors must be used as the external bonding material.

Under no circumstances must copper, or other non-ferrous material be allowed to come into contact with steel reinforcing bars, as this may cause severe corrosion and subsequent structural damage. The lightning protection system must not be bonded to any part of the structure which is electrically isolated from the remainder of the building, i.e. cantilevered sections. In these circumstances, or where it is otherwise impracticable to use the reinforcing system, external down conductors must be installed as described in 5.5.

5.7 Down conductors for steel framed structures

Where the framework of a building is constructed of structural steel columns, these may be used in place of down conductors providing the separating distance between them does not exceed 30 metres. The upper ends of the columns must be bonded to the air terminal systems and the lower ends to the earthing system.

5.8 Earthing by means of vertically installed rod type electrodes

Rod-type electrodes must be driven into the ground at a position directly below each down connector. The maximum earthing resistance of each electrode or number of electrodes bonded to any one down conductor shall not exceed N X 30 ohms, where N equals the total number of down conductors which are bonded to a common air terminal system, or 200 ohms whichever is the lower value.

The minimum horizontal separating distance between rod-type electrodes bonded together must not be less than their installed depth. The upper ends of installed rod-type electrodes are to be terminated approximately 500 mm below finished surface level. A 50 mm^2 copper bonding conductor must be installed to run between each earthing electrode system and the lower ends of the adjacent down conductors. A joint is to be made between each of these bonding conductors and the down conductors at a position approximately 200 mm above finished ground level. These bonding conductors must be installed in P.V.C. conduit securely affixed to the wall (see 3.4). The length of this P.V.C. conduit must be approximately 600 mm and must be installed so that approximately 200 mm protrudes above ground level, the remainder being buried into the soil.

5.9 Earthing by means of metallic water mains

Where two or three down conductors are installed the water mains may serve as an earth terminal for one of these. Where three of more down conductors are installed the water mains may serve as an earth terminal for two of these. Regardless of whether the water mains are used as an earth terminal or not, the incoming metal water pipe must be bonded to the lightning protection earthing system underground.

5.10 Earthing by means of trench type electrodes

Where the soil conditions prevent the satisfactory installation of rod-type electrodes, a trench earth system must be installed. This method is to comprise a 50 mm^2 stranded copper conductor installed horizontally into a trench at a depth of 500 mm below finished ground level. The conductor is to follow the general outline of the structure to be protected and be installed 1 metre away from the outside walls. Where the building stands on rocky ground, the trench earth may be attached to the lower part of the wall in areas where rock protrudes through the soil. The conductor must, however, be buried wherever possible as described above.

Each down conductor must be bonded to the trench earth system as directly as possible by means of a copper conductor.

Trench earth systems must have a maximum earth resistance of 30 ohms. An isolated length of trench earth mat must be bonded to the down conductor system in such a way as to reduce the length of dead-ends to the minimum.

Should trench earths be installed beneath pathways where people are likely to be present during a thunderstorm, a plastic, bitumastic or ceramic pipe must be installed having a length similar to the width of the pathway and the trench earth conductor run inside it.

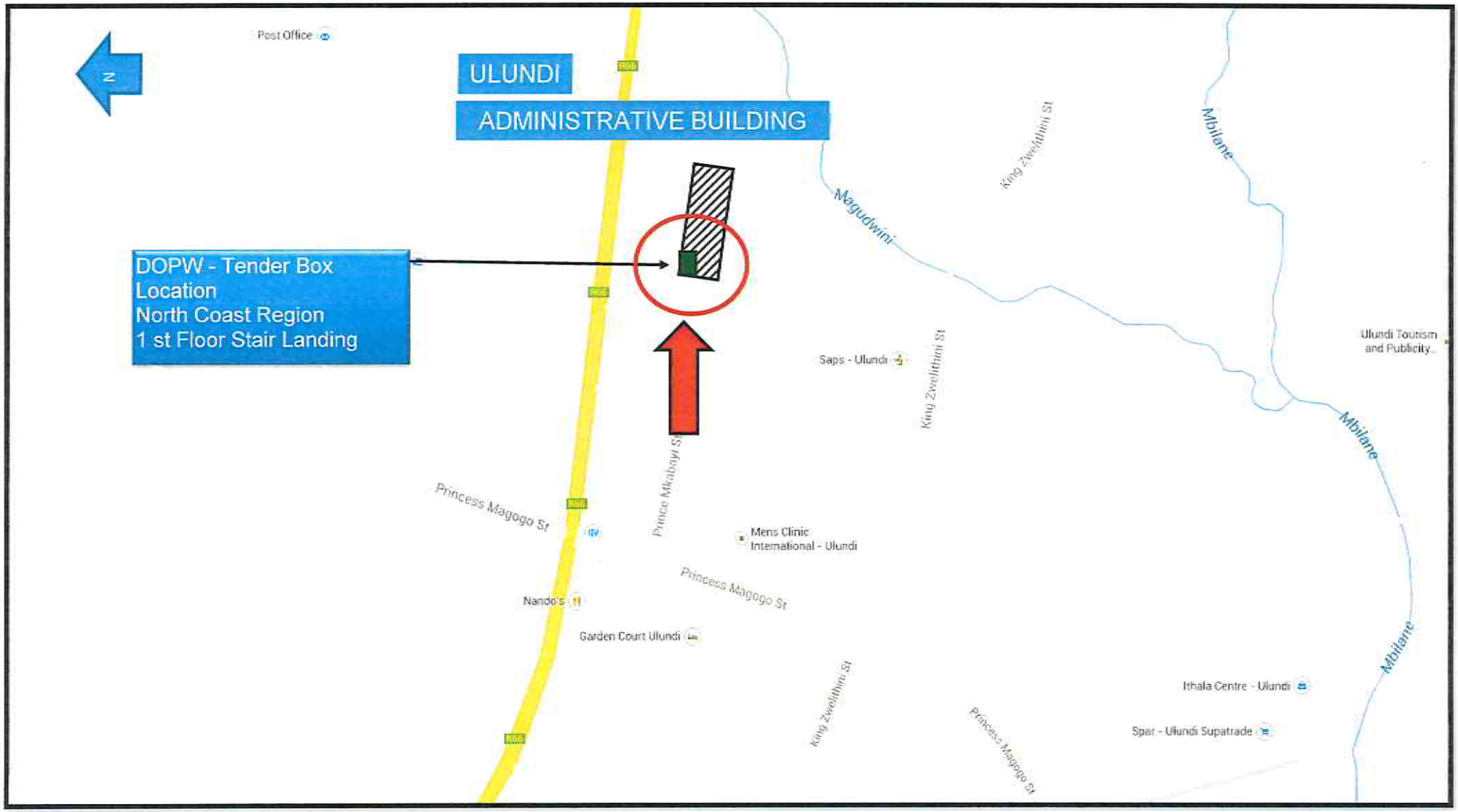
N.B. : The maximum useful length of a dead-ended trench earth is 80 metres.

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

ANNEXURE 4

MAP OF BID SUBMISSION LOCATION


N
ULUNDI
ADMINISTRATIVE BUILDING
DOPW - Tender Box
Location
North Coast Region
1 st Floor Stair Landing
Post Office
Magudwini
King Zwelithini St
Mbilane
Saps - Ulundi
Ulundi Tourism and Publicity...
Princess Magogo St
Prince Mkabayi St
Mens Clinic International - Ulundi
Nando's
Garden Court Ulundi
Ithala Centre - Ulundi
Spar - Ulundi Supatrade
R66

KWAZULU-NATAL PROVINCE
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ANNEXURE 5

JOINT VENTURE AGREEMENT

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

Joint Venture Agreement
(March 2004)
(First Edition of CIDB document 1017)

1. **PREAMBLE**

This agreement is made and entered into by and between

_____

_____

_____

of the first part and

_____

_____

_____

of the second part and

_____

_____

_____

of the third part.

(allow for additional parties as necessary).

Whereas the foregoing parties have resolved to form a Joint Venture under the title of

_____

_____

_____

for the exclusive purposes of securing and/or executing the Contract to be awarded by

(name of Employer)

to the KZN Department of Public Works in respect of the following project:

for *(brief description of Contract)*

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

Now it is hereby agreed as follows :

2. **DEFINITIONS AND INTERPRETATION**

2.1 Definitions

The following words and expressions shall have the meanings indicated, except where the context otherwise requires. Defined terms and words are, in general, signified in the text of the Agreement by the use of capital initial letters, but the absence of such letters does not necessarily signify that a term, or word, is not defined.

'Agreement' means the agreement between the Members of the Joint Venture and includes this model form of agreement together with the Preamble, Specific Provisions, if any, Schedules 'A', 'B' and 'C' and any relevant Documents prepared prior to the signing of the Agreement and appended thereto.

'Contract' means the contract with the Employer for the supply of the Deliverables, for the purposes of securing and executing which, the Joint Venture has been formed.

'Deliverables' means the works and/or services, equipment, materials, goods, etc. to be furnished by the Joint Venture to the Employer in terms of the Contract.

'Document' means any written, drawn, typed, printed, or photographic material, which relates to the Agreement

'Employer' means the person, or body, which is to award the Contract and will employ the Joint Venture if it is awarded the Contract.

'Joint Venture' means the joint venture formed by the Members in accordance with the Agreement

'Management Committee' means the body established in terms of the Agreement to manage all aspects of the work of the Joint Venture in securing and executing the Contract and in meeting the provisions for the Agreement.

'Member' means a person, or body which, being a party to the Agreement, is a member of the Joint Venture

'Member's Interest' means the proportion expressed as a percentage, which the total monetary value of all resources provided and contributions made by a Member towards the execution by the Joint Venture of the Contract bears to the total of such values by all Members and, unless otherwise indicated in the Agreement, represents the extent to which the Member participates in the fortunes of the Joint Venture.

'Representative' means the person representing a Member on the Management Committee

'Schedules' means Schedules 'A', 'B' and 'C' which set out general, financial and other information relating to the Members and the obligations, duties, rights, risks and benefits arising from their participation in the Joint Venture.

'Specific Provisions' means the variations, if any, required to this standard form of agreement for the specific purposes of the Agreement.

2.2 Interpretation

Unless inconsistent with the context, an expression in the Agreement which denotes:

- any gender shall include the other genders
- a natural person shall include a juristic person and vice versa
- the singular shall include the plural and vice versa

2.3 Headings

The headings to clauses of the Agreement shall not be considered part thereof, nor shall the words they contain be taken into account in the interpretation of any clause.

2.4 Law

The Agreement shall be construed in accordance with and governed by the laws of the Republic of South Africa and the English language versions shall prevail.

2.5 Language

English shall be exclusively used by the Members in the preparation of Documents unless otherwise indicated.

2.6 Conflict between Agreement and Contract

Should any provision of the Agreement be in conflict with the terms of the Contract, the Agreement shall be amended to the approval of the Management Committee so as to eliminate the conflict.

3. JOINT VENTURE GENERAL

3.1 Establishment and Purpose

The Joint Venture established by the Members in terms of the Agreement is an unincorporated association with the exclusive purposes of securing and executing the Contract for the benefit of the Members.

3.2 Termination

The operation of the Joint Venture and the validity of the Agreement shall terminate if and when it becomes evident that the Joint Venture will not be awarded the Contract, or, if the Joint Venture secures the Contract, when all obligations and rights of the Joint Venture and the Members in connection with the Contract and the Agreement have ceased and/or been satisfactorily discharged.

Unless otherwise decided by the Management Committee, the Agreement shall not terminate if a Member changes its name, or is taken over by, or merged with, another body.

This agreement will terminate when any one of the Members resigns, are liquidated or opts out of this agreement and the Joint Venture will be in breach of contract with the Employer and their contract could be cancelled.

3.3 Exclusivity

Unless otherwise agreed by the Management Committee, or provided for in the Contract no Member shall engage in any activity related to the Contract other than as a Member of the Joint Venture and Members shall ensure that their subsidiaries and other bodies over which they have control comply with this requirement.

3.4 Participation of Members

Except as may otherwise be stipulated in the Agreement, each Member shall be responsible for all costs incurred by it prior to the date of inception of the Agreement.

Subsequent to the date of inception of the Agreement, each Member shall, participate in the operations, risks, responsibilities and fortunes of the Joint Venture including, inter alia, the provision of funding, sureties, guarantees, insurances, human and other resources and participation in profits and losses to the extents indicated in the Schedules. Participation in any aspect not covered in the Schedules shall, if an agreement cannot be reached between the Members, be to the same extents as indicated by the Members Interests.

3.5 Management

The affairs of the Joint Venture shall be directed and controlled by the Management Committee, as set out in Section 4 hereof.

3.6 Confidentiality

All matters relating to the Agreement and the Contract shall be treated by the Members as confidential and no such matter shall be disclosed to any third party without the prior written approval of the Management Committee.

No Member shall be party to the dissemination of publicity relating to the Contract, or the Agreement, without the prior written approval of the Management Committee and the Employer.

3.7 Assignment

No Member shall cede, assign, or in any other way make over any of its rights, or obligations, under the Agreement without the prior written consent of the Management Committee.

3.8 Subcontracting

No Member shall subcontract any obligation, work or duty for which it is, itself, responsible in terms of the Agreement without the prior written consent of the Management Committee.

3.9 Variations to Agreement

No variation, modification, or waiver of any part of the Agreement shall be of any force, or effect, unless unanimously agreed by the Members and reduced to writing.

3.10 Liability

Each Member warrants that it will indemnify the other Members against all legal liabilities arising out of, or in connection with the performance of its obligations under the Agreement.

It is acknowledged by the Members that they may be held jointly and severally liable in respect of claims against the Joint Venture by the Employer or third parties.

4. MANAGEMENT OF JOINT VENTURE

4.1 General

The affairs of the Joint Venture shall be directed, controlled and managed by the Management Committee, which, within the terms of the Agreement and the Contract, shall have full authority to bind the Members in all matters relating to the affairs of the Joint Venture.

Communication between the Joint Venture and the Employer, or third parties, relating to the Contract shall be conducted exclusively by the Management Committee, or by such person as it may delegate to perform this function.

The Management Committee shall have the power to appoint a project manager and/or such other persons as it may see fit to appoint for the purpose of executing the Contract and may delegate such of its powers, responsibilities and duties as it may consider necessary, or desirable, to persons or bodies appointed or seconded for this purpose.

Such administrative functions as are necessary to ensure the effective operation of the Management Committee shall be performed by its chairman.

4.2 Management Committee

4.2.1 *Composition*

The Management Committee shall, unless otherwise agreed by all the Members, consist of one Representative of each Member and each Member shall be obliged, at all times, to maintain a Representative on the Management Committee.

Each member shall, not later than three working days after the signing of the Agreement, appoint its Representative and notify the other Members of the name and contact details of the Representative. Such Representative shall have the power to bind the Member that he represents in all matters relating to the execution of the Contract and the performance of the Agreement.

A Member shall be entitled, after giving the other Members not less than three working days written notice of his intention to do so, appoint, remove and/or replace, an alternate who shall, at any meeting of the Management Committee from which the Representative whom he represents is absent, be vested with all rights and powers and subjected to all the obligations of the absent Representative.

The chairman of the Management Committee shall be the Representative of the Member which has the largest Member's Interest. If two, or more, Members have the same, largest Member's Interest, the chairmanship shall rotate between the Representatives of such Members at three monthly intervals, the order of rotation to be determined by ballot.

Notwithstanding the foregoing, the chairmanship of the Management Committee may be determined, or changed, at any time by unanimous decision of the Management Committee.

No remuneration shall be paid by the Joint Venture to Representatives or their alternates for serving on the Management

4.2.2 *Meetings*

Meetings of the Management Committee shall take place at such times and places as the Management Committee may determine, provided that the chairman shall convene a meeting of the Management Committee to be held not later than ten working days after he has been requested, in writing, by a Member to do so. Not less than five working days written notice of any meeting of the Management Committee shall be given to all Representatives and their alternates.

The Management Committee may permit, or invite, persons other than Representatives or alternates to attend any of its meetings, but such persons shall not have voting rights.

4.2.3 *Decisions*

Each Representative shall have one vote on the Management Committee and where, in terms of this clause, a casting vote is required, this shall be exercised by the chairman.

All decisions of the Management Committee shall, desirably, be unanimous. Accordingly, if unanimity cannot, initially, be achieved in regard to a decision, the meeting at which that decision is sought shall be adjourned for a period of 48 hours to enable Representatives to consult with their principals. If, on resumption of the adjourned meeting, unanimity can still not be achieved, the decision, provided it is not one requiring unanimity of the Members, shall be taken by majority vote and, in the event of a tie, the chairman shall exercise a casting vote.

A Member not satisfied with a majority decision of the Management Committee may declare a dispute, to be dealt with in terms of Clause 8 hereof, but the majority decision shall, nevertheless, be implemented with immediate effect.

Decisions of the Management Committee, whether taken at a meeting, or otherwise, shall be recorded in written minutes, which shall be distributed by the chairman to reach the Representatives not later than five working days after those decisions were taken. Such minutes shall be deemed to have been affirmed by the Representatives unless written notice of dissent is received by the chairman not later than three working days after receipt of the minutes by the Representative.

4.2.4 Powers and duties

The functions, responsibilities and powers of the Management Committee shall include, inter alia, those listed below:

4.2.4.1 Formulating overall policy in regard to the achievement of the objectives of the Joint Venture.

4.2.4.2 Managing the day to day affairs of the Joint Venture.

4.2.4.3 Monitoring, directing and co-ordinating the activities of the Members to ensure that the objectives of the Joint Venture are achieved and that the obligations and responsibilities of the individual Members are met.

4.2.4.4 Monitoring and controlling the financial affairs of the Joint Venture and ensuring that proper books of account and financial records relating to affairs of the Joint Venture are maintained in an approved form and submitted to the Management Committee for approval at regular intervals, which shall not be longer than one month.

4.2.4.5 Determining the necessity for and the details of any changes in the duties and responsibilities of Members provided that any resulting changes in Members' Interests shall be unanimously approved by the Members.

4.2.4.6 Determining the terms and conditions of employment of personnel and the emoluments applicable to staff seconded to the Joint Venture by the Members.

4.2.4.7 Controlling and approving the appointment of all subcontractors.

4.2.4.8 Procuring, after the completion of the Contract and the release of all bonds, guarantees and sureties given in respect of the performances of the Joint Venture and the Members, the preparation and auditing of a final set of accounts, on the basis of which the final profits, or losses, attributable to the individual Members shall be determined and any necessary adjustments effected.

5 RESOURCES OF JOINT VENTURE

The resources to be utilised by the Joint Venture in securing and executing the Contract shall, insofar as these are to be provided directly by the Members, be as set out in the Schedules and may, from time to time, be amended by decision of the Management Committee, provided that the Member's Interests are not, except with the unanimous approval of the Members, affected thereby.

Similarly, specific areas of responsibility of the Members for the performance of work and the provision of facilities shall be as set out in the Schedules and may, from time to time, be amended by decision of the Management Committee, provided that the Members' Interest are not, except with the unanimous approval of the Members, affected thereby.

5.1 Schedule 'A' (General)

Schedule 'A' shall contain general information relating to the Joint Venture including, inter alia, the following :

1. The Employer's name and address.
2. A brief description of the Contract and the Deliverables.
3. The name, physical address, communications addresses and domicilium citandi et executandi of each Member and of the Joint Venture.
4. The Members' Interests.
5. A statement indicating whether, or not, Specific Provisions apply to the Agreement.
6. A schedule of insurance policies which must be taken out by the Joint Venture and by the individual Members.
7. A Schedule of sureties, indemnities and guarantees that must be furnished by the Joint Venture and by the individual Members.
8. Details of the persons, who, in the event of failure by the Members to reach agreement on the appointments of mediator and arbitrator, will nominate appointees to these positions in terms of Clauses 8.2 and 8.3.

5.2 Schedule 'B' (Financial)

Schedule 'B' shall contain information regarding the financial affairs of the Joint Venture including, inter alia, the following :

1. The working capital required by the Joint Venture and the extent to which and manner whereby this will be provided and/or guaranteed by the individual Members from time to time.
2. The banking accounts that are to be opened in the name of the Joint Venture and the manner in which these are to be operated.
3. The rates of interest that will be applicable to amounts by which Members are in debit, or credit, to the Joint Venture.
4. The names of the auditors and others, if any, who will provide auditing and accounting services to the Joint Venture.
5. The intervals at which interim financial accounts and forecasts will be prepared for approval by the Management Committee.
6. Insofar as not covered in Schedule 'C', the basis on which contributions of various types by the Members towards the work of the Joint Venture in securing, executing, managing and satisfactorily completing the Contract, will be valued.
7. The basis on which profits and/or surplus cash will, if available from time to time, be distributed to Members.
8. The basis upon which losses, if any, are to be apportioned to Members.

5.3 Schedule 'C' (Contributions by Members)

Schedule 'C' shall set out the contributions of various types, other than cash, that will be made by the individual Members towards the work and obligations of the Joint Venture and shall, as far as possible, indicate the monetary values to be placed on such contributions, which may include, inter alia, the following :

1. Staff seconded to the Joint Venture.
2. Work carried out and services provided to, or on behalf of, the Joint Venture.
3. Plant, equipment, facilities etc. made available for use by the Joint Venture.
4. Materials and goods supplied to, or on behalf of, the Joint Venture.
5. Licences, sureties, guarantees and indemnities furnished to, or on behalf of, the Joint Venture.
6. Joint Venture Disclosure form required for the Contract.

6. BREACH OF AGREEMENT

If a Member breaches any material provision of the Agreement, or delays or fails to fulfil its obligations in whole, or in part, and does not remedy the situation within fourteen calendar days of receipt of notice from the Management Committee, or another Member, to do so, the other Members shall have the right, without prejudice to any other rights arising from the default, to summarily terminate the Agreement and re-assign the defaulting Member's rights and obligations in the Joint Venture as they see fit and withhold any moneys due to the defaulting member by the Joint Venture.

Each Member shall indemnify the other Members against all losses, costs and claims which may arise against them in the event of the Agreement being terminated as a result of breach of the Agreement by the said Member.

7. INSOLVENCY OF MEMBER

Should a Member be placed in liquidation, or under judicial management, whether provisionally or finally, or propose any compromise with its creditors, the other Members shall be entitled to proceed in terms of Clause 6, as if the Member had breached the Agreement.

8. DISPUTES

8.1 Settlement

The Members shall negotiate in good faith and make every effort to settle any dispute, or claim, that may arise out of, or relate to, the Agreement.

If agreement cannot be reached, an aggrieved Member shall, if he intends to proceed further in terms of Clause 8.2 hereof, advise all other Members in writing that negotiations have failed and that he intends to refer the matter to mediation in terms of Clause 8.2.

8.2 Mediation

Not earlier than ten working days after having advised the other Members, in terms of Clause 8.1, that negotiations in regard to a dispute have failed, an aggrieved Member may require that the dispute be referred, without legal representation, to mediation by a single mediator.

The mediator shall be selected by agreement between the Members, or, failing such agreement, by the person named for this purpose in Schedule 'A'. The costs of the mediation shall be borne equally by all Members.

The mediator shall convene a hearing of the Members and may hold separate discussions with any Member and shall assist the Members in reaching a mutually acceptable settlement of their differences through means of reconciliation, interpretation, clarification, suggestion and advice. The Members shall record such agreement in writing and thereafter they shall be bound by such agreement.

The mediator is authorised to end the mediation process whenever in his opinion further efforts at mediation would not contribute to a resolution of the dispute between the Members.

8.3 Arbitration

Where a dispute or claim is not resolved by mediation, it shall be referred to arbitration by a single arbitrator to be selected by agreement between the Members or, failing agreement, to be nominated by the person named for this purpose in Schedule 'A'.

The Member requiring referral to arbitration shall notify the other Members, in writing, thereof, not later than thirty calendar days after the mediator has expressed his opinion, failing which the mediator's opinion shall be deemed to have been accepted by all Members and shall be put into effect.

Arbitration shall be conducted in accordance with the provisions of the Arbitration Act No. 42 of 1965, as amended, and in accordance with such procedure as may be agreed by the Members or, failing such agreement, in accordance with the rules for the Conduct of Arbitrations published by the Association of Arbitrators and current at the date that the arbitrator is appointed.

The decisions of the arbitrator shall be final and binding on the Members, shall be carried into immediate effect and, if necessary, be made an order of any court of competent jurisdiction.

9. DOMICILIUM

The Members choose domicilium citandi et executandi for all purposes of and in connection with the Agreement as stated in Schedule 'A'. A Member shall be entitled to change his domicilium from time to time, but such change shall be effective only on receipt of written notice of the change by all other Members.

Member No. 1

Thus done and signed at _____ this _____ day of _____ 20___

For and on behalf of _____ *[Company]*

by *[name]* _____ who warrants his authority to do so.

_____

As witnesses 1. _____ As witnesses 2. _____

Member No. 2

Thus done and signed at _____ this _____ day of _____ 20___

For and on behalf of _____ *[Company]*

by *[name]* _____ who warrants his authority to do so.

_____

As witnesses 1. _____ As witnesses 2. _____

Member No. 3

Thus done and signed at _____ this _____ day of _____ 20___

For and on behalf of_____ *[Company]*

by *[name]* _____ who warrants his authority to do so.

_____

As witnesses 1. _____ As witnesses 2. _____

[Allow for additional parties as necessary].

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

ANNEXURE 6

PROJECT SPECIFIC HEALTH AND SAFETY SPECIFICATION

public works

Department:
Public Works
PROVINCE OF KWAZULU-NATAL

Occupational Health and Safety Specification

(OHSE SPEC)

Project Name:	Mthambalala Secondary School
WIMS No:	060602
OHS Rep:	Z Macuacua
Region:	North Coast
District:	Umkhanyakude

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1. Introduction

The *KwaZulu Natal Department of Public Works* is deemed as the **"Client"** in terms of the definitions of Construction Regulations of 2014as published in *Government Gazette No. 37305*.TheConstruction Regulations of 2014under *CR (5)(1)* stipulates that that the client must prepare a suitable, sufficiently documented and coherent site specific Occupational Health and Safety Specification for the intended construction work based on the baseline risk assessment.

The purpose of this Occupational Health and Safety Specification document (which hereinafter will be referred to as OHSE Spec) is to provide designers and the successful tenderer with essential OHS information to ensure effective safety management during the design and construction phase of the project.

This OHSE Spec forms an integral part of the contract between the Client and the Principal Contractor, so as to ensure compliance with the Occupational Health and Safety Act, Act 85 of 1993 and its applicable regulations and must serve as the basis for the Principal Contractor to develop his/her Project Safety, Health and Environmental Management Plan. As with any other plan for it to be implemented and managed effectively it requires the allocation of sufficient funds to achieve the objectives set out in the plan. In line with this requirement Construction Regulation 5(1)(g) requires the Client to ensure that the Principal Contractor has made adequate provisions for the cost of Health and Safety Measures in their tenders.

It must be noted that this OHSE Spec as much as it is detailed it is not exhaustive and the onus is on the Principal Contractors to ensure that they comply with Section 8 of the OHS Act, Act 85 of 1993 which states that *"Every Employer shall provide and maintain, as far as is reasonably practicable, a working environment that is safe and without risk to the health of his employees."* this means that Principal Contractors as they are employers in their own right must at all times ensure continuous assessments are done for continued provision and maintenance of a healthy and safe working environment.

2. Definitions

For the purpose of the OHSE Spec, the abbreviations or definitions given hereunder shall apply and the reference to on gender will also apply to the other gender.

"CR" refers to the Construction Regulations 2014

"Agent (*Pr.CHSA*)" means a competent person who acts as a representative for a Client in terms of regulation (5)5.

"Client" means Department of Public Works

"Competent person" means a person who-

(a) Has in respect of the work or task to be performed the required knowledge, training and experience and, where applicable, qualifications, specific for that work or task: Provided that where appropriate qualifications and training are registered in terms of the provisions of the National Qualifications Framework Act, 2000 (Act No.67 of 2000), those qualifications and that training must be regarded as the required qualifications and training; and

(b) Is familiar with the OHS Act, Act 85 of 1993 and with the applicable regulations made under the Act;

"Construction Manager (*Site Agent*)" means a competent person responsible for the management of the physical construction processes and the coordination, administration and management of resources on a construction site;

"Construction Site" means a work place where construction work is being performed;

"Construction Supervisor" means a competent person responsible for supervising construction activities on a construction site;

"Construction Vehicle" means a vehicle used as a means of conveyance for transporting persons or material, or persons and material, on and off the construction site for the purposes of performing construction work;

"Construction work" means any work in connection with –

(a) The construction, erection, alteration, renovation, repair, demolition or dismantling of or addition to a building or any similar structure; or
(b) the construction, erection, maintenance, demolition or dismantling of any bridge, dam, canal, road, railway, runway, sewer or water reticulation system; or the moving of earth, clearing of land, the making of excavation, piling, or any similar civil engineering structure or type of work;

"Contractor" means an employer who performs construction work;

"Fall Protection Plan" means a documented plan, which includes and provides for-

(a) All risks relating to working from a fall risk position, considering the nature of work undertaken;
(b) The procedures and methods to be applied in order to eliminate the risk of falling; and
(c) A rescue plan and procedures;

"Health and Safety File" means a file, or other record containing the information in writing required by these Regulations;

"Health and Safety Plan" means a site, activity or project specific documented plan in accordance with the client's health and safety specification;

"Health and Safety Specification" means a site, activity or project specific document prepared by the client pertaining to all health and safety requirements related to construction work;

"Medical Certificate of Fitness" means a certificate contemplated in regulation 7(8) of Construction Regulations 2014;

"Principal Contractor" means an employer appointed by the client to perform construction work;

"Safety Officer" – a person deemed competent by SACPCMP under the relevant category of registration.

"Professional Engineer or Professional Certificated Engineer" means a person holding registration as either a Professional Engineer or Professional Certificated Engineer in terms of the Engineering Profession Act, 2000 (Act No. 46 of 2000);

3. Scope of Application

This OHSE Specification document stipulates the minimum Occupational Health, Safety, and Environmental requirements that the tenderer need to address in his/her OHSE Plan. This Specification also addresses legal compliance, hazard identification, risk assessment, risk control, and the promotion of a Health and Safety culture amongst those working on the project.

This Specification also makes provision for the protection of persons other than employees. This OHSE Spec is exclusively applicable to the following project pending any change of scope which may necessitate changes to the OHSE Specification;

MTHAMBALALA SECONDARY SCHOOL: DEPARTMENT OF EDUCATION SANITATION PROGRAMME

This OHSE Specification further seeks to achieve the following;

a) To provide Principal Contractors with the Structure of the Detailed OHSE Plans they will have to prepare and submit for this project. ***See Annexure A***

b) Provide the overarching framework within which the Principal Contractor is required to demonstrate compliance with certain requirements for occupational health and safety established by the Occupational Health and Safety Act, Act 85 of 1993, all applicable regulations and Client Specific Requirements. ***See Annexure B***

c) To bring to the attention of the Bidding Principal Contractors that they need to make an undertaking that the costs for executing the project includes the costs of complying with the OHS Act, Act 85 of 1993, all applicable regulations including Client Specific requirements. Such undertaking is made by appending signatures on the OHS Declaration for Tenders. ***See Annexure C***

d) Ensure that the Principal Agent as the Professional Service Provider appointed by the Department to manage the project on its behalf in terms of the Conditions of Contract applicable to this project ensures that the contents of this document and the attached Baseline Risk Assessment are taken into consideration during design by all professions appointed and that the OHSE Specification is incorporated into the tender documents. ***See Annexure D***

4. Contractual Issues

Acceptance by the Principal Contractor of the contract with KZN DOPW shall constitute acknowledgement that the Principal Contractor has familiarised him/herself with the contents of the OHSE Spec and that he/she will comply with all its obligations in respect thereof.

Due to fact that this document is based on legislative requirements, the Client requires that all Contractors comply with the requirements of this document and all other relevant legislative requirements not covered by this document.

The Client or its duly appointed Construction H&S Agent reserves the right to stop any Principal Contractor or Sub-Contractors from working whenever Safety, Health or Environmental requirements are being violated as required by regulation 5(1)(q). Any resultant costs of such work stoppages will be for the relevant Contractor's account.

The requirements as specified by the Client in this document must not be deemed to be exhaustive and the Client reserves the right to make changes as and when the Client deems fit to address issue of OHSE Compliance.

The Client will not entertain any claim of any nature whatsoever which arises as a result of costs incurred or delays being experienced due to the Contractor not complying with the requirements of this document and/or any other applicable legislative requirements imposed on the Contractor

5. Administrative Requirements

a) Notification of Construction Work

The successful tenderer must at least within 07 working days before commencing with construction work notify the Provincial Director in writing using **Annexure "2"**.

A copy of the notification once stamped by a DoL Official must be submitted to the client prior to commencing with construction work.

6. Appointment of a Fulltime/ Part time Safety Officer

The Principal Contractors will have to appoint a competent Construction H&S Officer as per the following criteria;

- *Number of employees onsite between 30 but below 50 – Part Time Safety Officer shall be appointed and will be onsite at least 2 days a week*
- *Number of employees above 50 – Fulltime Safety Officer should be appointed.*
- *Should the project require a Construction Work Permit – a Fulltime Safety Officer should be appointed.*

Further to the above criteria, should the Client or its Representative having considered the risks present and lack of compliance to the Occupational Health and Safety Act, Act 85 of 1993 and its applicable Regulations the Client or its Representative may issue an instruction that a Part/ Full Time Construction Health and Safety Officer must be appointed, such a requirement will have to be met.

Annexure A

Structure of the Detailed OHSE Plan

A detailed OHSE Plan is to be submitted by the successful tenderer as per section 8 above. The following are the minimum standard legal documentation that must form part of the OHSE Plan based on the risks attached in executing this project –

MTHAMBALALA SECONDARY SCHOOL: DEPARTMENT OF EDUCATION SANITATION PROGRAMME

1. The notification to commence with construction work made to the Provincial Director of Labour using Annexure 2.(*Filled in only to be submitted on approval of the Safety Plan*)
2. Letter of Good Standing with Compensation Commissioner or Compensation insurer
3. The Contractor's Health, Safety &Environmental Policy, signed by the chief executive officer, which outlines the Contractor's OHSE compliance objectives and how they will be achieved.
4. Pre-Construction risk assessment
5. Relevant checklists and registers.
6. Site specific OHSE Organogram
7. Preliminary Induction Program
8. Demolition Plan
9. Environmental Management Plan

10. Proof of competency for the following legal appointees;

10.1. Construction Manager –(Detailed CV reflecting qualification, relevant experience and references from previous clients)

10.2. Construction Work Supervisor - Detailed CV reflecting qualification, relevant experience and references from previous clients.

10.3. Construction H&S Officer – SAMTRAC or equivalent

10.4. Risk Assessor – SAMTRAC or equivalent

10.5. Fall Protection Planner -SAMTRAC or equivalent

10.6. Demolition work inspector – Registered Engineer or Technologist

Legal appointments to be appointed	
Prior Site Handover	**After Site Handover on commencement with Construction work**
• Construction Manager • Construction Work Supervisor • Assistant Construction Work Supervisors • Construction H&S Officer • Risk Assessor • Fall Protection Planner	• Scaffold Erectors • Scaffold Inspectors • Excavation inspector • Explosive actuated fastening device controller • First Aider • Emergency co-ordinator • Fire Marshalls • Fire team members • Portable Electrical tool inspector • Hand tools inspector • Housekeeping inspector • Stacking and storage inspector • Temporary electrical installation inspector • Flammable liquids Storage Inspector • Hazardous substance storage inspector

Annexure B

Client Specific Requirements

Items	Client Specific Requirements
Site Office location	• The location of the site office should be in an area that will not require

	visitors to pass through or enter area where construction work is active and will not require the re-location of the office as the project progresses.
Public Safety	• When working in a occupied facility the contractors risk assessment and subsequent safe work method statement must take into consideration the negative effect the Contractors activities may have on the health and safety of the occupants of the facility and make provisions for the implementation of all reasonably practicable measures to ensure the health and safety of the occupants of the building.
Extreme weather conditions	• If the weather condition poses a threat to the health & safety of employees be it extreme heat, cold, lighting or any adverse weather condition appropriate safety measures have to be taken.
Change to scope of work	• Should there be changes to the original scope of work, the Principal Agent must inform appointed Construction Health and Safety Agent to effect changes to the OHSE Specification.
Safety Plan Submission	• The successful Tenderer must submit a copy of the detailed OHSE Plan for approval and keep the original for onsite use during construction. The principal Contractor will not be allowed to start site establishment before his/her SHE Plan has been approved in writing.
Bylaws	• The Principal Contractor must incorporate any aspects of the Local Municipal bylaws which affect the, Safety and Environmental wellbeing of the employees and the public into his/her OHSE Plan and ensure compliance to such bylaws.
Risk assessment for construction work	• To comply with CR(9) and to also address environmental issues *See the attached baseline risk assessment to be considered by both the designer and the principal contractor.*
Fall protection	• To comply with CR (10), • Edge protection and protection of floor openings need to be of such a manner as to properly protect employees from falling off elevated positions or falling into floor openings
Structures	• To comply with CR (11)
Temporary work	• To comply with CR (12)
Excavations	• To comply with CR(13) and the following; • If the risk exists of a person in an excavation being enclosed in an event of a collapse the following will apply; shoring sufficient to prevent enclosure, any excavated material must be placed at least 1metre from the edge and at the maximum angle of repose to the horizontal. • No excavation may affect the stability of any adjoining structure or road unless steps have been taken as identified by an Engineer or a Technologist. • Adequate provisions must be made to ensure that water is drained from excavations where water may enter such excavations as a result of seepage or rain • All excavations made by the Principal or Sub Contractors must be barricaded by means of solid barricading and barricading tape may only be used to make such barricading more visible

Scaffolding	• To comply with CR(16) and the following; • Scaffolding Inspectors and Scaffolding Erectors must be different individuals. • Scaffold Harness must be used on Scaffolding, normal Harnesses may not be used on scaffolding • Sufficient Scaffolding material e.g., tags, trapdoors etc. need to be on site as determined by the activities on site • Scaffold bases may not be supported by materials such as bricks and chipboard. Suitable material needs to be used as per SANS 10085
Explosive actuated fastening device	• To comply with CR (21)
	•
Construction vehicles and mobile plant	• To comply with CR (23) and the following;
Electrical installations and machinery on construction sites	• To comply with **CR (24)**
Use and temporary storage of flammable liquids on construction sites	• To comply with **CR (25)**
Water environments	• To comply with **CR (26)**
Housekeeping and general safeguarding on construction sites	• To comply with CR (27) and the following; • Contractor to designate areas for placing refuse and rubble prior to being removed from site • Contractor must implement a daily task site clean-up for all activities these should cover work areas, stairways, walkways etc. to free of any construction debris obstruction. • Refuse to be separated for recycling purposes • Hazardous materials such as asbestos may not be included in general rubble and need to be disposed of as per applicable legislative requirements
Stacking and storage on construction sites	• To comply with CR (28)
Fire precautions on construction sites	• To comply with CR (29) and the following; • No smoking may be permitted on site except in designated smoking areas

Construction employees' facilities	• To comply with CR (30) and the following; • Gender signs to be placed at appropriate locations • All welfare facilities to be kept in a hygienic condition at all times • Employees to be trained in good hygiene practices
Public Safety & Signage	• The Principal Contractor engaged in construction work must ensure that each person working on or visiting a site, and the general public in the vicinity of the construction site, shall be made aware of the dangers likely to arise from onsite activities and the precautions to be observed to avoid or minimise those dangers. • Appropriate signage shall be posted at conspicuous points within and around the perimeter of the site. The steps to comply with this requirement must be outlined in the OHSE Plan. • The public or visitors may only be permitted on site if they go through an appropriate health and safety induction detailing hazards and risks they may be exposed to and what measures are in place to control these hazards and risks • The entire project site must be secured against unauthorized access and provided with appropriate warning signage. Where roadways or walkways must be encroached or closed due to work, adequate barriers shall be installed to safely redirect the flow of vehicles and pedestrians and protect them from construction activities. • Whenever it is necessary to maintain public use of work areas (such as sidewalks, ramps, entrances to buildings, corridors, or stairways), the public shall be protected with appropriate guardrails, barricades, temporary fences, overhead protection, or temporary partitions and hoarding. The public must also be adequately protected from any work created hazards, such as excavations. Appropriate warnings, signs, warning lights and instructional safety signs shall be conspicuously posted and placed where necessary. • The public must also be protected from falling debris and objects from the project site. Overhead protection shall be provided that will fully protect the public and be capable of withstanding the maximum forces that could be applied from potential falling objects. Special attention shall also be given to developing adequate means to protect against wind-blown debris and construction-related materials.
On Site Health and Safety Training & Induction	• The Principal Contractor shall ensure that all site personnel and visitors undergo a risk-specific health & safety induction training session before starting work or being permitted to enter the site. A record of attendance shall be kept in the health & safety file. • The Principal Contractor shall ensure that, on site periodic toolbox talks take place at least once per week. These talks should deal with risks relevant to the construction work at hand. A record of attendance shall be kept in the health & safety file. The above should also cover all sub-contractors that are onsite. • All Contractors have to comply with this minimum requirement. Environmental issues to be included in toolbox talks where required.
General Record Keeping	• The Principal Contractor and all Sub Contractors must keep and maintain Health and Safety records to demonstrate compliance with this Specification, The OHS Act 85/1993; and with the Construction Regulations of 2014. The Principal Contractor shall ensure that all

	records of incidents/accidents, training, inspections; audits, etc. are kept in a health & safety file held in the site office, which must be present on site at all times. The Principal Contractor must ensure that every Sub Contractor opens its own health & safety file, maintains the file and makes it available on request.
Health &Safety Audits, Monitoring and reporting	• The Client or its duly appointed Agent shall conduct monthly health & safety audits. The Principal Contractor is obligated to conduct similar audits on all Sub Contractors appointed by them at least once a month. Detailed audit reports must be presented and discussed at all levels of project management meetings and a copy of such audit will be provided to the Client or its duly appointed Agent within 7 working days of such audit. Copies of the Client's audit reports shall be kept in the Principal Contractors Health & Safety File.
Emergency Procedures	• The Principal Contractor shall submit a detailed Emergency Plan for approval by the Client prior to commencement on site. The plan shall detail the response procedure including the following key elements: 1. List of key competent personnel; 2. Details of emergency services; 3. Actions or steps to be taken in the event of the specific types of emergencies; 4. Information on hazardous material/situations.
First Aid Boxes and First Aid Equipment	• The appointed First Aider(s) to be in possession of a valid first aid training certificate Level 2. Valid certificates are to be kept in the Site Safety File. All Sub Contractors with more than 5 employees shall supply their own first aid box, except if otherwise agreed upon between Principal and Sub- Contractor in writing.
Accident / Incident Reporting and Investigation	• Injuries are to be categorised into Near miss, first aid, LTI, fatal etc. Fatal accidents to be reported in addition to applicable legislative requirements to the Client or its duly appointed Agent with immediate effect. The Principal Contractor must stipulate in its construction phase OHSE Plan how it will handle each of these categories. When reporting injuries to the Client, these categories shall be used. The Principal Contractor shall investigate all injuries, with a report being forwarded to the Client immediately. All Sub- Contractors have to report on the abovementioned categories of injuries to the Principal Contractor at least monthly. All categories of incidents/accidents must be in the Statistics Section of the Monthly Audit Reports, submitted to the Client or it's duly appointed Agent.
Hazards and Potential Situations	• The Principal Contractor shall immediately notify other Sub Contractors as well as the Client of any hazardous or potentially hazardous situations that may arise during performance of construction activities. • Should a hazardous situation require work stoppages, the work must be stopped and corrective steps taken such as the issue of Written Safe Work Procedures and the issue of Personal Protective Equipment.
Personal Protective Equipment (PPE) and Clothing	• The Principal Contractor must ensure that all workers are issued with the required PPE as required by the risks associated with the activities they perform .The minimum PPE to be worn on site will be Safety Shoes/Boots, Hard Hats, Overalls. No Visitors may enter the site without Safety Shoes/Boots and Hardhats. The Principal Contractor and all Sub Contractors shall make provision and keep adequate quantities of SABS approved PPE on site at all times. All employees issued with PPE to be trained in correct use, records of training and issue to be kept in the Site

	SHE File .Procedure to be in place to deal with: • 1 Lost or stolen PPE; • 2 Worn out or damaged PPE replacement. • 3. Employees not utilising PPE as required • The above procedure applies to Principal Contractors and their appointed Sub- Contractors, as they are all employers in their own right.
Permits	1) The Principal Contractor shall prepare and issue the required written permits relating to but not limited to the following: • Hot Work • Roof Work; and • Electrical work (both temporary and permanent) • Confined Space Entry 2) The Principal Contractor must ensure that where permits are required that they are properly implemented and adhered to.
Speed Restrictions and Protections	Unless otherwise stipulated, the maximum speed limit on sites must be limited to 10 km/h. 1) Vehicle movement routes on site must be clearly indicated where applicable. 2) Signage to ensure the safe movement of vehicles on site, as well as to ensure the health and safety of all employees and visitors on site, must be displayed in strategic locations.
Hazardous Chemical Substances (HCS)	1) To comply with Hazardous Chemical Substances Regulations as published in Government Notice No. R. 1179 dated 25 August 1995. 2) In addition to the abovementioned, Material Safety Data Sheets must be kept on site for all materials, which may contain hazardous chemical substances
Vessels under Pressure (VUP)	To comply with Pressure Equipment Regulations as published in Government Notice R. 734 dated 15 July 2009.
Fire Extinguishers and Fire Fighting Equipment	1) The Principal Contractor and Sub-Contractors must allow for and provide adequate provision of regularly serviced temporary fire fighting equipment located at strategic points on site, specific for the classes of fire likely to occur. 2) The appropriate notices and signs must be allowed for and be erected as required 3) Contractors may not utilize fire protection equipment belonging to the Client without prior consent
Ladders and Ladder Work	1) The Principal Contractor must allow for and ensure that all ladders are inspected at least monthly, are in a good safe working order, are the correct height for the task, extend at least 1m above the landing, are fastened and secured and are placed at a safe angle. 2) Records of inspections must be kept in a register on site.
General Machinery	To comply with Driven Machinery Regulations as published in Government Notice No. R. 1010 dated 18 July 2003
Portable Electrical Tools and Hand Tools	1) The Principal Contractor shall ensure that all electrical tools, electrical distribution boards, extension leads, and plugs are kept in a safe working order. 2.) The Principal Contractor shall ensure that all portable electrical Equipment, is clearly numbered, inspected by a Competent appointed person and records of such inspections to be kept on record in an appropriate register on the site SHE file

	3) The Principal Contractor shall allow for and ensure the following in relation to hand Tools: That a "Competent Person" undertakes routine inspections and records are kept on site. That only authorized trained persons use the tools. That safe working procedures apply. That PPE is provided and used.
High Voltage Electrical Equipment Installations and Equipment	1) All Employees must be made aware of the presence and location of High Voltage Equipment such as underground cables and overhead lines, and ensure that the necessary precautionary steps are taken where work has to be executed in the vicinity of such equipment. 2) Precautionary measures such as Isolation and Lock-Out of electrical systems or the use of electrically isolated tools must be used.
Adequate Lighting	All Contractors must allow for and ensure that adequate lighting is provided to allow for work to be carried out safely.
Transportation of Workers	1) In addition to CR 23 the following will apply The Principal Contractor and Sub-Contractors shall not: • Transport persons together with goods or tools unless there is an appropriate area or section of the vehicle in which to store such goods. • Transport persons on the back of trucks except if a proper canopy (properly covering the sides and top) has been provided with suitable seating areas. • Permit workers to stand or sit on the edge of the transporting vehicle. • Transport workers in LDVs unless they are closed/covered and have the correct number of seats for the passengers • No driver may transport more than six people on the back of a 1 Ton LDV and more than four passengers on the back of a ½ Ton LDV. 2) The driver of any LDV may not permit more than two passengers to occupy the cab of any LDV. 3) Drivers of such vehicles must have a valid driver's license for the code of vehicle being driven by them. 4) No servicing of vehicles will be permitted on a Construction Site. No Vehicles or machinery leaking oil will be permitted on site due to the risk posed to the environment. 5) Any oil or diesel spilled on site must be cleaned up as per accepted environmental practice In the event that Earth Moving Machinery is present on site the following must be adhered to: • Drivers of vehicles must be instructed to avoid parking behind earth moving machinery in order to ensure that their vehicles are visible to the operators of earth moving machinery. • Right of way must be afforded to earth moving machinery at all times. • Vehicles must only be permitted to park, where possible, in designated areas

Occupational Hygiene	1) Occupational exposure is a major problem and all Contractors must ensure that proper health and hygiene measures are put in place to prevent exposure to these hazards. 2) All Contractors must prevent inhalation, ingestion and absorption of any harmful chemical or biological agents 3) Water to be utilized for drinking purposes may only be drawn from taps designated for drinking water purposes. Fire hydrants and fire hose reels may not be utilized for drinking water purposes.
Desludging	Contractors to provide proof of safe desludging and disposal certificate from a registered sewage disposal site.
Environmental Management	• The Principal Contractor and Sub-Contractors must comply with the requirements of NEMA Act..... • The Principal Contractor must develop a waste management plan, implement and maintained it onsite • Cement mixing to be done at a predetermined location on site which must include a solid, slab, and bunded edges to prevent runoff • Contaminated run off water from the site must be treated such as to ensure that it does not pose a risk to the environment • Any material which may have a harmful effect when disposed of by normal means must be disposed of in an appropriate manner to eliminate its harmful effect on the environment after disposal. • The Principal Contractor must allow for and ensure that adequate procedures are implemented and maintained to ensure that waste generated is placed in suitable receptacles and removed from the site promptly. • Plans to deal with spillages must be in place and maintained. • No waste materials (liquid or solid) may be disposed of in drains. • No burning of waste material may take place on site as such material being burned may result in pollution of the air or give off toxic vapours which could be harmful to the health of employees or any other person present on site.
Alcohol and other Drugs	• No alcohol and other drugs will be allowed on site without the express permission of the Principal Contractor • No person may be under the influence of alcohol or any other drugs while on the construction site. • Any person on the construction site who is on prescription drugs must inform his/her Employer accordingly and the Employer shall in turn report this to the Principal Contractor immediately. • Any person on the construction site who is suffering from any illness/condition that may have a negative effect on his/her safety performance must report this to his/her Employer, who in turn must report this to the Principal Contractor forthwith. • Any person on the construction site who is suspected of being under the influence of alcohol or other drugs must be removed from site immediately and be instructed to report back the next day for a preliminary inquiry. A full disciplinary procedure must be followed by the Contractor concerned and a copy of the disciplinary action must be forwarded to the Principal Contractor for his records.

Annexure C

T2.16 CONTRACTOR'S SAFETY, HEALTH AND ENVIRONMENTAL DECLARATION

Project title:			
Bid no:		**WIMS no:**	

INTRODUCTION

In terms of *Construction Regulation 5(1)(h)* of the *Construction Regulations of February 2014* a Contractor may only be appointed to perform construction work if the Client is satisfied that the Contractor has the necessary competencies and resources to carry out the work safely in accordance with the *Occupational Health and Safety Act, Act 85 of 1993* and the Construction Regulations of February 2014. In line with this requirement the Contractor is required to read through this document carefully, sign it and submit it with his/her Tender.

DECLARATION

1. I the undersigned hereby declare and confirm that I am fully conversant with the Occupational Health and Safety Act, Act 85 of 1993, the Construction Regulations of February 2014 and the Construction Safety, Health and Environmental Specification attached in the tender document.

2. I hereby declare that my company and its employees has the necessary competency and resources to safely carry out the construction work under this contract in compliance with the Occupational Health and Safety Act, Act 85 of 1993,the Construction Regulations of February 2014 and the Construction Safety, Health and Environmental Specification.

3. I hereby confirm that adequate provisions has been made in my tender to cover the cost of all Safety, Health and Environmental duties and responsibilities imposed on me by the Occupational Health and Safety Act, Act 85 of 1993, the Construction Regulations of February 2014 and the Construction Safety, Health and Environmental Specification.

4. I confirm that I may not commence with any part of construction work under the contract until my Construction Safety, Health and Environmental Plan has been approved in writing by the Client.

5. I hereby confirm that copies of the following documentation will be kept on site for viewing and inspection purposes for the duration of the construction work:

    a) Client's Construction Safety, Health and Environmental Specification
    b) Approved Construction Safety, Health and Environmental Plan
    c) Occupational Health and Safety Act, Act 85 of 1993, and

d) Construction Regulations of February 2014.

6. I agree that my failure to complete and execute this declaration to the satisfaction of the Client will mean that I am unable to comply with the requirements of the Occupational Health and Safety Act, Act 85 of 1993 and Construction Regulations 2014, and accept that my tender will be rejected.

Duly Signed at.....on this the.....day of.....201.....

Full Name of Signatory	Name of Enterprise

Annexure D
Baseline Risk Assessment

Main Activity	Sub Activity	Safety	Health	Environmental	Public Safety	Control Measures	Responsible Person
Site Establishment	Off-loading materials and equipment	Struck by falling objects , caught between surface, unsafe lifting position , sharp edges	Cuts, abrasions , brusing ,backstrain , death	None	None if work area access properly controlled	Supervision, safe systems of work , signage and barricading, training etc.	**Contractor**
	Fencing/ Hoarding the site	Struck by tools, sharp objects,tripping, Hidden services ,	cuts, abrasion, heat exhaustion	None	Tripping, cuts	Use of gloves and safe systems of work and supervision.	Contractor
	Placing equipment and site office on site	Struck by tools, tripping, carrying heavy objects, struck by moving vehicles	Back strain, cuts, abrasion, heat exhaustion, fractures, death	Contamination of natural resources due to leaking fuel and oil	Tripping hazard , Noise, struck by moving vehicles,	Training and safe systems of work and supervision.PPE	Contractor

Main Activity	Sub Activity	Safety	Health	Environmental	Public Safety	Control Measures	Responsible Person
Demolition of existing facilities	Removal of roof sheets	Struck by tools, heat exhaustion, cuts and abrasions, falls	Cuts and abrasions, heat stroke	Land pollution	none	Training , use of PPE, proper supervision	**contractor**
	Removal of roof trusses	Struck by tools, heat exhaustion, cuts and abrasions, falls	Cuts and abrasions, heat stroke	Land pollution	none	Training , use of PPE, proper supervision	**contractor**
	Demolition of walls	Struck by tools, heat exhaustion, cuts and abrasions, falls, exposure to dust	Cuts and abrasions, heat stroke	Land pollution dust	Exposure to dust	Training , use of PPE, proper supervision	**Contractor**
	Removal of waste	Back injuries, dust exposure	Sprains and cuts, respiratory problems due to dust	Air pollution	Dust inhalation	Supervision, PPEs and training	**contractor**

Main Activity	Sub Activity	Safety	Health	Environmental	Public Safety	Control Measures	Responsible Person
Excavations for underground sewer connection	Setting out for excavations	Tripping, struck by, bumping against,	Back strain, dust inhalation, cuts and abrasions	none	none	Training, PPE, Barricading, safe systems of work and supervision.	Contractor
	Digging of Excavations manually	Struck by tools , tripping, Falling into excavations, Hidden services	Back strain, heat exhaustion, bruising,, cuts, abrasions, death	Spilling of oil, diesel, petrol	Noise, dust, collisions, death	Training, PPE, Barricading, safe systems of work and supervision.	Contractor
	Digging of Excavations by machines	Machinery colliding with people and vehicles, machine coming into contact with hidden services. Heated surfaces	Fractures, death ,	Contamination of environmental resources due to leaking of fuel, diesel and oil	Dust, noise, death, severe cuts and abrasions	Flag man, traffic control, reverse hooters reflective vest, proper barricading, signage and safe systems of work and supervision.	Contractor

Main Activity	Sub Activity	Safety	Health	Environmental	Public Safety	Control Measures	Responsible Person
Brick work	Cement mixing	Striking against area, sharp edge, hazardous substance	Cuts &abrasions, inhalation of duct, contact dermatitis	Cement spillage	None	Training, PPE, safe systems of work and supervision	Contractor
	Brick work and Plastering	Rough surfaces, hazardous substances, flying particles, falling objects	Cuts, abrasions, burns, fractures, death	None	None	Training, PPE, safe systems of work and supervision	Contractor
	Scaffolding Erection	Struck by, tools, bumping against, falls	Cuts, abrasions, fractures, death	none	none	Training, PPE, safe systems of work and supervision	Contractor
Installation of Roof Trusses and Roof Covering	Installation of roof Trusses	Falls, Struck by, hands caught between,	Back strain, cuts, abrasions, Heat exhaustion, noise, fractures and death/	None	None	Training, PPE, safe systems of work and supervision	Contractor
	Fitting of battens or purlins	Falls, Struck by, hands caught between,	Back strain, cuts, abrasions, Heat exhaustion, noise, fractures and death	None	None	Training, PPE, safe systems of work and supervision	Contractor
	Fitting of roof sheets	Falls, struck by, bumping against objects, sharp edges	Back strain, cuts, abrasions, Heat exhaustion, noise, fractures and death etc.	none	Sheets being fitted falling on public	Training, PPE, safe systems of work and supervision	Contractor

Main Activity	Sub Activity	Safety	Health	Environmental	Public Safety	Control Measures	Responsible Person
Fitting Doors/windows	Fitting doors/windows into frames /openings	Struck by items, hands caught between areas, falling items, sharp edges, noise, dust	Cuts, abrasions, fractures, death	none	None	Training, PPE, safe systems of work and supervision	Contractor
	Fitting glass panes	Struck by items, hands caught between areas,, falling items, sharp edges	Cuts, abrasions, fractures, severe injuries, death	None	None	Training, PPE, safe systems of work and supervision	Contractor
Fitting Gutters and Down Pipes	Securing Hangers	Struck by falling tools and equipment, Falling from heights, cuts and abrasions' electrocution	Back strain, fractures, cuts, electrocution , death	none	None	Training, PPE, safe systems of work and supervision	**Contractor**
	Placement of gutters	Struck by falling tools and equipment, Falling from heights, cuts and abrasions, electrocution	Back strain, fractures, cuts, electrocution , death	none	None	Training, PPE, safe systems of work and supervision	**Contractor**
	Fitting down pipes and brackets	Struck by falling tools and equipment, Falling from heights, cuts and abrasions	Back strain, fractures, cuts, electrocution , death	none	None	Training, PPE, safe systems of work and supervision	**Contractor**

Main Activity	Sub Activity	Safety	Health	Environmental	Public Safety	Control Measures	Responsible Person
Plumbing	Chasing	Electricity, moving part, entanglement, struck by flying items, sparks, noise , dust	Electrocution, cuts abrasions, dust inhalation, noise induced hearing loss	None	None	Training, PPE, safe systems of work and supervision	Contractor
	Chiselling	Struck by tools, hands caught between areas, Flying particles	cuts, abrasions, dust inhalation, fractures	None	None	Training, PPE, safe systems of work and supervision	Contractor
	Excavations	Struck by tools , tripping, Falling into excavations,	Back strain, heat exhaustion, bruising,, cuts, abrasions, death	None	None	Training, PPE, Barricading, safe systems of work and supervision.	Contractor
	Compaction	Noise , dust ,Flammable substances ,struck by, vibration	Muscular strain, dust inhalation , noise induced hearing loss	None	None	Training, PPE, safe systems of work and supervision	Contractor
	Fitting of fixtures	Noise , dust, sharp edges, bumping against ,	Muscular strain, dust inhalation , noise induced hearing loss	None	None	Training, PPE, safe systems of work and supervision	Contractor
	Soldering of pipes	Hazardous substances , heated surfaces, flammable substances, Sharp edges	Inhalation of hazardous vapour ,burns, noise induced hearing loss	None	None	Training, PPE, safe systems of work and supervision	Contractor

Main Activity	Sub Activity	Safety	Health	Environmental	Public Safety	Control Measures	Responsible Person
Installation of walkways	Levelling of the ground	Struck by tools, cuts and abrasions, heat exhaustion	Heat stroke, cuts and lacerations	none	none	Training, PPE usage and proper supervision of employees	contractor
	Concrete mixing	Inhalation of dust, struck by tools	Cuts and lacerations, abrasions, heat stroke, dust inhalation	None	none	Training, PPE usage and proper supervision of employees	
	Concrete pouring	Back injuries, struck by tools, heat exhaustion	Sprains, cuts, heat stroke	none	none	Training, PPE usage and proper supervision of employees	

Main Activity	Sub Activity	Safety	Health	Environmental	Public Safety	Control Measures	Responsible Person
Installation of Jojo tanks	Levelling of the ground	Struck by tools, cuts and abrasions, heat exhaustion	Heat stroke, cuts and lacerations	none	none	Training, PPE usage and proper supervision of employees	contractor
	Concrete mixing	Inhalation of dust, struck by tools	Cuts and lacerations, abrasions, heat stroke, dust inhalation	None	none	Training, PPE usage and proper supervision of employees	
	Concrete pouring	Back injuries, struck by tools, heat exhaustion	Sprains, cuts, heat stroke	none	none	Training, PPE usage and proper supervision of employees	
	Installation of tanks	Back injuries, struck by tools, heat exhaustion	Sprains and cuts	none	none	Training, PPE usage and proper supervision of employees	
	Fitting of fixtures	Struck by tool	Cuts and lacerations	none	none	Training, PPE usage and proper supervision of employees	

Main Activity	Sub Activity	Safety	Health	Environmental	Public Safety	Control Measures	Responsible Person
Installation of a borehole	Excavations	Buried by falling soil, struck by tools,	Sprains , cuts and lacerations	Water pollution	none	**Training, PPE usage and proper supervision of employees**	contractor
	Concrete mixing	Inhalation of dust, struck by tools	Cuts and lacerations, abrasions, heat stroke, dust inhalation	None	none	**Training, PPE usage and proper supervision of employees**	
	Concrete pouring	Back injuries, struck by tools, heat exhaustion	Sprains, cuts, heat stroke	none	none	**Training, PPE usage and proper supervision of employees**	
	Fitting of fixtures	Struck by tool	Cuts and lacerations	none	none	**Training, PPE usage and proper supervision of employees**	

Prepared by: _____

Signature: _____

Date: _____

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

ANNEXURE 7

HEALTH AND SAFETY BILL OF QUANTITIES

HEALTH AND SAFETY IMPLEMENTATION COSTING

Contractor to give a breakdown of his Health and Safety costs on this sheet.

ITEM	DESCRIPTION	UNIT	QUAN-TITY	MONTHS (Indicative)	RATE	AMOUNT
			(a)		(b)	(a) x (b)
1	**MEDICALS**					
1.1	Pre-employment medical	Nr.	-			
1.2	Re-medicals - yearly	Nr.	-			
	TOTAL					
2	**PERSONAL PROTECTIVE EQUIPMENT**					
2.1	Overalls	Nr.				
2.2	Hard Hats	Nr.				
2.3	Safety boots/shoes	Nr.				
2.4	Gloves	Nr.				
2.5	Gumboots steel toe cap	Nr.				
2.6	Safety glasses	Nr.				
2.7	Reflector Bibs	Nr.				
2.8	Barricading Material	M				
2.9	Dust masks	Box 20				
	TOTAL					
3	**FIRE FIGHTING**					
3.1	Fire extinguishers - 4.5Kg	Nr.				
3.2	Surveys - Annual Service	Nr.				
	TOTAL					
4	**HEALTH AND SAFETY PERSONNEL**					
4.1	Safety Manager	Nr.				
4.2	Safety Officer	Nr.				
4.3	Construction Phase Safety, Health, Environmental and Waste Management Plan	Nr.				
	TOTAL					
5	**FACILITIES**					
5.1	Provision of ablution facilities	Nr.				
5.2	Service and maintenance of ablution facilities	Nr.				
5.3	Provision of eating areas	Nr.				
5.4	Cleaning of Lay down and other storage areas	Nr.				
5.5	Wash hand basin	Nr.				
5.6	Hot and Cold running water	Nr.				
5.7	Degreasing & Toilet soap	Nr.				
	TOTAL					
6	**FALL PREVENTION / PROTECTION**					
6.1	Safety harnesses with double lanyards	Nr.				
6.2	Safety harnesses with Scaffold hooks	Nr.				
6.3	Lifelines and vertical fall arrest systems	Nr.				
6.4	Scaffolding – material, erection and inspection (Estimate for project)	Nr.				
6.5	Temporary hand railing material and kick flats	Nr.				
6.6	Chin Straps	Nr.				
	TOTAL					

7	**FIRST AID**					
7.1	Replenishment of boxes and other supplies	Nr				
	TOTAL					
8	**TRAINING**					
8.1	SHE Representative	Nr.				
8.2	First Aid Level 1	Nr.				
8.3	Fire Fighting	Nr.				
	TOTAL					
9	**SIGNAGE**					
9.1	All Signage as required by Law, regulatory, warning and information	Nr.				
9.2	Posters for awareness	Nr.				
	TOTAL					
10	**ELECTRICAL**					
10.1	Replacement of Locks required for lockouts	Nr.				
10.2	Replacement of tags	Nr.				
10.3	Replacement for Permit books	Nr.				
10.4	Replacement of Calipers	Nr.				
	TOTAL					
11	**OTHERS (Project Specific)**					
11.1		Nr.				
	TOTAL					
GRAND TOTAL TO BE CARRIED TO THE PRELIMINARIES AND GENERAL IN BILL OF QUANTITIES						

KWAZULU-NATAL PROVINCE
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ANNEXURE 8

GEOTECHNICAL INVESTIGATION REPORT - (IF APPLICABLE)

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

ANNEXURE 9

EPWP EMPLOYMENT CONTRACT AND EPWP SPECIFICATION/CHECKLIST

(Insert Your Company Logo)

(This shall serve as the cover page on employment contracts for local labour)

EMPLOYMENT AGREEMENT

BETWEEN

[CONTRACTOR NAME].....

AND

[WORKER NAME].....

1. PARTIES

The Parties to this Agreement are -

1.1. Contractor: _____

herein represented by: _____

duly authorised thereto

And

1.2. Mr / Me: _____
[worker's name]

2. DEFINITIONS AND INTERPRETATION

2.1. In this Agreement and any Annexure thereto, unless inconsistent with or otherwise indicated by the context-

"Agreement"	means the contents of this Agreement.
"Company"	means the company that employs the worker
"Department"	means the Department of Public Works
"Worker"	is a person that performs a specific or necessary task or who completes tasks in a certain way
"EPWP"	The Expanded Public Works Programme is a government programme aimed at the alleviation of poverty and unemployment. The programme ensures the full engagement on Labour Intensive Methods of Construction (LIC) to contractors for skills development. The EPWP focuses at reducing unemployment by increasing economic growth by means of improving skills levels through education and training and improving the enabling environment for the industry to flourish.

3. PURPOSE

The purpose of this agreement is to:-

Ensure that the agreement is binding to both the Worker and the Employer.

4. TERMS AND CONDITIONS

- The worker will have no entitlement to the benefits of a full time employee, namely;

  _____

  _____

- The worker should not have the expectation that this contract will be renewed or extended.
- The worker will be subject to all laws, rules, policies, codes and procedures applicable to the;

  _____

- The worker must meet the standards and requirements of the contractor
- The worker must render his/her services during normal working hours of minimum of forty to fifty five hours in any week; which comprise of an eight-hour working day in a five-day week.

5. REMUNERATION

The worker will receive compensation to the amount of R_____00 which must be paid by the 25th or on the last day of each month.

6. ROLES AND RESPONSIBILITIES

6.1 Employer / Worker

- Work for _____ in terms of the period as specified in the employment agreement contract.
- Be available for and participate in all learning and work experience required by the company.
- Comply with workplace policies and procedures.
- Complete any attendance or any written assessment tools supplied by the contractor to record relevant workplace experience.
- Demonstrate willingness to grow and learn through work experience.

  Provide the following documentation to the employer,

  - Certified identity document not longer than 3 months
  - ID size photos
  - Sign employment contract

6.2 Employer

- Employ the worker for a period specified in the agreement.
- Provide the worker with appropriate work based experience in the work environment.
- Facilitate payments of wages / stipends.
- Keep accurate records of workers.
- Where a worker/ learner is disabled, the employer will have to provide in the additional needs e.g. special materials, learning aids and in some cases physical or professional support (such aids remain the property of the employer).
- Keep up to date records of learning and discuss progress with the intern on a regular basis.
- Apply fair disciplinary, grievance and dispute resolution procedures to the worker.
- Prepare an orientation/ induction course to introduce worker/ learner to the workplace and specific workplace requirements.
- Ensure the daily attendance register is signed by the worker.

7. DURATION.

This agreement commences on: _____

and

expires on: _____

8. BREACH.

If either party commits any breach of the terms of this contract (and fails to rectify it within 30 days of receipt of a written notice calling it to do so, then) the other party shall be entitled to terminate the contract or to claim specific performance without prejudice to any of its other legal rights, including its rights to claim damages.

9. CONDITIONS OF EMPLOYMENT

9.1. Meal Breaks

9.1.1 A worker may not work for more than five hours without taking a meal break of at least thirty minutes duration.

9.1.2 An employer and worker may agree on longer meal breaks.

9.1.3 A worker may not work during a meal break. However, an employer may require a worker to perform duties during a meal break if those duties cannot be left unattended and cannot be performed by another worker. An employer must take reasonable steps to ensure that a worker is relieved of his or her duties during the meal break.

9.1.4 A worker is not entitled to payment for the period of a meal break. However, a worker who is paid on the basis of time worked must be paid if the worker is required to work or to be available for work during the meal break.

9.2. Special Conditions for Security Guards (Only applicable to security Guards)

9.2.1 A security guard may work up to 55 hours per week and up to eleven hours per day.

9.2.2 A security guard who works more than ten hours per day must have a meal break of at least one hour or two breaks of at least 30 minutes each.

9.3. Weekly Rest Period

Every worker must have two days off every week. A worker may only work on their day off to perform work which must be done without delay and cannot be performed by workers during their ordinary hours of work ("emergency work").

9.4. Work on Sundays and Public Holidays

9.4.1 A worker may only work on a Sunday or public holiday to perform emergency or security work.

9.4.2 Work on Sundays is paid at the ordinary rate of pay.

9.4.3 A task-rated worker who works on a public holiday must be paid;

(a) the worker's daily task rate, if the worker works for less than four hours;

(b) double the worker's daily task rate, if the worker works for more than four hours.

9.4.4 A time-rated worker who works on a public holiday must be paid

(a) the worker's daily rate of pay, if the worker works for less than four hours on the public holiday;

(b) double the worker's daily rate of pay, if the worker works for more than four hours on the public holiday.

9.5 Sick leave

9.5.1 Only workers who work more than 24 hours per month have the right to claim sick-pay in terms of this clause.

9.5.2 A worker who is unable to work on account of illness or injury is entitled to claim one day's paid sick leave for every full month that the worker has worked in terms of a contract.

9.5.3 A worker may accumulate a maximum of twelve days' sick leave in a year.

9.5.4 Accumulated sick-leave may not be transferred from one contract to another contract.

9.5.5 An employer must pay a task-rated worker the worker's daily task rate for a day's sick leave.

9.5.6 An employer must pay a time-rated worker the worker's daily rate of pay for a day's sick leave.

9.5.7 An employer must pay a worker sick pay on the worker's usual payday.

9.5.8 Before paying sick-pay, an employer may require a worker to produce a certificate stating that the worker was unable to work on account of sickness or injury if the worker is

(a) absent from work for more than two consecutive days; or

(b) absent from work on more than two occasions in any eight-week period.

9.5.9 A medical certificate must be issued and signed by a medical practitioner, a qualified nurse or a clinic staff member authorised to issue medical certificates indicating the duration and reason for incapacity.

9.5.10 A worker is not entitled to paid sick-leave for a work-related injury or occupational disease for which the worker can claim compensation under the Compensation for Occupational Injuries and Diseases Act.

9.6. Maternity Leave

9.6.1 A worker may take up to four consecutive months' unpaid maternity leave.

9.6.2 A worker is not entitled to any payment or employment-related benefits during maternity leave.

9.6.3 A worker must give her employer reasonable notice of when she will start maternity leave and when she will return to work.

9.6.4 A worker is not required to take the full period of maternity leave. However, a worker may not work for four weeks before the expected date of birth of her child or for six weeks after the birth of her child, unless a medical practitioner, midwife or qualified nurse certifies that she is fit to do so.

9.6.5 A worker may begin maternity leave as follows;

(a) four weeks before the expected date of birth; or

(b) on an earlier date

(i) if a medical practitioner, midwife or certified nurse certifies that it is necessary for the health of the worker or that of her unborn child; or

(ii) if agreed to between employer and worker; or

(c) on a later date, if a medical practitioner, midwife or certified nurse has certified that the worker is able to continue to work without endangering her health.

10.6 A worker who has a miscarriage during the third trimester of pregnancy or bears a stillborn child may take maternity leave for up to six weeks after the miscarriage or stillbirth.

9.7. Family responsibility leave

9.7.1 Workers, who work for at least four days per week, are entitled to three days paid family responsibility leave each year in the following circumstances;

(a) when the employee's child is born;

(b) when the employee's child is sick;

(c) in the event of a death of

(i) the employee's spouse or life partner;

(ii) the employee's parent, adoptive parent, grandparent, child, adopted child, grandchild or sibling.

9.8. Keeping Records

9.8.1 Every employer must keep a written record on site for the duration of the project and three (3) year after completion records should consists of at least the following;

(a) the worker's name and position;

(b) copy of an acceptable worker identification

(c) in the case of a task-rated worker the number of tasks completed by the worker;

(d) in the case of a time-rated worker, the time worked by the worker;

(e) payments made to each worker in a form of Proof of Payment, Payroll registers and the acknowledgement of payment receipt signed by the worker.

9.8.2 The employer must keep this record for a period of at least three years after the completion of the EPWP.

9.9. Payment

9.9.1 An employer must pay all wages at least monthly in cash or by cheque or into a bank account.

9.9.2 A worker may not be paid less than the Ministerial Determination wage rate.

9.9.3 A task-rated worker will only be paid for tasks that have been completed.

9.9.4 An employer must pay a task-rated worker within five weeks of the work being completed and the work having been approved by the manager or the contractor having submitted an invoice to the employer.

9.9.5 A time-rated worker will be paid at the end of each month.

9.9.6 Payment must be made in cash, by cheque or by direct deposit into a bank account designated by the worker.

9.9.7 Payment in cash or by cheque must take place

(a) at the workplace or at a place agreed to by the worker;

(b) during the worker's working hours or within fifteen minutes of the start or finish of work;

(c) in a sealed envelope which becomes the property of the worker.

9.9.8 An employer must give a worker the following information in writing

(a) the period for which payment is made;

(b) the numbers of tasks completed or hours worked;

(c) the worker's earnings;

(d) any money deducted from the payment;

(e) the actual amount paid to the worker.

9.9.9 If the worker is paid in cash or by cheque, this information must be recorded on the envelope and the worker must acknowledge receipt of payment by signing for it.

9.9.10 If a worker's employment is terminated, the employer must pay all monies owing to that worker within one month of the termination of employment.

9.10. Inclement weather

If no work has begun on site, and if an employee has reported for work, the employee will be paid for four hours. Should work be stopped after the first four hours, the employee will be paid for the hours worked. Where the employer has given employees notice on the previous working day that no work will be available due to inclement weather, then no payment will be made.

9.11. Deductions

9.11.1 An employer may not deduct money from a worker's payment unless the deduction is required in terms of a law.

9.11.2 An employer must deduct and pay to the SA Revenue Services any income tax that the worker is required to pay.

9.11.3 An employer who deducts money from a worker's pay for payment to another person must pay the money to that person within the time period and other requirements specified in the agreement of Law; court order or arbitration

9.11.4 It is the responsibility of the employers to arrange for all persons employed on a Project to be covered in terms of the Unemployment Insurance Fund Contributions Act, 2002 (Act No. 4 of 2002)

9.11.5 An employer may not require or allow a worker to

(a) repay any payment except an overpayment previously made by the employer by mistake;

(b) state that the worker received a greater amount of money than the employer actually paid to the worker; or

(c) pay the employer or any other person for having been employed.

9.12. Health and Safety

9.12.1 Employers must take all reasonable steps to ensure that the working environment is healthy and safe.

9.12.2 A worker must;

(a) work in a way that does not endanger his/her health and safety or that of any other person;

(b) obey any health and safety instruction;

(c) use any personal protective equipment or clothing issued by the employer;

(d) report any accident, near-miss incident or dangerous behaviour by another person to their employer or manager.

9.13. Compensation for Injuries and Diseases

9.13.1 It is the responsibility of the employers to arrange for all persons employed on a Project to be covered in terms of the Compensation for Occupational Injuries and Diseases Act, 130 of 1993 as amended by COIDA Act 61, 1997.

9.13.2 A worker must report any work-related injury or occupational disease to their employer or manager.

9.13.3 The employer must report the accident or disease to the Compensation Commissioner.

9.13.4 An employer must pay a worker who is unable to work because of an injury caused by an accident at work 75% of their earnings for up to three months. The employer will be refunded this amount by the Compensation Commissioner. This does NOT apply to injuries caused by accidents outside the workplace such as road accidents or accidents at home.

9.14. Termination

9.14.1 The employer may terminate the employment of a worker for good cause after following a fair procedure.

9.14.2 A worker will not receive severance pay on termination.

9.14.3 A worker is not required to give notice to terminate employment. However, a worker who wishes to resign should advise the employer in advance to allow the employer to find a replacement.

9.14.4 A worker **who is absent for more than three consecutive days** without informing the employer of an intention to return to work will have terminated the contract. However, the worker may be re-engaged if a position becomes available.

9.14.5 A worker who does not attend required training events, without good reason, will have terminated the contract. However, the worker may be re-engaged if a position becomes available.

Notice procedure is as follows;

- One week if employed for four weeks or less
- Two weeks if employed for more than four weeks but not more than a year
- Four weeks of employed for one (1) year or more

9.15. Certificate of Service

9.15.1 On termination of employment, a worker is entitled to a certificate stating;

(a) the worker's full name;
(b) the name and address of the employer;
(c) the Project on which the worker worked; the work performed by the worker;
(d) any training received by the worker;
(e) the period for which the worker worked on the Project; and
(f) any other information agreed on by the employer and worker.

9.16. DOMICILE

The address to which notices and all legal documents may be delivered or served are as follows:

Employee Details

Name & Surname: _____

ID No: _____

Residential Address: _____

_____

Contact No: _____

Date of Employment: _____

To be supervised by: **Main Contractor:** ☐
or Sub Contractor: ☐

Category of employment: **Skilled:** ☐
Semi-skilled: ☐
Unskilled: ☐

For Skilled & Semi-skilled state the trade: _____

Period of employment: Fixed for until when your services are still required on site

I confirm that I have been inducted and fully understand the condition of my appointment

Employee Signature: _____ **Witness by SGB/CLO:** _____

Signature by Witness: _____

Employer Details

Name & Surname: _____
Designation: _____
Contact No: _____ **Signature:** _____

Project Employment Data Management and Reporting Requirements – to be included in the tender documents for the Department of Public Works

NB: All information, documents and files stated herein must be available for Auditor

No.	Information / Document	Comments
1	**Monthly Reports**	
1.1	Monthly reports to be submitted in the specified **Employment Data Collection Form** • This is a monthly schedule where monthly attendance, training and other aspects of participants (labourers) is summarised. The Employment Data Collection Form must provide credible data that corresponds with the Payroll Register and Proof of payment.	
1.2	**Payroll Register** • Which is a list of each participant (labourer) who was paid for each month and which would include the amount of the wage paid.	
1.3	**Proof of payment** • Which is a download from the payment system or a bank statement reflecting all participants paid and the amounts paid	
1.4	**Payment Register/Pay sheet signed by workers** • Where proof of payment is not available, a payment register must be submitted. This is a schedule where participants sign as an acknowledgement of receipt of wages for the number of days worked at a stipulated daily rate. .	
1.5	**ID size photos** • Every participant must have an ID size photo taken within the first month of employment and photo to be supplied to the Department.	

No.	Information / Document	Comments
2	**Records to be filed and updated monthly on site**	
2.1	Identity Document (ID) copies • Every new (at the beginning of employment) participant to provide a certified South African ID copy that is not older than 3 months	
2.2	Daily attendance register showing full name and gender (To correspond with Proof of payment and payroll register and monthly report in the Data Collection Form)	
2.3	Employment Contracts indicating date signed by both the employer and the employee and witnesses if applicable	
2.4	Payslips for all payments made to participants indicating the number of days worked	
2.5	Document where beneficiaries completed / provided their bank account details	
2.6	Completed Beneficiary/participants list-simplified form	
2.7	Project coordinates	
2.8	Project progress report	
3	**Training**	
3.1	Training attendance registers for ALL training attended by participants Number of training days and Training should be reported as follows; 1. Number of people trained 2. Number of people that received accredited training 3. Number of people that received non-accredited training 4. Profile of the participants (Women, Disabled, Youth)	As and when training is provided

No.	Information / Document	Comments
	5. Percentage of participants who worked on the project after receiving training.	
4	**UIF**	
4.1	Evidence to confirm that UIF for participants has been paid for the employment duration	
5	**COIDA**	
	Evidence that the participants of the project are included in the Employers monthly provisions for COIDA. • Evidence that the Employer paid the relevant contributions as required by the Compensation Commissioner.	

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

ANNEXURE 10

ATTENDANCE REGISTER - INFRASTRUCTURE & OTHER PROJECTS

KWAZULU-NATAL DEPARTMENT OF PUBLIC WORKS

EXPANDED PUBLIC WORKS PROGRAMME

The Attendance Register for on-site Workers

Reporting month: _____ Cell No: _____

Surname: _____ First Name: _____

Project Name: **DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER**

Project Code: **060602** Tender No **ZNTU04134W**

IDENTITY NUMBER:

Day	Date	Time In	Signature	Time Out	Signature	Report On Any Formal Training Provided In The Reporting Month
WEEK 1						
MONDAY						
TUESDAY						
WEDNESDAY						
THURSDAY						
FRIDAY						
WEEK 2						
MONDAY						
TUESDAY						
WEDNESDAY						
THURSDAY						
FRIDAY						
WEEK 3						
MONDAY						
TUESDAY						
WEDNESDAY						
THURSDAY						
FRIDAY						
WEEK 4						
MONDAY						
TUESDAY						
WEDNESDAY						
THURSDAY						
FRIDAY						
WEEK 5						
MONDAY						
TUESDAY						
WEDNESDAY						
THURSDAY						
FRIDAY						
Total Days worked						

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

ANNEXURE 11

EPWP DATA COLLECTION TOOL

BUSINESS PLAN

Reference No	
Profile ID	
Project Name	
Project Details	
Project Name	
Project Reference Number	
Project description	
Project Start Date	
Project End Date	
Estimated Budget	
Project Location	
Province	
District/Metro Municipality	
Local Municipality/Metro Region	
Latitude (in decimal format)	
Longitude (in decimal format)	
Public Body Details	
Public body sphere	
Reporting public body that is the project owner (and will report on the project)	
Implementing public body type	
Public body that will implement the project	
IDP reference number allocated to the project	
EPWP Details	
EPWP Sector	
EPWP Program	
EPWP Sub programme	
Budget Amount	
April 2014/March 2015	
April 2015/March 2016	
Total Budget Amount	
Wages	

UIF	
COIDA	
Training	
Administration	
Equipment and materials	
Other	
Describe other	
Outputs and Training	
Output	
Despription	
Target Quantity	
Number of persons to be trained	
Contact person	
Title	
Initials	
First Name	
Surname	
Email	
Tel (Office)	
Fax Number	
Cell Number	
Physical Address 1	
Physical Address 2	
Physical Address 3	
Physical Address 4	
Postal Address 1	
Postal Address 2	
Postal Address 3	
Postal Address 4	

KZN PUBLIC WORKS
Monthly Data collection for LOCAL Labour

KWAZULU-NATAL PROVINCE
PUBLIC WORKS

EXPANDED PUBLIC WORKS PROGRAMME

Name of Contractor: _____ Project Code: **060602** Project location name (area):_____

Name of Project: **DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER**

Reporting month:_____ Project location (Ward No.):_____

Beneficiary Details																Experience/Literacy				Location Details				Household Details		
No	First Name	Initial	Surname	ID number	D.O.B	Gender F/M	Disability Y/N	Start Date on the current month	End Date on the current month	Total days worked	Job description	Registered on UIF (Y/N)	Registered with COIDA (Y/N)	Are you receiving any Gov grant? (Y/N)	1st Language	Other Language 1	Other Language 2	Education Level (See Codes below)	Highest Level of Education	Address	Ward No.	Cell No.	Nationality	No. of people in Household	No. of Dependants in Household	No. of Children attending school
1																										
2																										
3																										
4																										
5																										
6																										
7																										
8																										
9																										
10																										

- Education Levels – use the codes (1,2,3) on the excel spreadsheet
  - (1) Unknown
  - (2) No Schooling
  - (3) Grade 1-3 (Sub A – Std 1)
  - (4) Grade 4 (Std 2) ABET 1
  - (5) Grade 5-6 (Std 3-4) ABET 2
  - (6) Grade 7-8 (Std 5-6) ABET 3
  - (7) Grade 9 (Std 7) ABET 4
  - (8) Grade 10-11 (Std 8-9)
  - (9) Grade 12 (Std 10)
  - (10) Post Matric

Contractor sign:_____ DPW Official/Consultant sign:_____ EPWP Official sign:_____

Designation:_____ Designation:_____ Designation:_____

Date:_____ Date:_____ Date:_____

Contact no:_____ Contact no:_____ Contact no:_____

KZN PUBLIC WORKS

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

EXPANDED PUBLIC WORKS PROGRAMME

Worker payment capture form for LOCAL Labour

Name of Contractor: _____ Project Code: **060602**

Name of Project: **DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER**

_____ Reporting month: _____

Payment Upload

No.	First Name	Initials	Surname	Identity No.	D.O.B	Job Description	Daily Wage Rate	Total Paid Days	Total Amount Paid	Total days Worked Days
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

Contractor sign:_____
Designation:_____
Date:_____
Contact no:_____

DPW Official/Consultant sign:_____
Designation:_____
Date:_____
Contact no:_____

EPWP Official sign:_____
Designation:_____
Date:_____
Contact no:_____

KZN PUBLIC WORKS
Worker Training capture form for LOCAL Labour

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

EXPANDED PUBLIC WORKS PROGRAMME

Name of Contractor: _____

Project Code: 060602

Name of Project:

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

Reporting month: _____

Training

No	Name	Surname	ID No.	Job description	Course Name	Was training Accredited or Non - accredited by a relevant SETA	Start date on current month	End date on current month	Training Days Paid	Training Days Not Paid	Total Number of Training Days	Cost per trainee	Is training complete or on - going	Name of Training Provider
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														

Contractor sign: _____

Designation: _____

Date: _____

Contact no: _____

DPW Official/Consultant sign: _____

Designation: _____

Date: _____

Contact no: _____

EPWP Official sign: _____

Designation: _____

Date: _____

Contact no: _____

Location	
Locality Name	
Municipality	
Subplace	
Ward	
Government Facility	
Latitude	
Longitude	
Physical Address/Location	

KWAZULU-NATAL PROVINCE
PUBLIC WORKS
REPUBLIC OF SOUTH AFRICA

DPW: DEPARTMENT OF EDUCATION: WATER AND SANITATION PROGRAMME: PHASE 3A: NORTH COAST REGION: MTHAMBALALA SS - OPEN TENDER

ANNEXURE 12

STRUCTURAL ENGINEERS PROJECT SPECIFICATION BOOKLET

LDM
Solutions For The Built Environment

MAP AFRICA
CONSULTING ENGINEERS

WIMS NO. 064539
DEPARTMENT OF EDUCATION
WATER & SANITATION
PROGRAMME

TYPICAL DETAILS AND SPECIFICATIONS BOOKLET

SEPTEMBER 2018

PRELIMINARY

Prepared For :

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SECTION 1
GENERAL SPECIFICATIONS

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REPAIRS TO EXISTING ROOF SHEETING

1. PREPARE AND CLEAN EXISTING SURFACE WHERE THE ROOF APPEARS TO BE LEAKING.
2. APPLY A GENEROUS COAT OF SIKA RAIN TITE BY BRUSH OR ROLLER.
3. EMBED THE SIKA RAIN TITE MEMBRANE INTO THE BASE COAT WHILE IT IS STILL WET.
4. REMOVE AND SMOOTH OUT AIR POCKETS AND CREASES.
5. APPLY A SECOND COAT OF SIKA RAIN TITE ONTO THE MEMBRANE.
6. WHEN TOUCH DRY, APPLY AN ADDITIONAL COAT OF SIKA RAIN TITE.
7. REPAIRED AREA OF ROOF SHEETING TO BE PAINTED WITH 2 COATS OF PAINT. COLOUR TO MATCH EXISTING ROOF SHEETING.

NOTE: REFER TO MANUFACTURER'S SPECIFICATIONS ON SIKA RAIN TITE

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	GENERAL SPECIFICATIONS: REPAIRS TO EXISTING ROOF SHEETING	2016.07.06	B
		PROJ. No. 447	SKETCH No. Sk 100

A. ASBESTOS ROOF SHEETING

1. ANY PERSON WHO ERECTS, MAINTAINS, ALTERS, RENOVATES, REPAIRS OR DISMANTLES ASBESTOS ROOF SHEETING, GUTTERS, FASCIA BOARDS AND BARGE BOARDS SHALL ENSURE THAT:
   - WRITTEN WORK PROCEDURES ARE LAID DOWN AND FOLLOWED TO PREVENT THE RELEASE OF ASBESTOS DUST INTO THE ENVIRONMENT.
   - ALL RUN□OFF WATER MUST BE FILTERED BEFORE ENTERING THE STORMWATER SYSTEM.
   - FULL COMPLIANCE WITH THE DEPARTMENT OF LABOUR RE□UIREMENTS IN TERMS OF THE SAFE REMOVAL AND/OR THE SAFE REPAIR (PATCHING) OF THE ASBESTOS ROOF SHEETING.
   - NOTIFICATION IN TERMS OF AN ASBESTOS PLAN□MUST BE SUBMITTED TO AN APPROVED INSPECTION AUTHORITY AND THEN TO THE DEPARTMENT OF LABOUR FOR APPROVAL PRIOR TO WORKING ON ANY ASBESTOS ROOF SHEETING.

2. IF ANY HOLES ON THE SHEETING ARE LARGER THAN 75mm X 75mm OR OTHERWISE BADLY DAMAGED OR CRACKED IN MANY AREAS OF THE SHEET, THEN THE EXISTING ASBESTOS ROOF SHEET MUST BE REMOVED AND REPLACED WITH NUTEC□FIBRE CEMENT ROOF SHEETING. PROFILE AND COLOUR TO MATCH THE EXISTING ROOF SHEETING. REFER TO ITEM 1 ABOVE FOR THE DEPARTMENT OF LABOUR RE□UIREMENTS FOR THE SAFE HANDLING OF ASBESTOS SHEETING.

3. WHEN REMOVING AND REPLACING THE ENTIRE ASBESTOS ROOF SHEETING WITH NUTEC□ROOF SHEETING, ENSURE THAT THE NEW TIMBER PURLINS ARE 76 X 50 GRADE 5 TYPE SA PINE TIMBER WITH THE 76mm DIMENSION PLACED VERTICALLY. NOTE : PURLIN SPACING SHOULD NOT EXCEED 900mm CENTRES. THE USE OF 76 X 50 GRADE 5 TYPE SA PINE TIMBER PURLINS ARE ONLY ACCEPTABLE WHEN TRUSS SPACINGS DO NOT EXCEED 1200mm CENTRES. WHERE TRUSS SPACINGS EXCEED 1200mm CENTRES, THE CONTRACTOR IS TO ENGAGE THE ENGINEER FOR FURTHER RECOMMENDATIONS.

B. STEEL ROOF SHEETING

1. SHEETING SPECIFICATION FOR A COMPLETE NEW ROOF: USE 0,53mm COLOUR BOND OR 0,55mm COLOUPLUS (A□150) IBR PROFILE SHEETING, SUPPLIED IN SINGLE LENGTHS (FROM ROOF RIDGE TO EAVES GUTTER) FIXED ONTO 76 X 50 GRADE 5 TYPE SA PINE TIMBER PURLINS WITH THE 76mm DIMENSION PLACED VERTICALLY. NOTE : PURLIN SPACING SHOULD NOT EXCEED 900mm CENTRES. THE USE OF 76 X 50 GRADE 5 TYPE SA PINE TIMBER PURLINS ARE ONLY ACCEPTABLE WHEN TRUSS SPACINGS DO NOT EXCEED 1200mm CENTRES. WHERE TRUSS SPACINGS EXCEED 1200mm CENTRES, THE CONTRACTOR IS TO ENGAGE THE ENGINEER FOR FURTHER RECOMMENDATIONS.
   COLOUR OF THE NEW SHEETING TO MATCH THE ROOF SHEETING ON EXISTING CLASSROOM BLOCKS OR OTHERWISE DIRECTED BY PROJECT MANAGER.
2. MINOR DAMAGE TO EXISTING STEEL ROOF SHEETING: REMOVE AND REPLACE DAMAGE ROOF SHEETING WITH NEW STEEL SHEETING. NEW SHEETING TO MATCH THE EXISTING SHEETING PROFILE, TYPE, OVERALL THICKNESS AND COLOUR. SHEETING TO BE SUPPLIED IN SINGLE LENGTHS (FROM ROOF RIDGE TO EAVES GUTTER).

C. CONCRETE ROOF TILES

1. ALL DAMAGED AND CRACKED CONCRETE ROOF TILES ARE TO BE REMOVED AND REPLACED WITH NEW CONCRETE TILES TO MATCH THE EXISTING ROOF TILES. COLOUR OF THE NEW CONCRETE TILES TO MATCH THE EXISTING ROOF TILES.

D. DAMAGED ROOF TRUSSES REPLACED WITH COMPLETE NEW 'GANG NAILED' ROOF STRUCTURE

1. EXISTING DAMAGED TIMBER ROOF TRUSSES TO BE REMOVE AND CARTED OF SITE.
2. THE INSTALLATION OF THE GANG□NAILED ROOF STRUCTURE BY THE MAIN CONTRACTOR IS TO BE : **A DESIGN, SUPPLY, INSTALL AND CERTIFY** CONTRACT.
3. IT IS THE RESPONSIBILITY OF THE MAIN CONTRACTOR TO SUBMIT THE RE□UIRED TR1 AND TR2 CERTIFICATES TO US FOR OUR RECORDS AT THE RELEVANT STAGE OF THE PROJECT. THE TR1 AND TR2 CERTIFICATES CERTIFY THAT THE OVERALL ROOF STRUCTURE IS STRUCTURALLY STABLE.
4. IT IS THE RESPONSIBILITY OF THE MAIN CONTRACTOR TO ENSURE THAT THE APPROVED COMPETENT PERSON (REGISTERED WITH ECSA) ISSUING THE TR1 CERTIFICATE HAS INSPECTED THE SITE, COMPLIED WITH ALL THE RE□UIRED SPECIFICATIONS AS NOTED ABOVE, AND HAS PROVIDED HIS OWN SPECIFICATIONS / DRAWINGS FOR THE TRUSS TIE□DOWNS, BRACING, ETC.
5. THE TR1 CERTIFICATE CONFIRMS THAT THE GANG□NAILED ROOF TRUSSES HAVE BEEN DESIGNED BY AN APPROVED COMPETENT PERSON (REGISTERED WITH ECSA) AND THE TR2 CERTIFICATE CONFIRMS THAT THE INSTALLATION OF THE GANG□NAILED ROOF TRUSSES ON SITE HAS BEEN INSPECTED, CHECKED FOR COMPLIANCE WITH THE ROOF TRUSS SHOP DRAWINGS AND APPROVED BY AN APPROVED COMPETENT PERSON (REGISTERED WITH ECSA).

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO.064539 DEPARTMENT OF EDUCATION WATER &SANITATION PROGRAMME	GENERAL SPECIFICATIONS: REPLACEMENT OF DAMAGED ROOFS AND TRUSSES	2016.07.06	B
		PROJ. No. 447	SKETCH No. Sk 101

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DAMAGED CEILINGS AND CORNICES

1. REMOVE DAMAGED CEILING AND CART RUBBLE OFF SITE.
2. PREPARE SURFACE TO RECEIVE NEW CEILING.
3. CONSTRUCT NEW CEILING WITH 9.5mm THICK GYPSUM BOARD. 44mm □10mm TIMBER COVER STRIP OR PLASTIC M□STRIP□TO BE INSTALLED AT CEILING JOINTS. ALL TO BE INSTALLED ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
4. CONSTRUCT CEILING CORNICES WITH NUTEC EVERITE 75mm COVED CORNICES. ALL TO BE INSTALLED ACCORDING TO MANUFACTURES SPECIFICATIONS.
5. ALL CEILING BOARDS TO BE FIXED ONTO NEW 38mm □50mm (WITH 50mm DIMENSION PLACED VERTICALLY) GRADE 5 SA PINE TIMBER BATTENS. BATTENS SPACING TO BE MAX. 400mm C/C.
6. ALL MATERIALS TO BE SABS APPROVED.

RECOMMENDED TIMBER BATTEN SI□ES FOR 9.5mm □k. GYPSUM CEILING BOARDS	
TIMBER JOIST / TRUSS SPACING	TIMBER BATTEN SI□E
□1000mm	38mm □38mm GRADE 5 SA PINE
1001mm □ 1200mm	38mm □50mm GRADE 5 SA PINE (WITH 50mm DIMENSION PLACED VERTICALLY)
1201mm □ 1400mm	50mm □76mm GRADE 5 SA PINE (WITH 76mm DIMENSION PLACED VERTICALLY)
□1401mm	CONSULT WITH APPOINTED STRUCTURAL ENGINEER.

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	GENERAL SPECIFICATIONS: REPLACE DAMAGED CEILINGS AND CORNICES	2016.07.06	B
		PROJ. No. 447	SKETCH No. Sk 102

REPLACEMENT OF SISALATION :

1. REMOVE EXISTING ROOF SHEETING AND STORE FOR RE□USE OR TO BE ASSESSED (BY THE APPOINTED STRUCTURAL ENGINEER) ON SITE IF ROOF SHEETING NEEDS TO BE REPLACED.
2. INSTALL MULTIPURPOSE ROOF SISALATION. SPECIFICATION □SISALATION MULTIPURPOSE LIGHT DUTY 439. ALL TO BE INSTALLED ACCORDING TO MANUFACTURER'S SPECIFICATION.
3. RE□INSTALL OR REPLACE ROOF SHEETING AS RE□UIRED / INSTRUCTED BY THE APPOINTED STRUCTURAL ENGINEER.
4. ALL MATERIAL TO BE SABS APPROVED.

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER &SANITATION PROGRAMME	GENERAL SPECIFICATIONS: REPLACE DAMAGED SISALATION	2016.07.06	B
		PROJ. No. 447	SKETCH No. Sk 103

NOTE: BATCHING AND MIXING MATERIAL :

- 1 BAG OF CEMENT HAS A VOLUME OF 33 LITRES.
- 1 BUILDERS WHEELBARROW HAS A VOLUME OF 65 LITRES WHICH IS EQUIVALENT TO 2 BAGS OF CEMENT.
- DO NOT SPLIT BAGS WHEN BATCHING EXCEPT FOR SMALL OR NO STRUCTURAL WORK.
- USE A CONCRETE MIXER OR HAND MIXER ON A DRY, CLEAN, NON-ABSORBENT SURFACE.
- WHEN MIXING CONCRETE BY HAND, FIRST MIX THE CEMENT, SAND AND WATER THOROUGHLY AND MIX THE STONE LAST - THIS SAVES A LOT OF EFFORT.
- MIX UNTIL COLOUR AND WORKABILITY IS UNIFORM.
- ALL CONCRETE TO BE VIBRATORED WHEN PLACING.
- CONCRETE CUBE TEST RESULTS TO BE SUBMITTED TO THE ENGINEER AS PER BELOW:
  - > 3No. CUBES TESTS FOR 7 DAY RESULTS
  - > 3No. CUBES TESTS FOR 28 DAY RESULTS

CONCRETE STRENGTH	CEMENT (50KG BAGS)	SAND (WHEELBARROWS)	STONE (WHEELBARROWS)	WATER (LITRES)
20 MPa	2	4	4	55
25 MPa	2	3	3	55

TYPICAL CONCRETE MIX DESIGN

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	CONCRETE MIX DESIGN FOR 20MPA CONCRETE AND 25MPA CONCRETE	2016.07.06	B
		PROJ. No. 447	SKETCH No. Sk 104

GUTTERS AND DOWNPIPES

1. GUTTERS AND DOWNPIPES TO A COMPLETELY NEW ROOF :

   ALL GUTTERS TO BE SEAMLESS 110mm HALF ROUND uPVC GUTTERS – ALL TO SUPPLIER'S SPECIFICATIONS.
   DOWNPIPES TO BE 75mm DIAMETER uPVC DOWNPIPES, ALL FIXED AS PER SUPPLIER'S SPECIFICATIONS.
   NOTE: GUTTER BRACKETS ARE TO BE FIXED AT A MAXIMUM OF 750mm CENTRES.

2. GUTTER SUPPORT :

   NUTEC FASCIA BOARDS ARE TO BE FIXED (AT MAXIMUM 750mm CENTRES) TO A 114X38 (GRADE 5) SA PINE TIMBER CLOSURE PIECE OF WHICH IS FITTED AT THE GUTTER END OF THE VERANDAH OVERHANG AND BETWEEN ALL ROOF TRUSSES TO SUPPORT THE NEW FASCIA BOARD AND GUTTERS.

3. COMPLETE DAMAGE TO ALL EXISTING ALUMINIUM GUTTERS AND DOWNPIPES ONLY :

   INSTALL NEW GUTTERS AND DOWNPIPES AS PER ITEM 1 ABOVE.

4. MINOR DAMAGE (IN SMALL SECTIONS) TO EXISTING GUTTERS AND DOWNPIPES (PVC, NUTEC, ALUMINIUM, ETC.) :

   REMOVE ONLY THE DAMAGED SECTIONS OF GUTTERS AND DOWNPIPES AND REPLACE WITH NEW GUTTERS AND DOWNPIPES TO MATCH EXISTING IN MATERIAL, PROFILE, TYPE AND COLOUR.

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	REPLACEMENT OF GUTTER AND RAINWATER DOWNPIPES	2016.07.06	C
		PROJECT No. 447	SKETCH No. SK 105

REPLACING GLAZING

1. REMOVE EXISTING PUTTY.
2. RUB THE WINDOW FRAME WITH A WIRE BRUSH TO REMOVE ANY REMAINING GLAZING PUTTY OR OLD CAULK FROM THE GROOVES.
3. SAND THE WINDOW FRAME LIGHTLY WITH GRIT SANDPAPER TO REMOVE STUCK-ON CAULK, PUTTY OR WOOD SPLINTERS.
4. ALIGN THE GLAZING WITH THE GROOVE IN THE FRAME AND PUTTY INTO PLACE. USE 4mm thk. (SABS APPROVED) CLEAR GLAZING FOR ALL WINDOWS.
5. HOLD A METAL PUTTY KNIFE AT A LOW ANGLE TO THE WINDOW FRAME AND PUSH THE KNIFE ALONG THE WINDOW FRAME TO REMOVE THE EXCESS PUTTY.

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	REPLACING GLAZING	2016.07.06	B
		PROJECT No. 447	SKETCH No. SK 106

ROOF SHEETING PAINT SPECIFICATION

1. EXISTING ASBESTOS ROOF AND EXISTING FIBRE CEMENT ROOF:
   EXISTING ASBESTOS ROOF COVERING AND FIBRE CEMENT ROOF COVERING & ASSOCIATED RAINWATER PRODUCTS TO BE HIGH PRESSURE POWER CLEANED OR IN SOME CIRCUMSTANCES SCRUBBED CLEAN. APPLY 2 COATS DULUX ROOFGUARD EXTERIOR ROOF COATING WITH SOLARFLEX PROPERTIES.
2. EXISTING GALVANISED STEEL ROOF:
   PLEASE ENSURE SURFACES ARE SOUND, CLEAN AND HAVE BEEN CORRECTLY PREPARED USING APPROPRIATE PRIMERS WHERE RELEVANT. THEN APPLY 2 COATS OF DULUX ROOFGUARD EXTERIOR ROOF COATING WITH SOLARFLEX PROPERTIES.
   APPLICATION TO BE WITH A BRUSH OR ROLLER. RE COAT AFTER 4 HOURS. TOUCH DRY AFTER 1 HOUR.
   PLEASE NOTE COVERAGE MAY VARY ACCORDING TO SURFACE POROSITY.

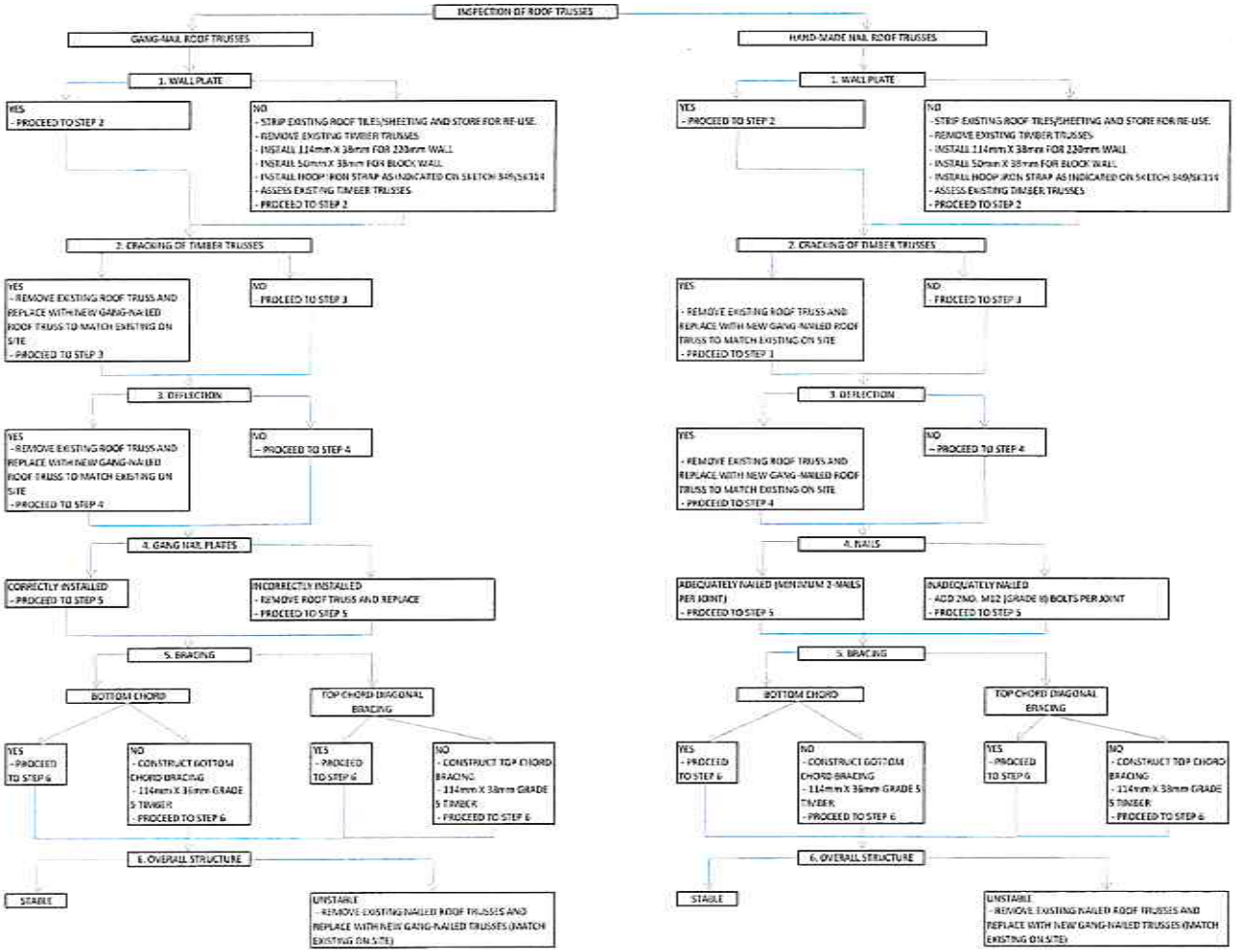
PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	GENERAL SPECIFICATIONS: ROOF SHEETING PAINT SPECIFICATIONS	2016.07.06	B
		PROJ. No. 447	SKETCH No. Sk 107

NEW DOORS

1. DOOR FRAMES
   GALVANISED STOCK STEEL DOUBLE REBATED DOOR FRAMES (1.2mm THICK) FOR 115mm AND 230mm WALLS - NOT PAINTED WITH 1 PAIR OF 100mm GALVANISED STEEL LOOSE-PIN HINGES WELDED IN POSITION

2. DOORS
   MERANTI DOORS AS PER ARCHITECTS LAYOUT. ALL DOORS TO BE PRIMED, UNDERCOATED AND PAINTED WITH 2 COATS OF GLOSS ENAMEL PAINT.

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 053895 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	GENERAL SPECIFICATIONS: NEW DOORS	2016.07.06	A
		PROJ. No. 447	SKETCH No. Sk 108



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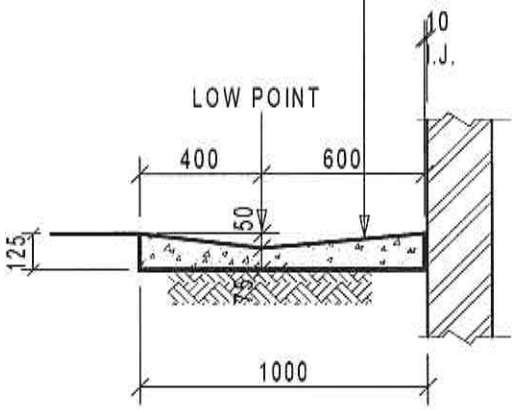
PROJECT:
WIMS NO. 064539
DEPARTMENT OF EDUCATION
WATER & SANITATION
PROGRAMME

DETAILS:
ROOF TRUSS INSPECTION
SPECIFICATIONS

DATE	REVISION
2016.07.06	B
PROJ. No.	SKETCH No.
447	Sk 109

SECTION 2
STRUCTURAL TYPICAL DETAILS AND SPECIFICATIONS

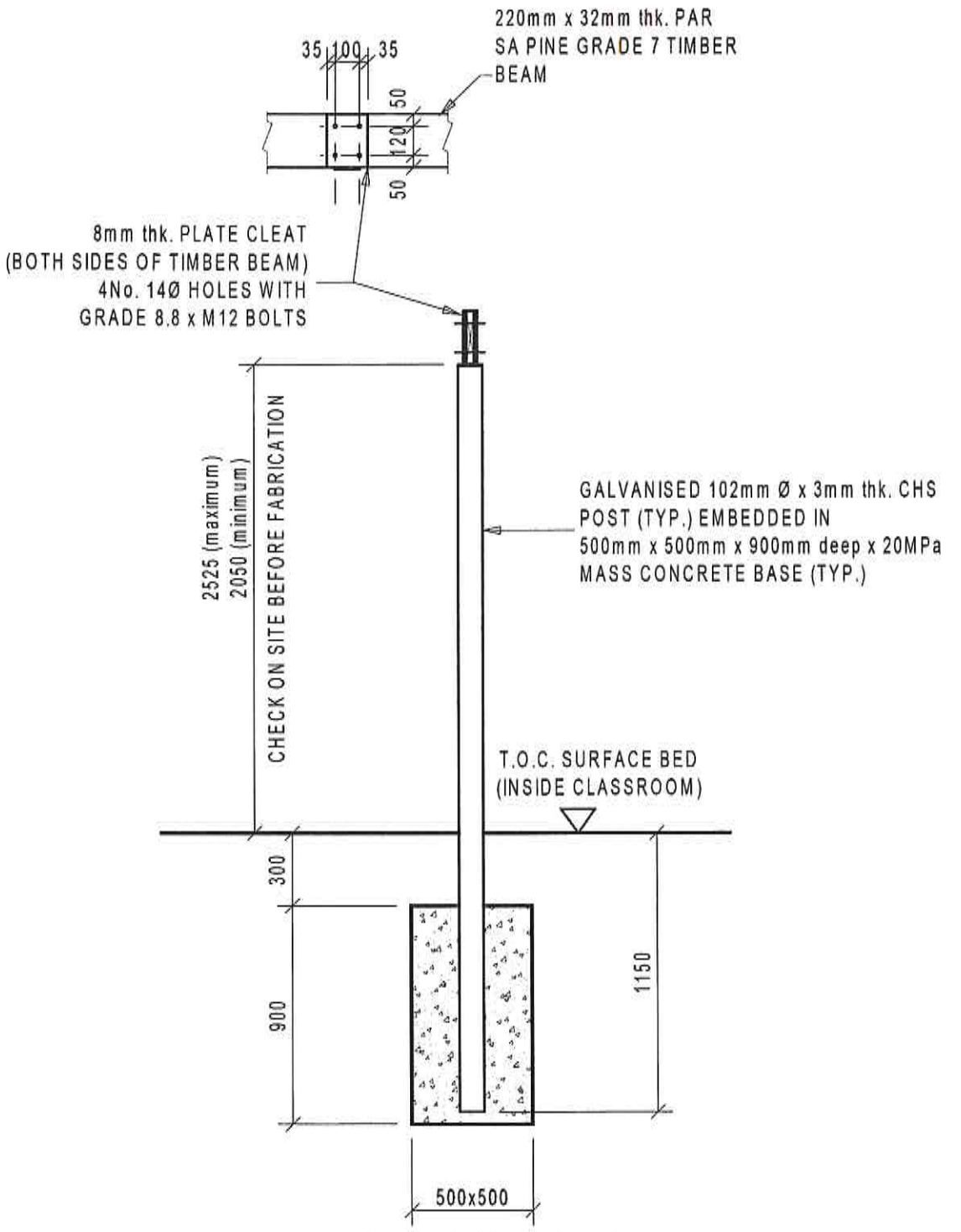
CONCRETE CHANNELS/APRON:
125mm thk. X 20MPa CONCRETE APRONS
REINFORCED WITH MESH REF 193 PLACED 30mm
FROM BOTTOM LAID TO A FALL TO RELIEF POINTS
CAST IN ALTERNATE PANELS OF 2000mm ON
FILL COMPACTED TO 95% MOD AASHTO.
COMPACTION TEST RESULTS TO BE SUBMITTED
TO THE ENGINEER FOR APPROVAL PRIOR TO CASTING.



TYPICAL SECTION
THRU' 'V' DRAIN APRON / CHANNEL

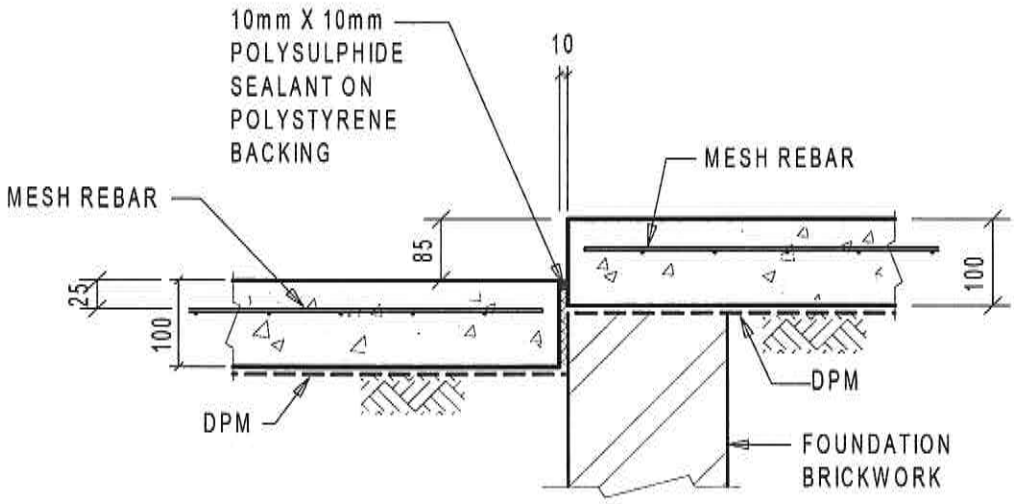
NOTE :
ALL 'V' DRAIN TEMPLATES ARE TO BE INSPECTED BY THE ENGINEER PRIOR TO ANY WORK BEING PUT TO HAND.

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	EXTERNAL CONCRETE 'V' DRAIN APRON CHANNEL	2016.07.06	B
		PROJECT No. 447	SKETCH No. SK 300



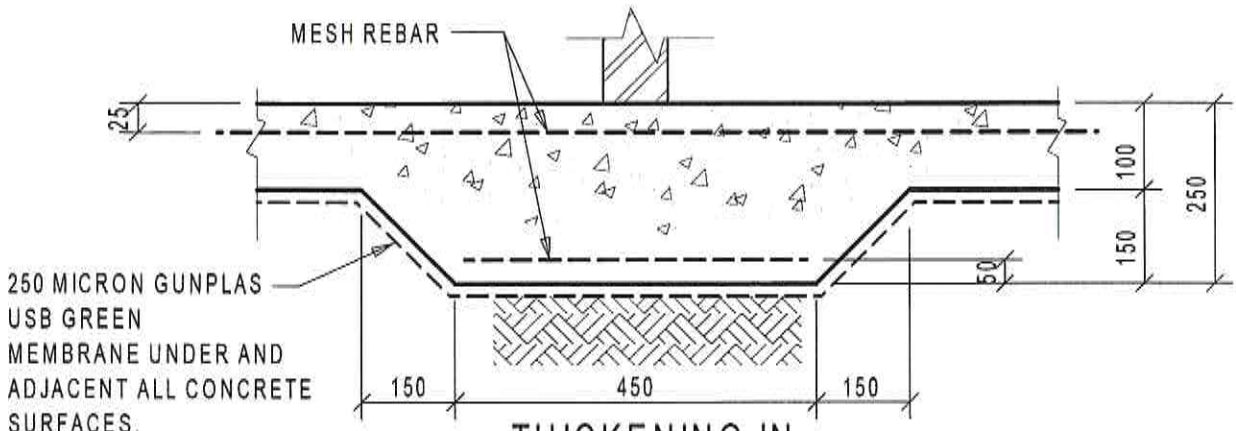
STEEL POST DETAIL

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	WALKWAY ROOF SUPPORT: STEEL POST DETAIL	2016.07.06	B
		PROJECT No. 447	SKETCH No. SK 301



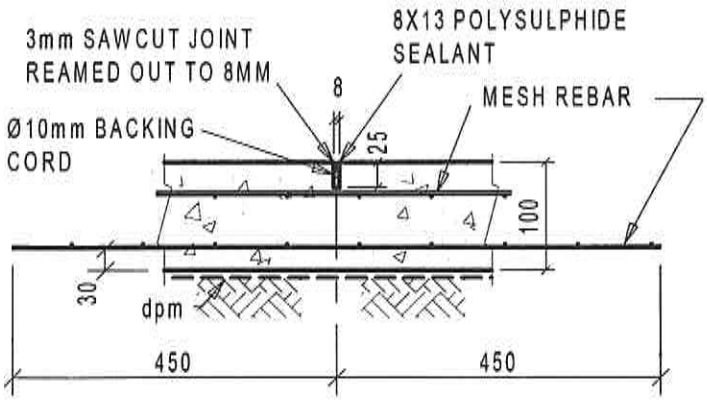
EXTERNAL DOOR THRESHOLD (E.D.T.)

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	EXTERNAL DOOR THRESHOLD DETAIL (E.D.T.)	2016.07.06	B
		PROJECT No. 447	SKETCH No. SK 302

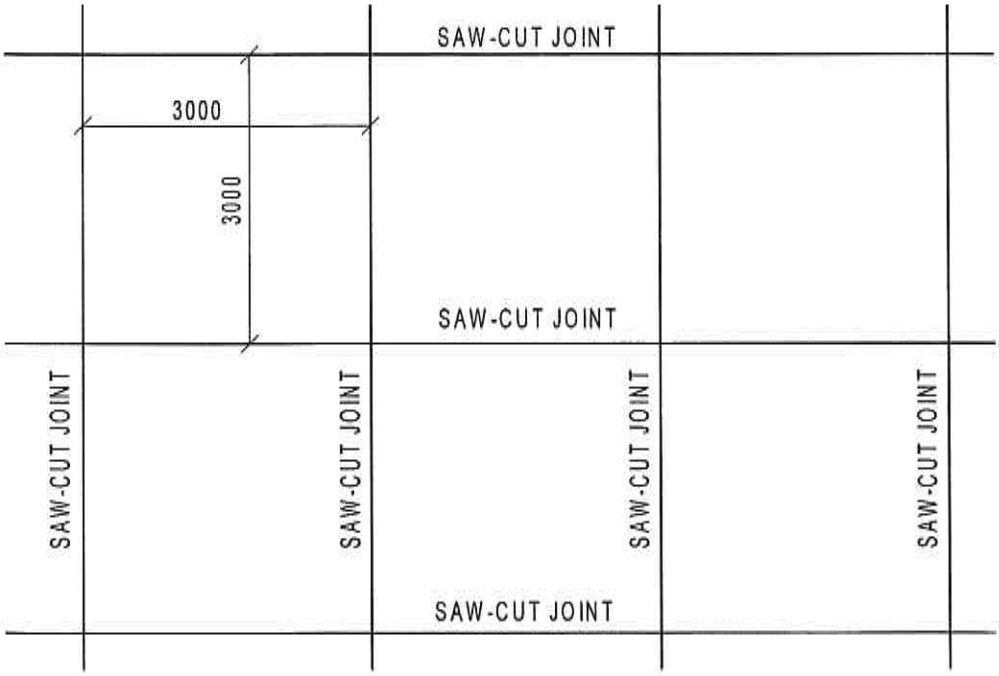


THICKENING IN
SURFACE BED (TYP)

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	THICKENING IN SURFACE BED FOR 110mm WALL	2016.07.06	B
		PROJECT No. 447	SKETCH No. SK 303



TYPICAL SAW-CUT JOINT DETAIL



JOINTS ARE AT MAXIMUM 3m crs BOTH WAYS

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL SAW-CUT JOINT DETAIL	2016.07.06	B
		PROJECT No. 447	SKETCH No. SK 304

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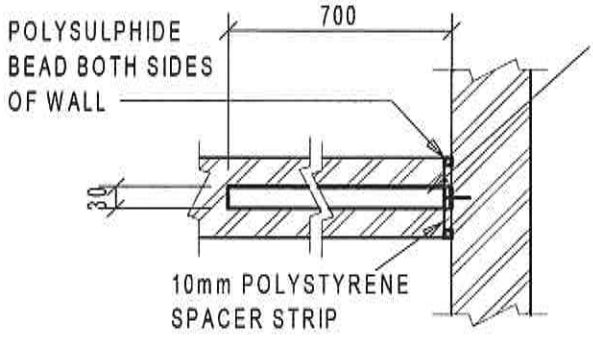
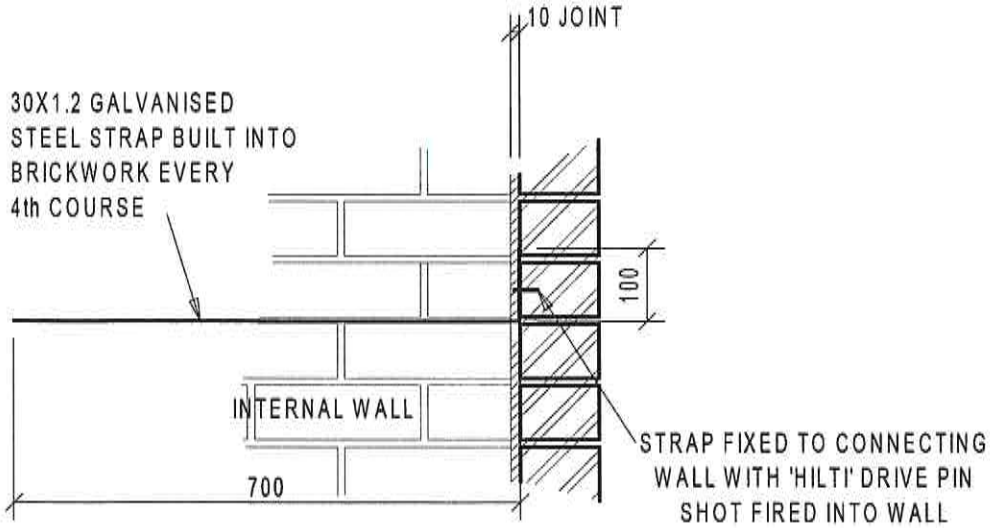
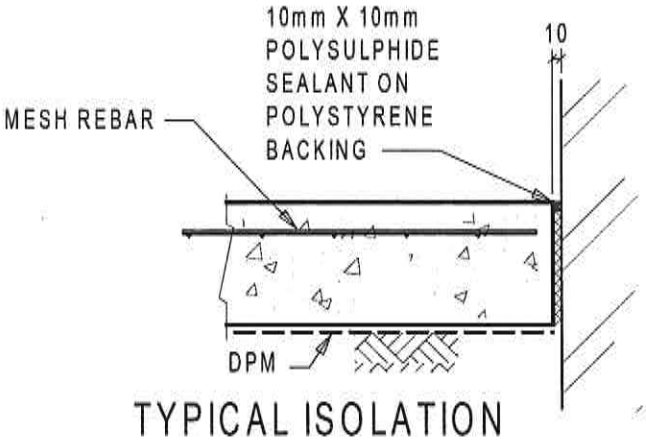


PLAN 110 WALL



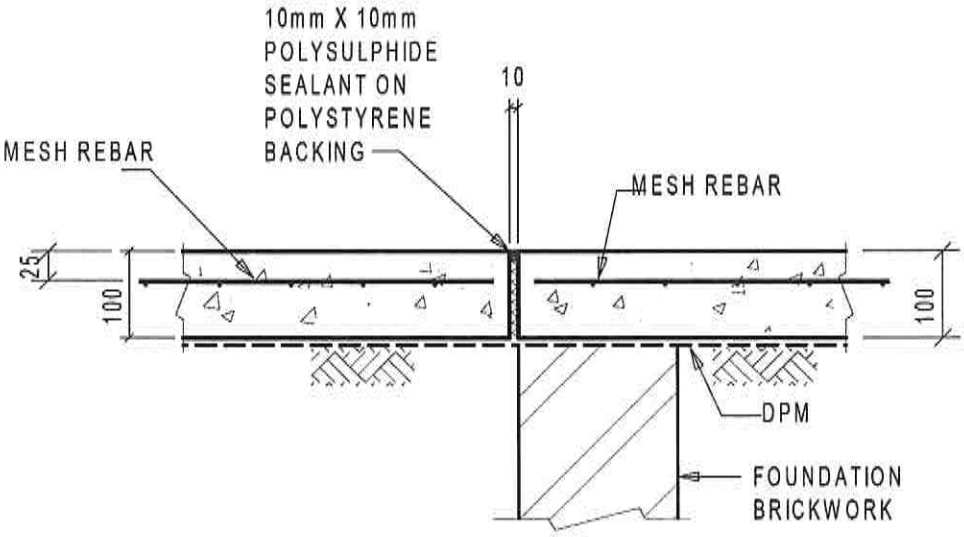
ELEVATION 110 WALL

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	INTERNAL WALL CONNECTION DETAIL	2016.07.06	B
		PROJECT No. 447	SKETCH No. SK 305



TYPICAL ISOLATION JOINT DETAIL (I.J.)

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL ISOLATION JOINT DETAIL (I.J.)	2016.07.06	B
		PROJECT No. 447	SKETCH No. SK 306



INTERNAL DOOR THRESHOLD (I.D.T.)

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	INTERNAL DOOR THRESHOLD (I.D.T.)	2016.07.06	B
		PROJECT No. 447	SKETCH No. SK 307

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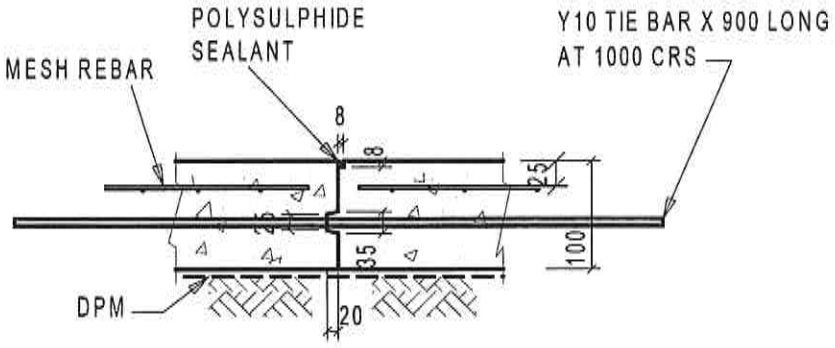
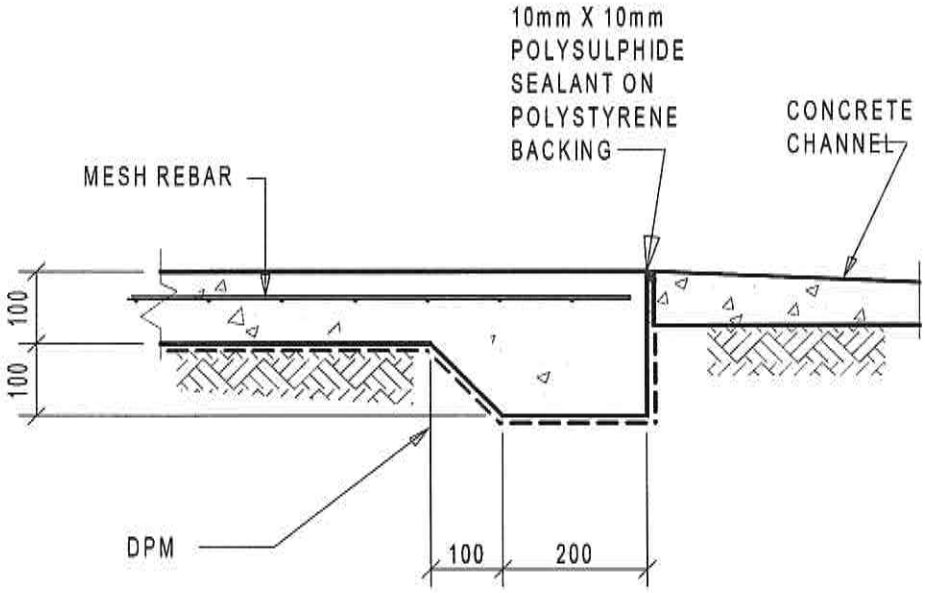


TYPICAL CONSTRUCTION JOINT DETAIL

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL CONSTRUCTION JOINT DETAIL	2016.07.06	B
		PROJECT No. 447	SKETCH No. SK 308



TYPICAL EDGE THICKENING DETAIL

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL EDGE THICKENING DETAIL	2016.07.06	B
		PROJECT No. 447	SKETCH No. SK 309

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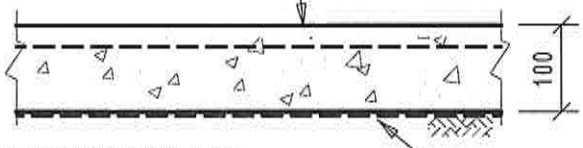
100mm thk. X 25MPa STEEL FLOATED CONCRETE SLAB REINFORCED WITH MESH REF 193 PLACED 25mm FROM TOP ON 250µM 'GUNPLAS USB GREEN' DPM ON 50mm TREATED & RAMMED RIVERSAND ON WELL WATERED CLEAN EARTH FILL COMPACTED TO 90% MOD AASHTO IN LAYERS NOT EXCEEDING 150mm. SOIL TO BE POISONED IN ACCORDANCE WITH SABS 1165. CERTIFICATE MUST BE PROVIDED. COMPACTION TEST RESULTS TO BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO CASTING OF CONCRETE.



IN-SITU SUBBASE COMPACTED TO MIN. 90% MOD AASHTO. COMPACTION TEST RESULTS TO BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO CASTING OF CONCRETE.

250 MICRON GUNPLAS USB GREEN HYPERLASTIC MEMBRANE UNDER AND ADJACENT ALL CONCRETE SURFACES.

TYPICAL SECTION THRU' SURFACE BED

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL SECTION THRU' SURFACE BED	2016.07.06	B
		PROJECT No. 447	SKETCH No. SK 310

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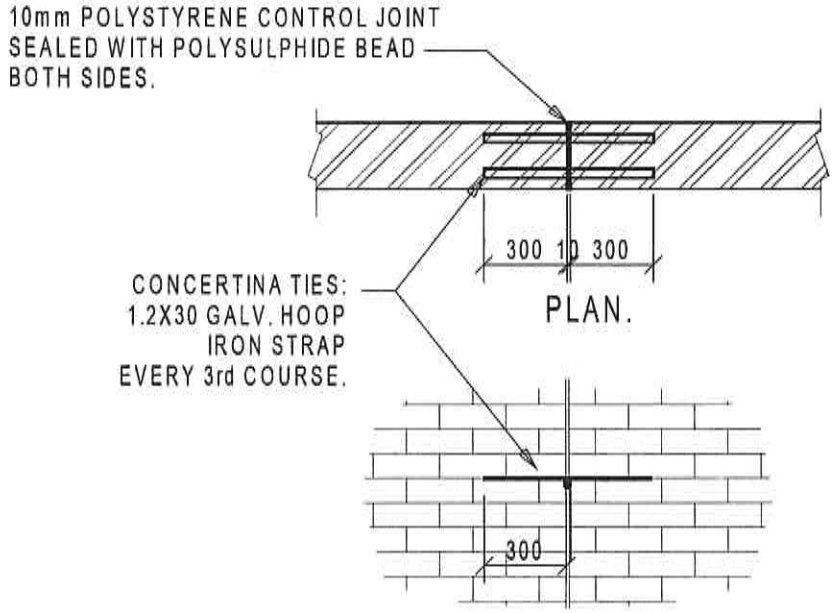

ELEVATION

TYPICAL CONTROL JOINT DETAIL FOR BRICKWORK

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL CONTROL JOINT DETAIL FOR BRICKWORK	2016.07.06	B
		PROJECT No. 447	SKETCH No. SK 311

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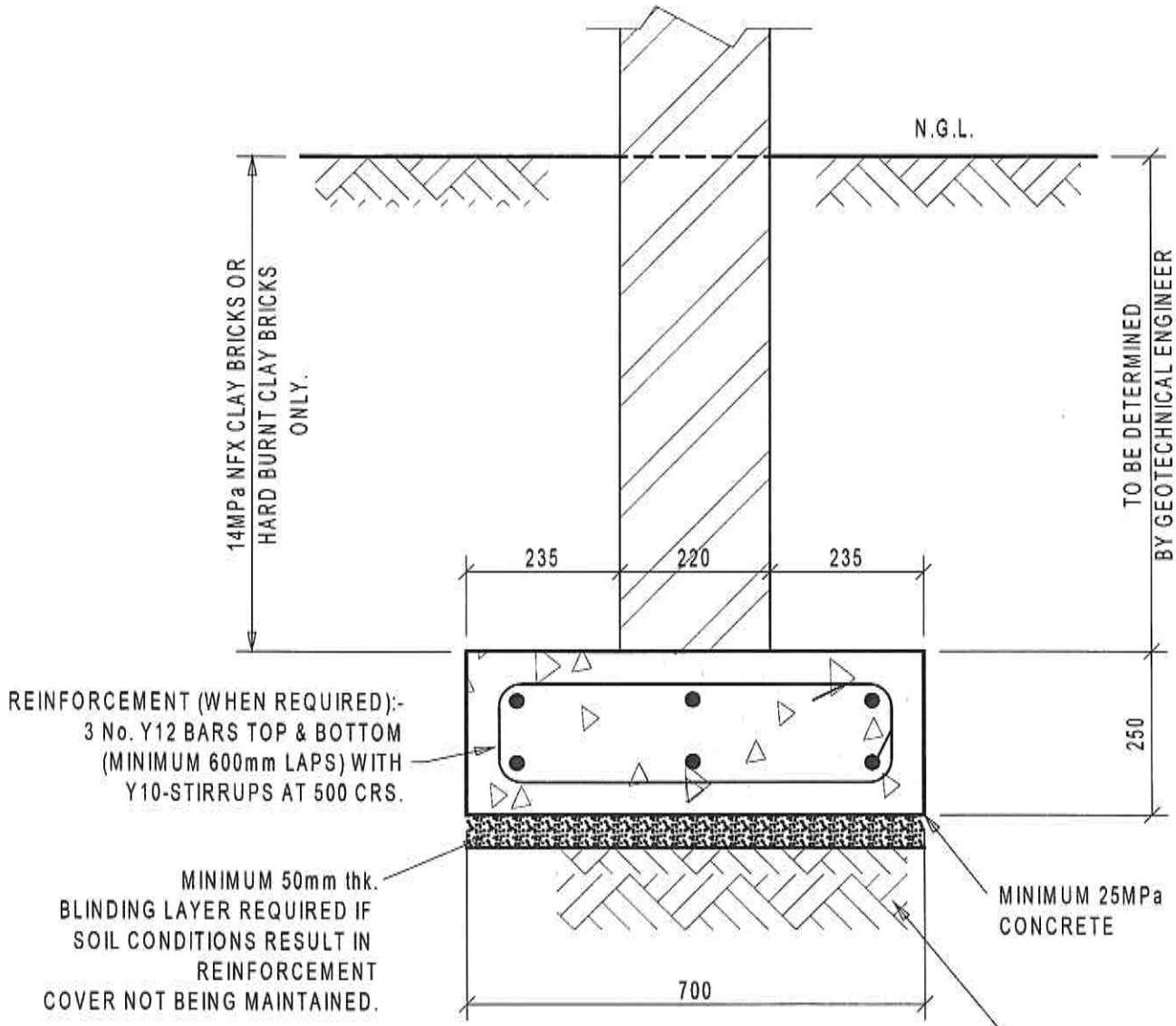
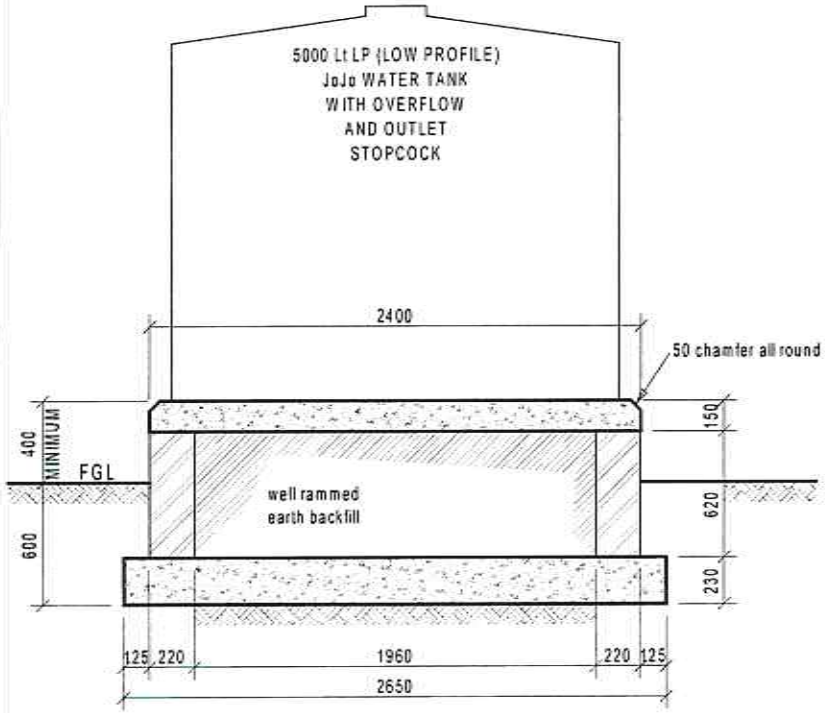
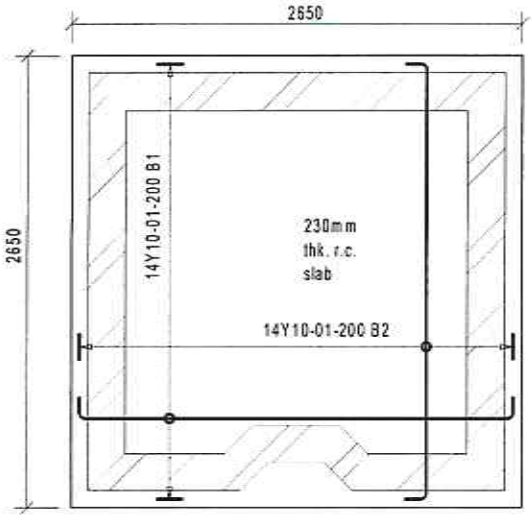


220mm WALL FOUNDATION DETAIL

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	220mm WALL FOUNDATION DETAIL	2016.07.06	B
		PROJECT No. 447	SKETCH No. SK 312

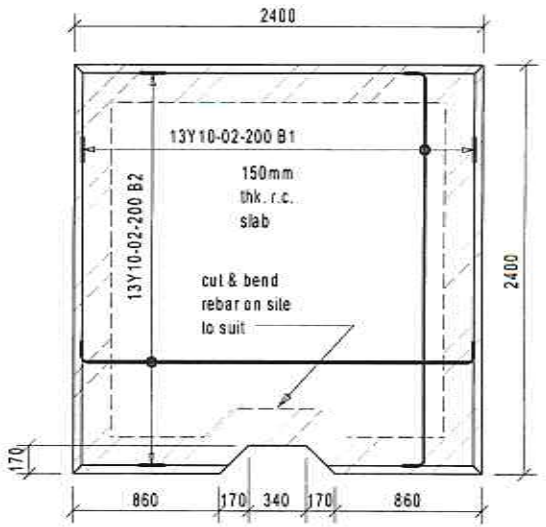


TYPICAL SECTION



PLAN ON FOOTING

50mm cover to reinforcement all round



PLAN ON TANK SUPPORT SLAB

25mm cover to reinforcement all round

NOTES:

1. SEE ARCHITECTS LAYOUT FOR LOCATION OF TANK.
2. ALL FOUNDATION EXCAVATIONS TO BE COMPACTED TO A MINIMUM OF 93% MOD AASHTO PRIOR TO CONCRETE BEING CAST. COMPACTION TEST RESULTS ARE TO BE SUBMITTED TO THE ENGINEER PRIOR TO CASTING OF CONCRETE.
3. MINIMUM 25MPa CONCRETE STRENGTH AT 28 DAYS
4. MINIMUM 14MPa NFX BRICKWORK IN CLASS II MORTAR

JoJo Tank – 'strapping' down specifications

All JoJo tanks are to be strapped down (at each of the 4 stubs on top of the tank) to the supporting concrete base with 2 no. off 4mm diameter fully galvanized stay wires (allow for 'turnbuckles' to tighten each of the 'double strap' stay wires). Each of the 'double strap' stay wires are to be tied to a M12 eye bolt of which is to be drilled and fixed to the 4 corners of the concrete supporting base. The specification for the eye bolt is as follows : galvanised mild steel - M12 eye bolt with 25mm eye inside diameter and with 80mm long shank.

MEMBER	No OF	BARS PER MEMB	DIA.	LENGTH	TOTAL NUM-BER	MARK	S C	BENDING A
	1	28	Y10	2750	28	01	35	2550
		26	Y10	2500	26	02	35	2300

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PROJECT
WIMS NO. 064539
DEPARTMENT OF EDUCATION
WATER & SANITATION PROGRAMME

DATE
2016.07.06

REVISION
B

DETAILS
TYPICAL WATER TANK SUPPORT
CONCRETE & REINFORCEMENT
LAYOUT & DETAILS

DRG. No.
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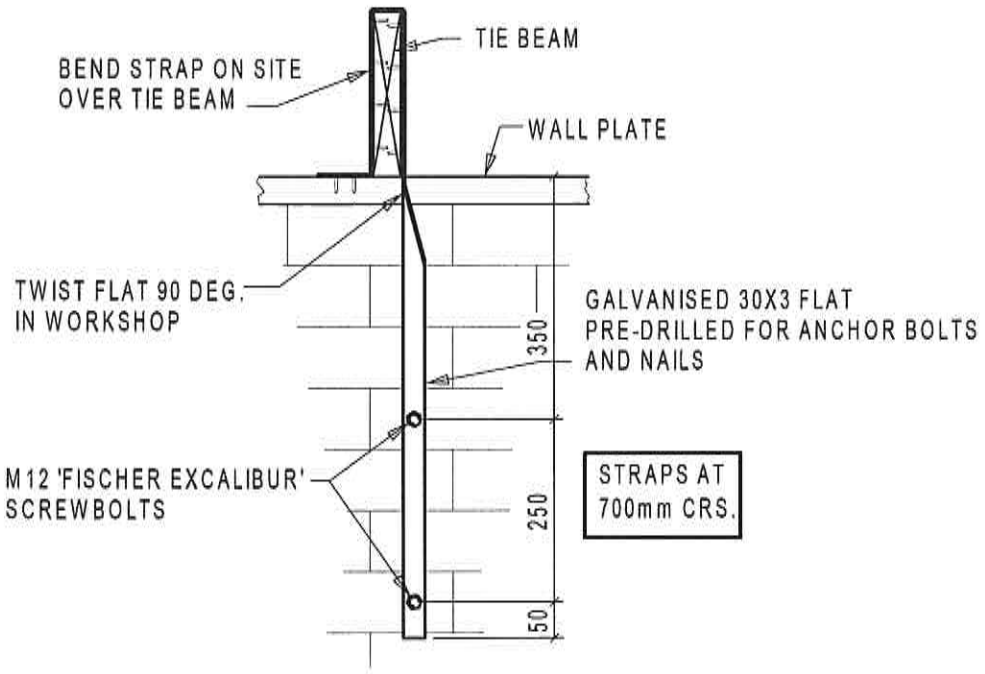

SUGGESTED METHOD TO FIX NEW PRE-FABRICATED TIMBER ROOF TRUSSES TO EXISTING BRICKWORK

ALL DAMAGED ROOF TRUSSES TO BE REPLACED
WITH PRE-FABRICATED TIMBER ROOF TRUSSES
TO MATCH EXISTING.
ALL OTHER DAMAGED TIMBER BATTENS, WALL PLATES, ETC.
TO BE REMOVED AND REPLACED WITH NEW TIMBER
TO MATCH EXISTING.

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TIMBER ROOF TRUSS ANCHOR DETAIL	2016.07.06	B
		PROJECT No. 447	SKETCH No. SK 314

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GENERAL PLASTER REPAIRS &
BRICKWORK/BLOCKWORK STITCHING REPAIRS SPECIFICATIONS

GENERAL PLASTER 'CRACK' REPAIRS:

1. RECOMMENDATIONS & SPECIFICATIONS:

ALL PLASTER 'CRACKING' MUST BE REPAIRED AS SPECIFIED BELOW. THE CONTRACTOR IS ALSO REQUIRED TO DETERMINE IF ANY CRACKS IN THE PLASTER HAVE BEEN TRANSFERRED TO THE BLOCKWORK/BRICKWORK. (CONTRACTOR IS REQUIRED TO CUT 100mm LONG X 20mm WIDE INSPECTION SLOT). IF A CRACK HAS TRANSFERRED TO THE BLOCKWORK/BRICKWORK, THEN IT NEEDS TO BE REPAIRED AS SET OUT IN THE SPECIFICATION FOR BLOCKWORK/BRICKWORK 'STITCHING'.

1.1 SPECIFICATION FOR GENERAL 'PLASTER' REPAIR:

BREAK OUT AND REMOVE DAMAGED PLASTER TO 50MM INTO SOUND PLASTER. CLEAN WALL AND APPLY 'SIKA PLASTERSTIK' OR SIMILAR APPROVED BONDING AGENT TO MANUFACTURER'S SPECIFICATIONS. RE-PLASTER WALL AND PAINT TO ARCHITECTS SPECIFICATIONS.

1.2 SPECIFICATION FOR PLASTER REPAIR 'CRACKING':

RAKE OUT CRACK 6MM X 6MM DEEP. CLEAN OUT ALL DEBRIS/LOOSE MATERIAL. FILL WITH ACRYLIC FILLER - 'SIKACRYL' OR SIMILAR APPROVED TO MANUFACTURERS SPECIFICATIONS. PAINT TO ARCHITECTS SPECIFICATIONS.

1.3 SPECIFICATION FOR BLOCKWORK/BRICKWORK 'STITCHING' REPAIR:

- RAKE OUT CRACK. REMOVE ALL DEBRIS/LOOSE MATERIAL.
- STITCH CRACK IN BLOCKWORK/BRICKWORK WITH R8 REINFORCING RODS.
- R8 REINFORCING RODS ARE TO BE 300mm LONG WITH 50mm BENDS AT BOTH ENDS - TOTAL LENGTH = 400mm.
- R8 REINFORCING RODS ARE TO BE EPOXY GROUTED WITH 'PROSTRUCT 617 GENERAL PURPOSE EPOXY ADHESIVE' OR SIMILAR APPROVED AT 250mm CENTRES, AND GROUTED INTO (10mm DEEP) SLOTS CUT INTO BLOCKWORK/BRICKWORK AND WITH (60mm DEEP) 10mm DIA. DRILL HOLES AT EACH END TO ACCOMMODATE THE BENDS OF THE REINFORCING RODS.
- ALL SLOTS AND DRILL HOLES TO BE COMPLETELY FILLED WITH EPOXY ADHESIVE.
- ALL SLOTS TO BE CUT PERPENDICULAR TO THE CRACK IN THE BLOCKWORK/BRICKWORK.
- EPOXY ADHESIVE APPLICATION TO BE AS PER MANUFACTURERS' SPECIFICATIONS.
- APPLY 'SIKA PLASTERSTIK' AND RE-PLASTER WALL, HOWEVER IF LARGE AREAS OF PLASTER HAS BEEN REMOVED, 450mm WIDE 'CHICKEN WIRE MESH' MUST BE 'TACKED ON' OVER THE CRACKED AREA PRIOR TO RE-PLASTERING.
- RE-PAINT PLASTER TO ARCHITECTS SPECIFICATIONS.

FOR CONSTRUCTION

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	GENERAL PLASTER REPAIRS & BRICKWORK/BLOCKWORK STITCHING REPAIRS SPECIFICATIONS	2016.07.06	B
		PROJECT No. 447	SKETCH No. Sk315

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CONCRETE SPALLING REPAIRS
FOR REPAIRS UP TO 30mm THICK :

SURFACE PREPARATION :

" REMOVE ALL LOOSE, UNSOUND CONCRETE FROM THE AREAS TO BE REPAIRED.
" CUT OUT AROUND THE AREAS TO BE REPAIRED TO A MINIMUM DEPTH OF 10mm TO AVOID FEATHER EDGING.
" HIGH PRESSURE WATER BLAST THE PREPARED AREAS TO REMOVE ANY CONTAMINANTS.
" ENSURE THAT THE SUBSTRATE ONTO WHICH THE REPAIR MORTAR IS TO BE APPLIED IS SOUND AND FREE FROM LOOSE MATERIAL.
" IF REINFORCING IS EXPOSED & SHOWS SIGNS OF CORROSION, THE REINFORCING SHALL BE OPENED UP BY BREAKING OUT THE CONCRETE TO A DEPTH OF 20mm BELOW THE REINFORCING AND 50mm BEYOND THE CORRODED LENGTH OF THE REINFORCING.
" ANY EXPOSED STEEL MUST BE MECHANICALLY CLEANED AND COATED WITH 1 COAT OF PRO-STRUCT 688 : ZINC RICH PRIMER @ 4m²/LT.
" REMOVAL OF BADLY CORRODED REINFORCEMENT AND ITS REPLACEMENT-ALL TO ENGINEERS INSTRUCTIONS ON SITE.

PRIMING :

" PRE-DAMPEN PREPARED SURFACE WITH WATER.
" DO NOT ALLOW TO DRY OUT PRIOR TO THE APPLICATION OF THE PRO-STRUCT 528 : STRUCTURAL CONCRETE .

REPAIR MORTAR :

" APPLY PRO-STRUCT 528 : STRUCTURAL CONCRETE INTO THE PRE-SATURATED SURFACE.
" COVERAGE WILL BE APPROXIMATELY 1.4m² @ 10mm THICK PER 25KG BAG OF PRO-STRUCT 528.
" ENSURE COMPLETE SUBSTRATE CONTACT AND MAXIMUM COMPACTION.
" CURE THE REPAIRS BY KEEPING THEM DAMP FOR 24 HOURS AFTER THE INITIAL SET HAS TAKEN PLACE.

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	CONCRETE SPALLING REPAIRS - FOR REPAIRS UP TO 30mm THICK	2016.07.06	B
		PROJECT No. 447	SKETCH No. SK 316

CONCRETE SPALLING REPAIRS
FOR REPAIRS OVER 30mm THICK :

SURFACE PREPARATION :

- " REMOVE ALL LOOSE, UNSOUND CONCRETE FROM THE AREAS TO BE REPAIRED.
- " CUT OUT AROUND THE AREAS TO BE REPAIRED TO A MINIMUM DEPTH OF 10mm TO AVOID FEATHER EDGING.
- " HIGH PRESSURE WATER BLAST THE PREPARED AREAS TO REMOVE ANY CONTAMINANTS.
- " ENSURE THAT THE SUBSTRATE ONTO WHICH THE REPAIR MORTAR IS TO BE APPLIED IS SOUND AND FREE FROM LOOSE MATERIAL.
- " IF REINFORCING IS EXPOSED & SHOWS SIGNS OF CORROSION, THE REINFORCING SHALL BE OPENED UP BY BREAKING OUT THE CONCRETE TO A DEPTH OF 20mm BELOW THE REINFORCING AND 50mm BEYOND THE CORRODED LENGTH OF THE REINFORCING.
- " ANY EXPOSED STEEL MUST BE MECHANICALLY CLEANED AND COATED WITH 1 COAT OF PRO-STRUCT 688 : ZINC RICH PRIMER @ 4m²/LT.
- " REMOVAL OF BADLY CORRODED REINFORCEMENT AND ITS REPLACEMENT- ALL TO ENGINEERS INSTRUCTIONS ON SITE.

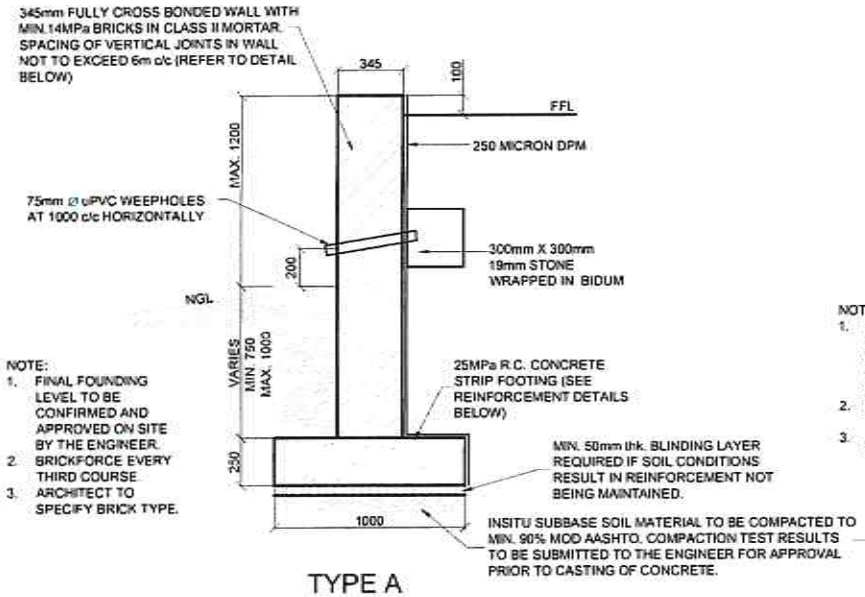
PRIMING :

- " PRE-DAMPEN PREPARED SURFACE WITH WATER AS DESCRIBED BELOW.

REPAIR MATERIAL:

- " SHUTTER UP SIDES AND/OR SOFFIT OF AREA TO BE REPAIRED.
- " THOROUGHLY WET THE SURFACE OF THE CONCRETE WITHIN THE REPAIR AREA WITH WATER.
- " DRAIN EXCESS WATER.
- " MIX PRO-STRUCT 531m AS PER DETAILED INSTRUCTIONS AND POUR REPAIR GROUT INTO THE SHUTTERED AREA FROM ONE SIDE, ENSURING THAT THE GROUT FILLS THE ENTIRE SHUTTERED AREA WITH NO AIR POCKETS.
- " COVERAGE WILL BE APPROXIMATELY 1,4m² @ 10mm THICK PER 25KG BAG OF PRO-STRUCT 531m.
- " LEAVE SHUTTER IN POSITION FOR AT LEAST 24HRS AND THEN STRIP AND CLEAN DOWN THE NEWLY REPAIRED SURFACE.
- " REPAIRED AREAS MUST BE WET CURED FOR A MINIMUM OF 3 DAYS ONCE SHUTTERS HAVE BEEN STRIPPED.

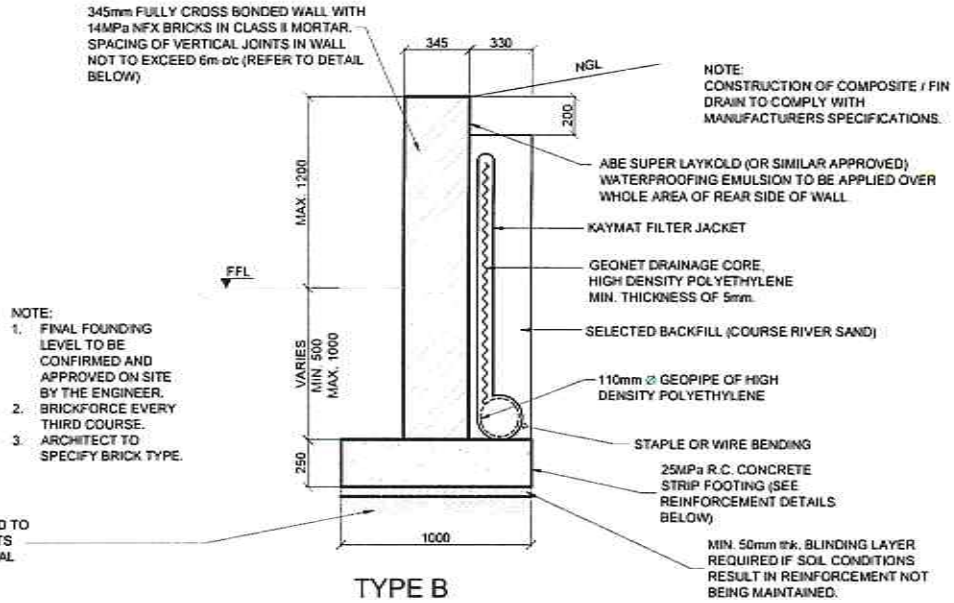
PROJECT	DETAILS	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	CONCRETE SPALLING REPAIRS - FOR REPAIRS OVER 30mm THICK	2016.07.06	B
		PROJECT No. 447	SKETCH No. SK 317



TYPE A

TYPICAL 345mm CROSS BONDED BRICK RETAINING WALL WITH WEEP HOLES

N.T.S

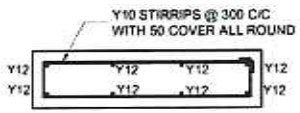


TYPE B

TYPICAL 345mm CROSS BONDED BRICK RETAINING WALL WITH COMPOSITE/FIN DRAIN DETAILS

N.T.S

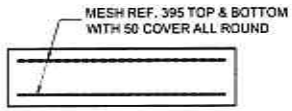
OPTION 1 OR OPTION 2 TO BE CONFIRMED BY ENGINEER ON SITE



OPTION 1

WALL FOUNDATION REINFORCEMENT DETAILS

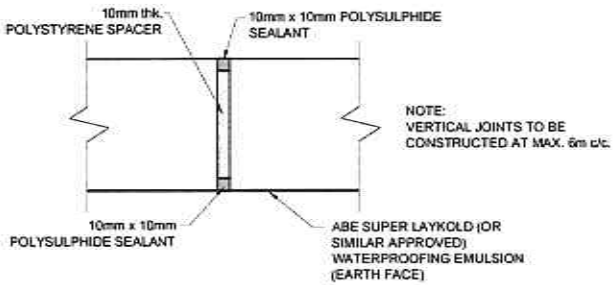
N.T.S



OPTION 2

WALL FOUNDATION REINFORCEMENT DETAILS

N.T.S



TYPICAL VERTICAL ISOLATION JOINT DETAIL

N.T.S

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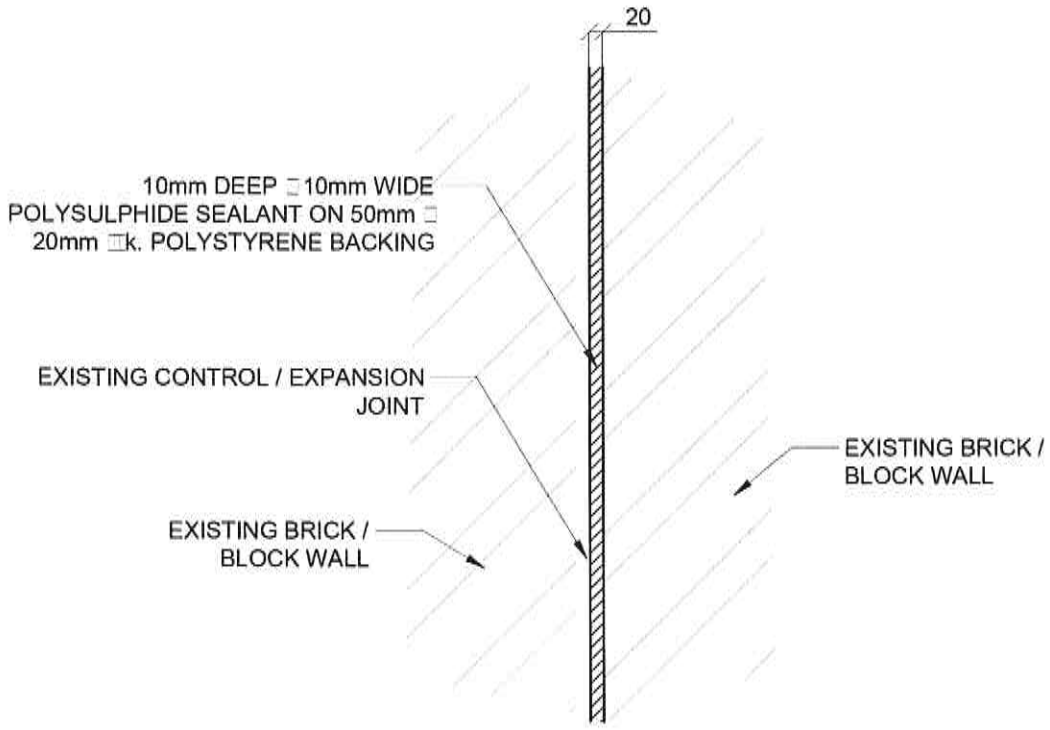
PROJECT: WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	DETAILS: TYPICAL 345mm FULLY CROSS BONDED BRICK RETAINING WALL DETAILS	DATE: 2016.07.06	REVISION: B
		PROJ. No: 447	SKETCH No: Sk 318

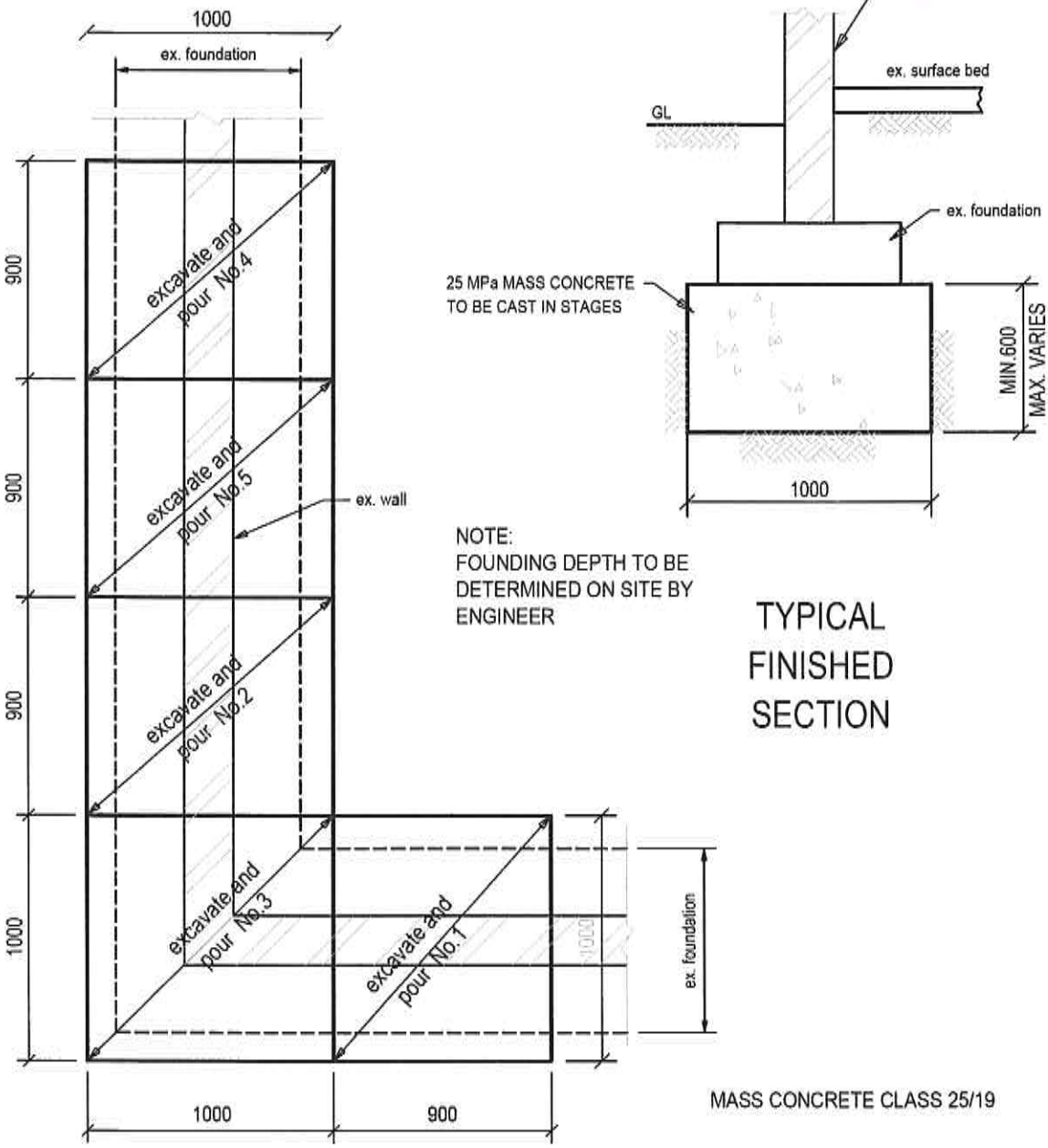
NOTES:

1. SCRAPE OUT AND REMOVE EXISTING MORTAR FILLER AT CONTROL / EXPANSION JOINT TO A MIN DEPTH OF 60mm.
2. INSERT 50mm □20mm THICK POLYSTYRENE BACKING ALONG LENGTH OF JOINT.
3. APPLY 10mm DEEP □20mm WIDE POLYSULPHIDE SEALANT TO COVER JOINT AND MAKE GOOD.



TYPICAL REPAIR DETAILS TO
EXISTING CONTROL / EXPANSION JOINTS
N.T.S

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL CONTROL JOINT DETAILS	2016.07.06	B
		PROJ. No. 447	SKETCH No. Sk 319



PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL UNDERPINNING DETAILS	2016.07.06	B
		PROJ. No. 447	SKETCH No. Sk 320

REPAIRS TO EXISTING CONCRETE SURFACE BED:

SURFACE PREPARATION :

" REMOVE ALL LOOSE, UNSOUND CONCRETE FROM THE AREAS TO BE REPAIRED.
" CUT OUT AROUND THE AREAS TO BE REPAIRED TO A MINIMUM DEPTH OF 10mm TO AVOID FEATHER EDGING.
" HIGH PRESSURE WATER BLAST THE PREPARED AREAS TO REMOVE ANY CONTAMINANTS.
" ENSURE THAT THE SUBSTRATE ONTO WHICH THE REPAIRED CONCRETE IS TO BE APPLIED IS SOUND AND FREE FROM LOOSE MATERIAL.
" IF REINFORCING IS EXPOSED & SHOWS SIGNS OF CORROSION, THE REINFORCING SHALL BE OPENED UP BY BREAKING OUT THE CONCRETE TO A DEPTH OF 20mm BELOW THE REINFORCING AND 50mm BEYOND THE CORRODED LENGTH OF THE REINFORCING.
" ANY EXPOSED STEEL MUST BE MECHANICALLY CLEANED AND COATED WITH 1 COAT OF PRO-STRUCT 688 : ZINC RICH PRIMER @ 4m²/LT.
" REMOVAL OF BADLY CORRODED REINFORCEMENT AND ITS REPLACEMENT- ALL TO ENGINEERS INSTRUCTIONS ON SITE.

TOLERANCES :

" IF LOOSE MATERIAL EXCEEDS MORE THAN 20mm THICK, THE ENTIRE CONCRETE SLAB IS TO BE DEMOLISHED AND RE-CAST AS PER SKETCH 369/SK 304.

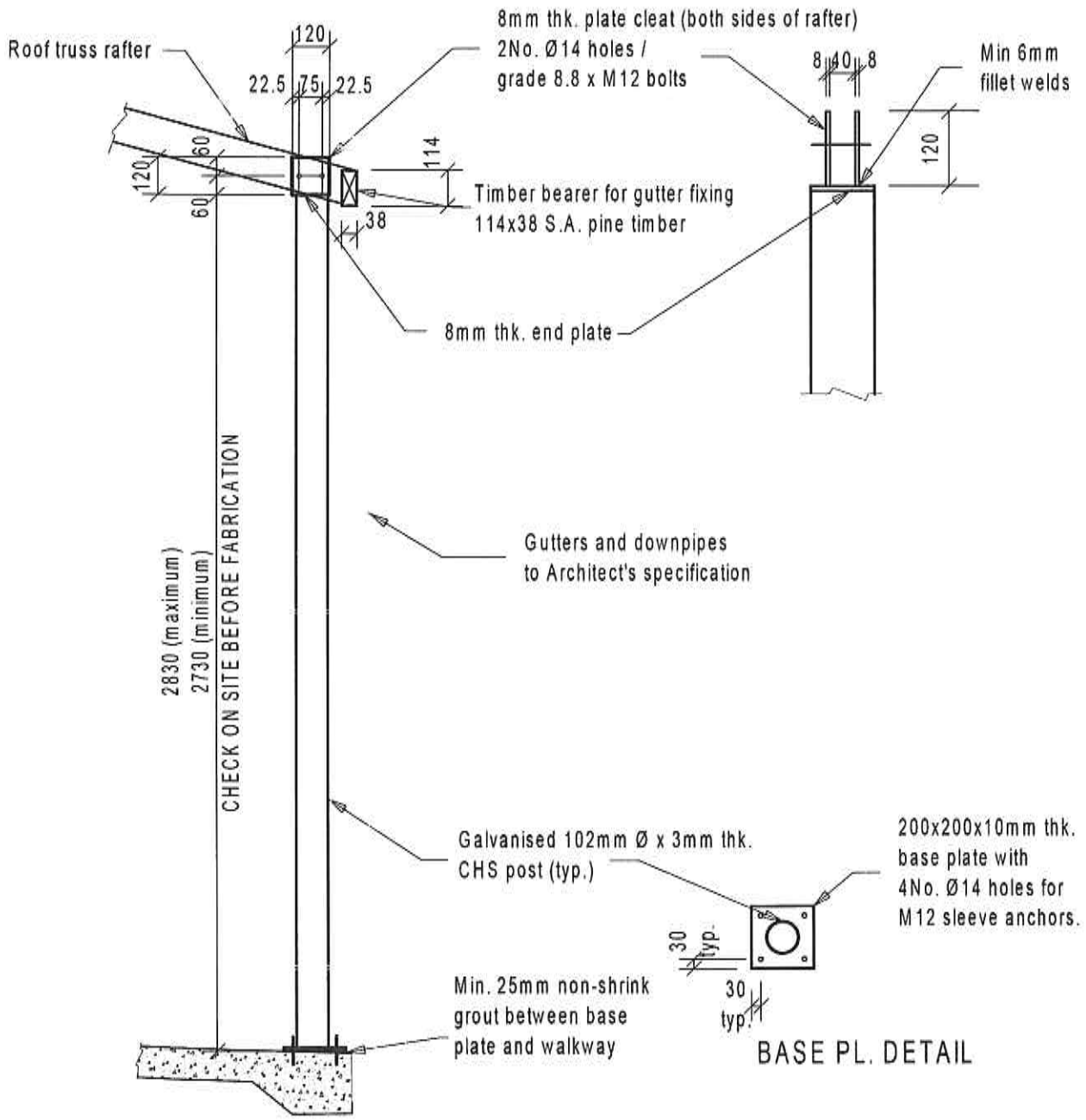
PRIMING :

" PRE-DAMPEN PREPARED SURFACE WITH WATER AS DESCRIBED BELOW.

REPAIR MATERIAL:

" THOROUGHLY WET THE SURFACE OF THE CONCRETE WITHIN THE REPAIR AREA WITH WATER.
" DRAIN EXCESS WATER.
" MIX PRO-STRUCT 617 WET TO DRY EPOXY GROUT AS PER DETAILED INSTRUCTIONS AND RE SCREED THE SURFACE BED.
" REPAIRED AREAS MUST BE WET CURED FOR A MINIMUM OF 3 DAYS ONCE SHUTTERS HAVE BEEN STRIPPED.

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	REPAIRS TO EXISTING CONCRETE SURFACE BED	2016.07.06	B
		PROJECT No. 447	SKETCH No. SK 321



STEEL POST DETAIL

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	GUTTER SUPPORT: STEEL POST DETAIL	2016.07.06	B
		PROJECT No. 447	SKETCH No. SK 322

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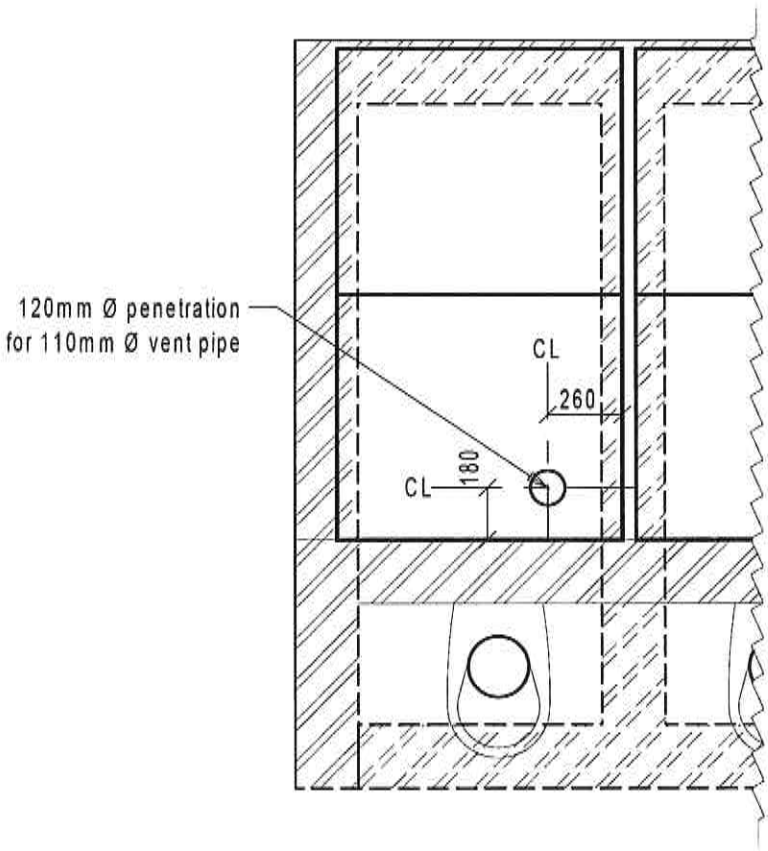
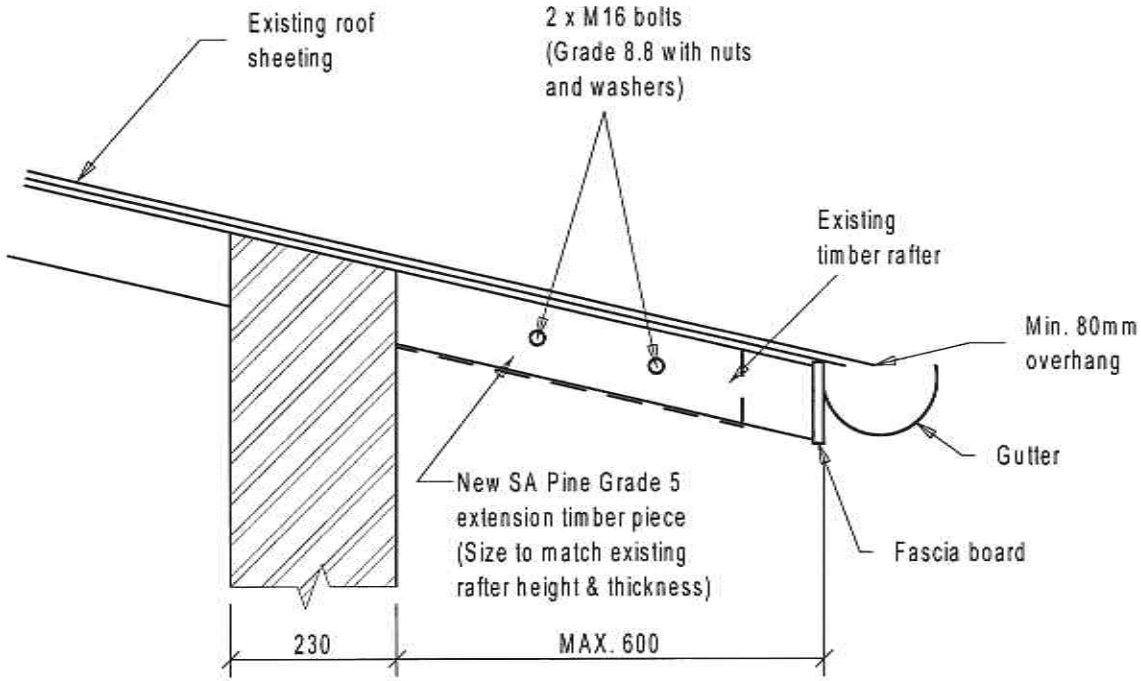


VENT PIPE SETTING OUT ON PRECAST PANEL FOR ABLUTION PITS

PROJECT	DETAILS	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL VENT PIPE SETTING OUT ON PRECAST PANEL FOR ABLUTION PITS	2016.07.06	B
		PROJECT No. 447	SKETCH No. SK 323



SPECIFICATION ON EXTENSION FOR TIMBER RAFTER

SCALE 1:10

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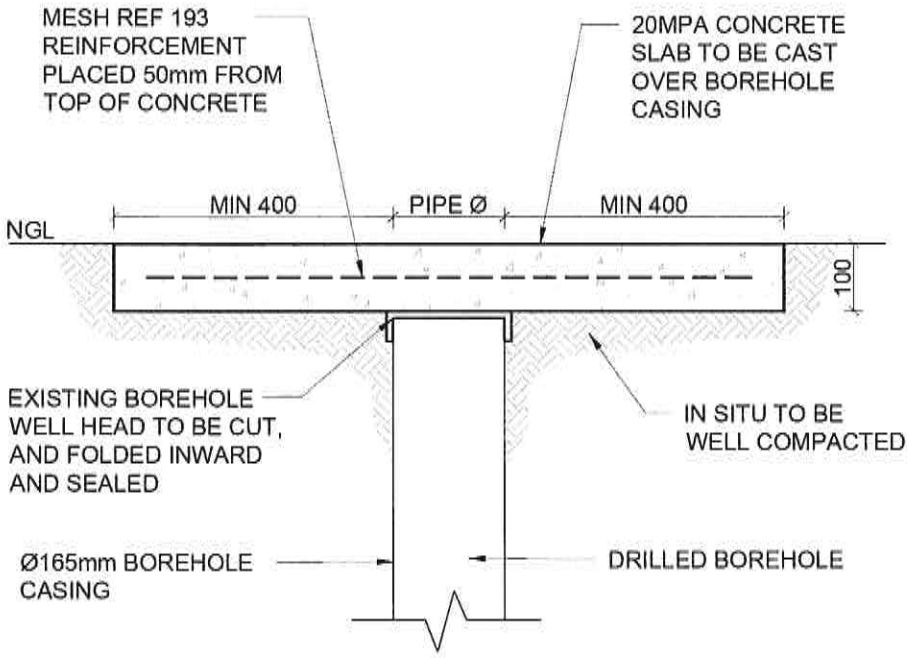
PROJECT
WIMS NO. 064539
DEPARTMENT OF EDUCATION
WATER & SANITATION PROGRAMME

DATE
2016.07.06

REVISION
B

DETAILS
SPECIFICATION ON EXTENSION FOR TIMBER RAFTER

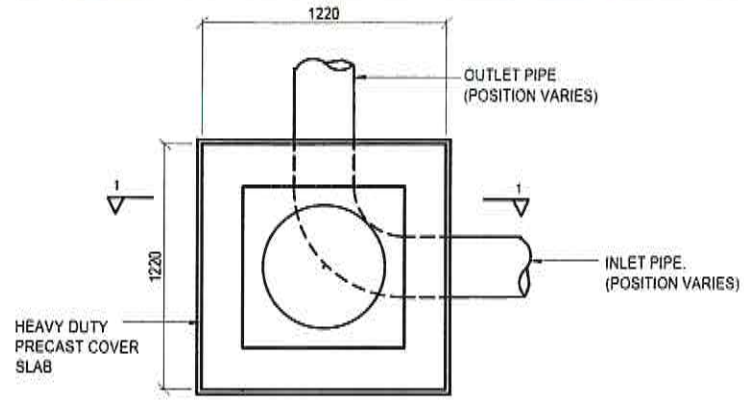
DRG. No.
447 / Sk 324



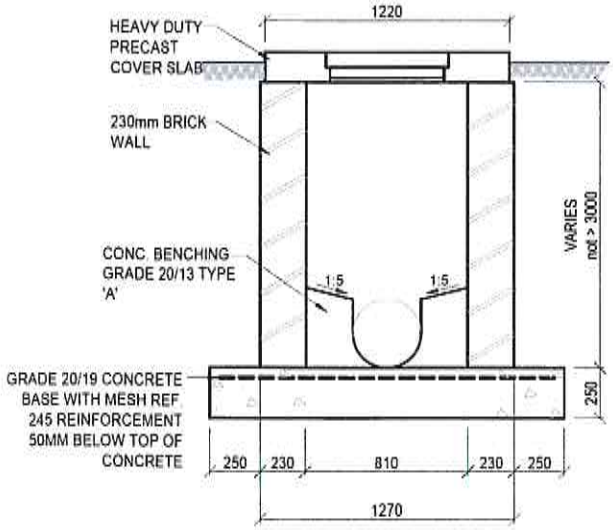
BOREHOLE CAPPING DETAIL

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	BOREHOLE CAPPING DETAIL	2018.06.18	A
		PROJ. No. 447	SKETCH No. Sk 325

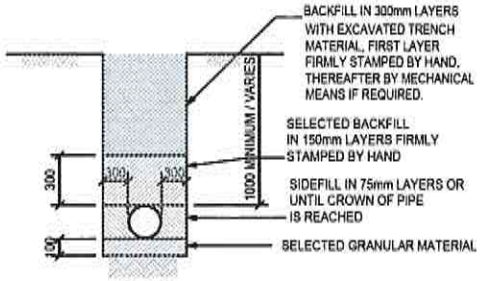
SECTION 3
CIVIL TYPICAL DETAILS AND SPECIFICATIONS



PLAN



SECTION 1 - 1



TYPICAL PIPE BEDDING DETAIL

N.T.S

TYPICAL MANHOLE DETAILS FOR DEPTHS NOT EXCEEDING 3000mm AND FOR PIPES SIZES NOT > 675mm Ø

N.T.S

NOTES

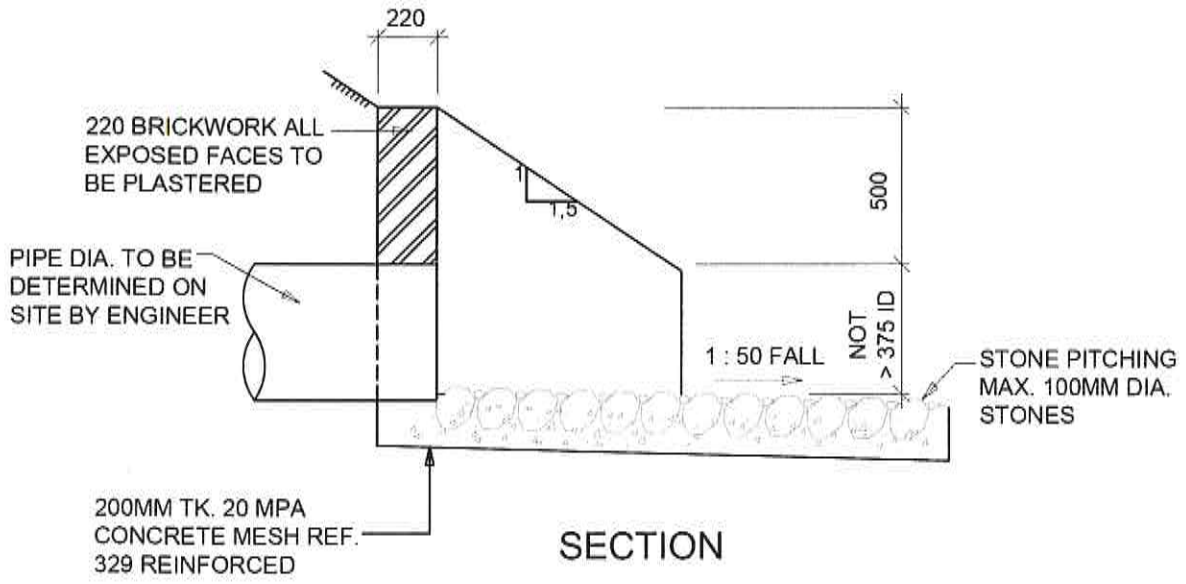
GENERAL

1. SETTING OUT TO ENGINEERS DETAILS.
2. PROVE ALL SERVICES PRIOR TO CONSTRUCTION.
3. ALL WORK AREAS TO BE REINSTATED (PREMIX, CONCRETE, ETC.)
4. SUPPLY AND INSTALLATION TO COMPLY WITH SANS 1200.
5. ALL LEVELS AND DIMENSIONS TO BE VERIFIED ON SITE.
6. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE ARCHITECTURAL AND MECHANICAL ENGINEERS DRAWINGS.

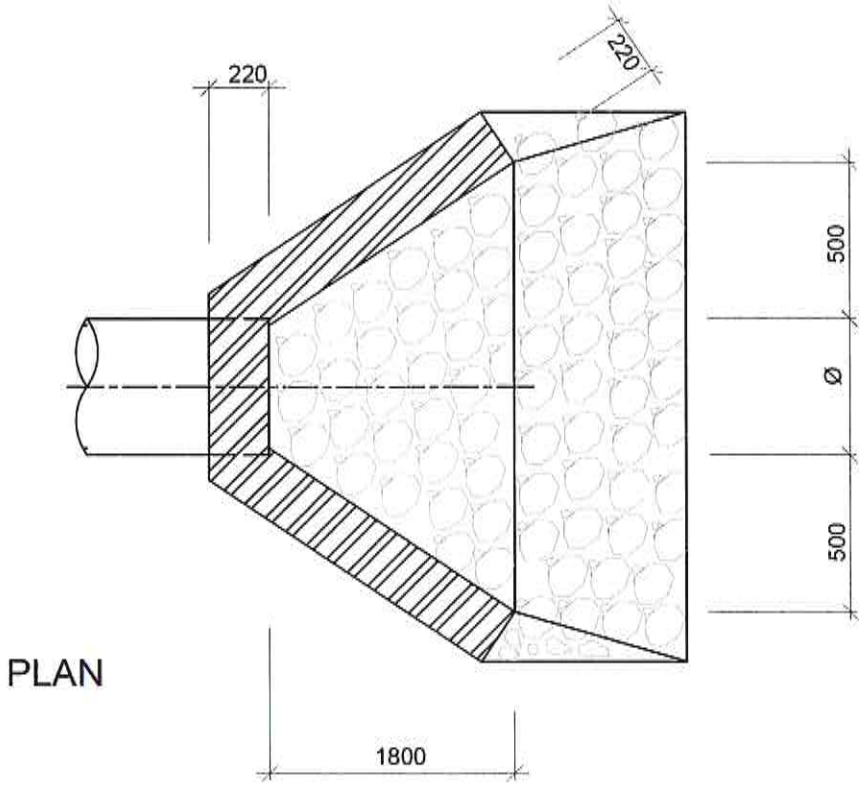
STORMWATER

1. THE INSITU GROUND MUST BE COMPACTED TO 95% MOD. A.A.S.H.T.O. PRIOR TO THE INLET BASE SLAB BEING CAST. IF THIS DENSITY CANNOT BE ATTAINED THE INSITU MATERIAL MUST BE REMOVED TO A DEPTH OF 300mm AND REPLACED WITH A SELECTED BACKFILL.
2. BRICKS TO BE ENGINEERING UNITS (NXFE-14) AS PER SABS 227.
3. TYPE AND CLASS OF PIPE AS SPECIFIED ON SITE.
4. MANHOLE COVER AND FRAME TO BE SPECIFIED ON SITE.

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL STORMWATER MANHOLE AND PIPE BEDDING DETAILS	2016.07.06	B
		PROJ. No. 447	SKETCH No. Sk 900



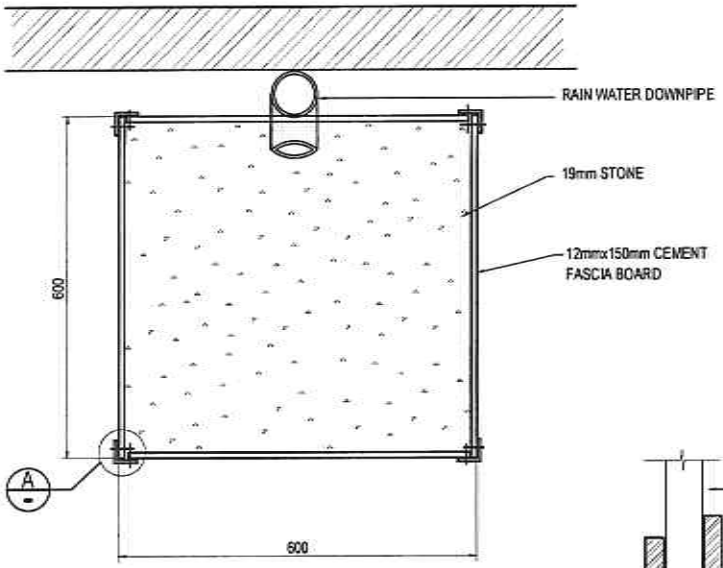
SECTION



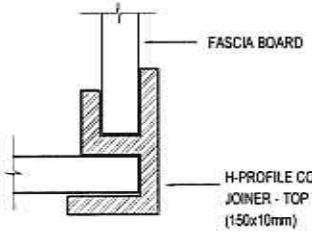
PLAN

STORMWATER HEADWALL DETAILS

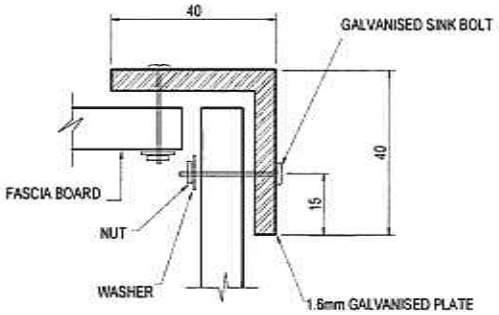
PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL STORMWATER HEADWALL DETAILS ; BRICK AND STONE PITCHED	2016.07.06	B
		PROJ. No. 447	SKETCH No. Sk 901



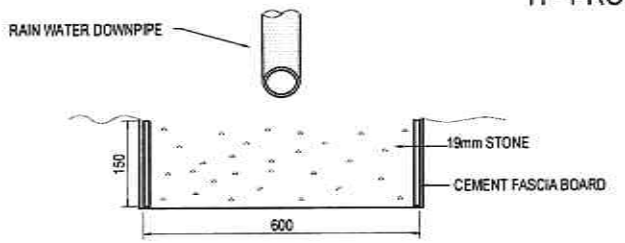
PLAN



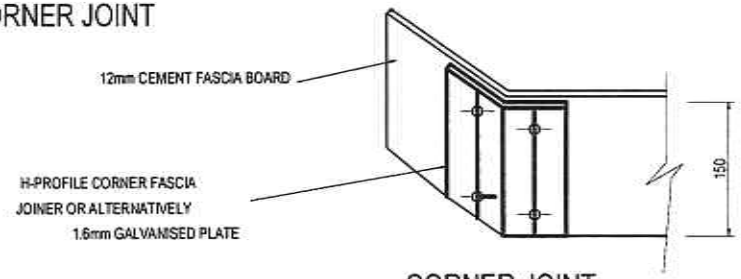
H - PROFILE CORNER JOINT



DETAIL A
(NB. ALTERNATIVE METHOD)



SECTION



CORNER JOINT

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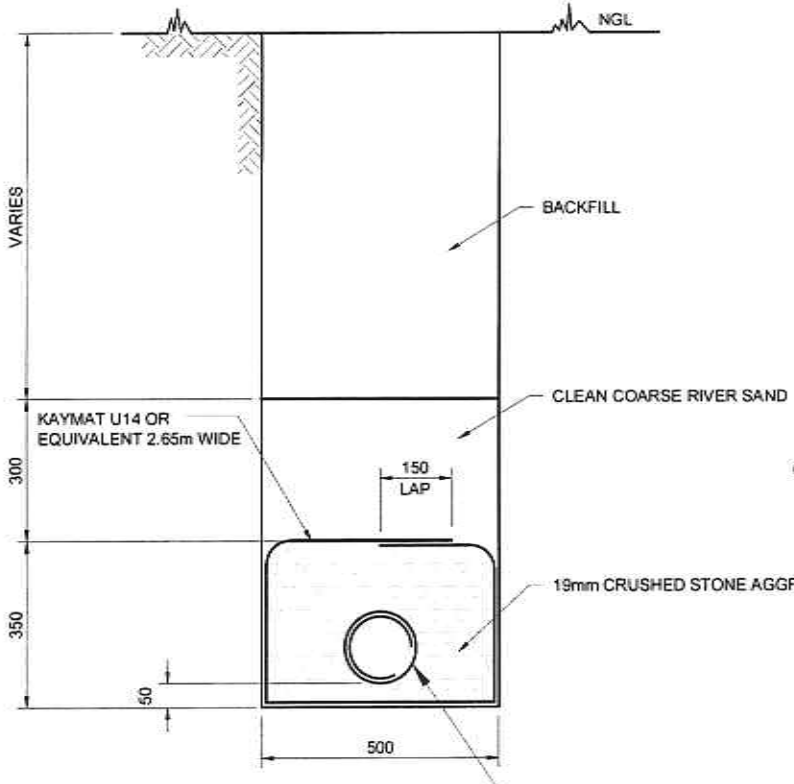
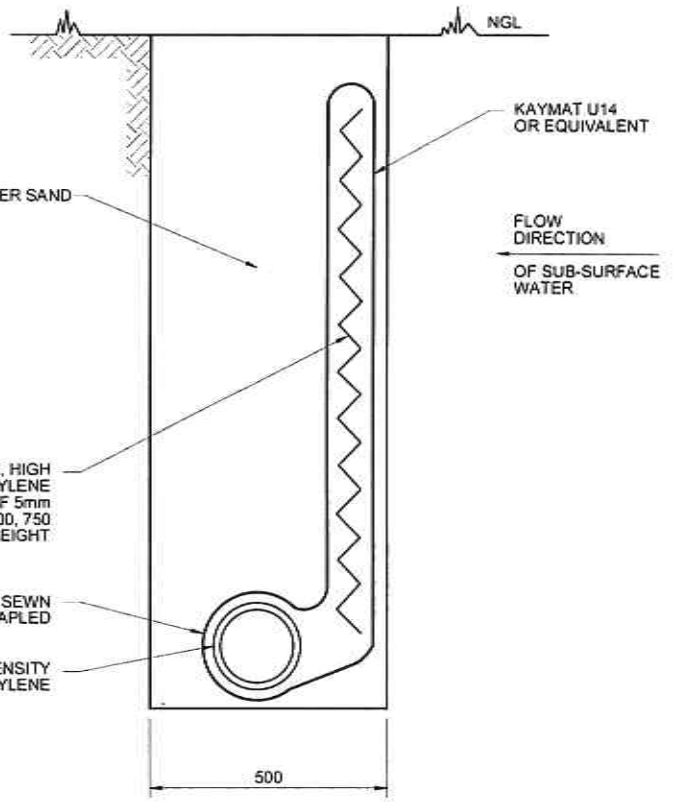
PROJECT: WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	DETAILS: TYPICAL DETAILS: SCOUR PROTECTION AT RWDP OUTLET	DATE 2016.07.06	REVISION B
		PROJ No 447	SKETCH No Sk 902



AGGREGATE DRAIN



COMPOSITE DRAIN

50, 65, 80, 100 OR 150mm dia. - GEOPIPE
OR
110 OR 160mm dia. uPVC PIPES CLASS 4 (SABS 966) SLOTTED
OR
VITRIFIED CLAY PIPES CLASS II (SABS 559) WITH
VITRO SUBSOIL DRAINAGE COUPLINGS
WITH TAPERED DRIVE JOINTS
OR
uPVC CORDRAIN (DIN 1187)
65, 90, 110 OR 160mm dia.

NOTES :

1. HOLES OR SLOTS TO BE LOCATED TOWARDS 4 & 8 O'CLOCK
2. ENGINEER TO ADVISE ON LEVELS AND POSITION ON SITE

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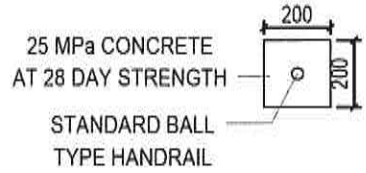
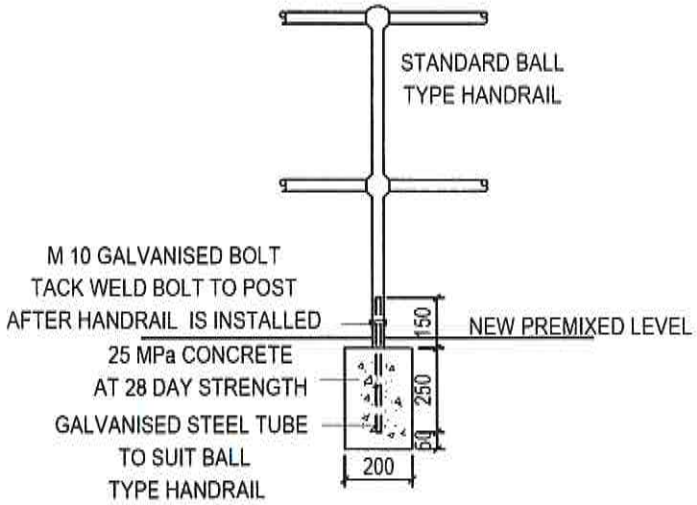
PROJECT: WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	DETAILS: TYPICAL SUB-SURFACE DRAINAGE DETAILS	DATE 2016.07.06	REVISION B
		PROJ. No. 447	SKETCH No. Sk 903

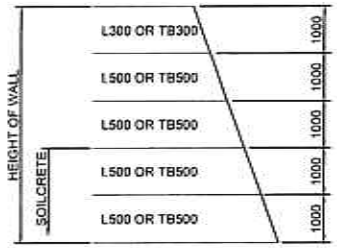


PLAN ON CONCRETE BASE
N.T.S



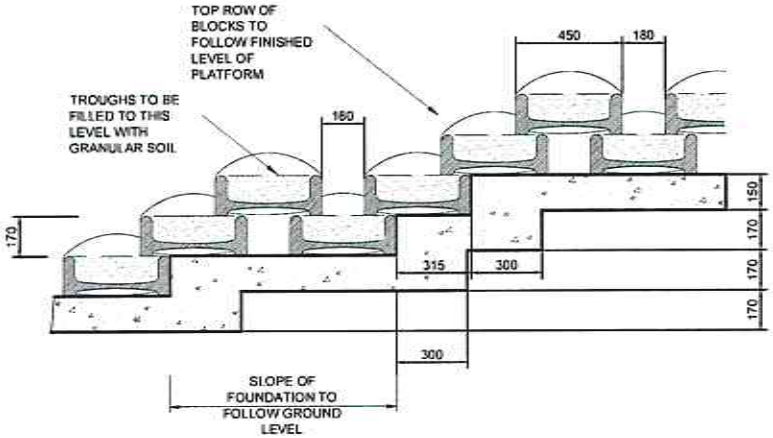
FIXING DETAIL FOR HANDRAIL
N.T.S

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL HAND RAIL DETAILS	2016.07.06	B
		PROJ. No. 447	SKETCH No. Sk 904

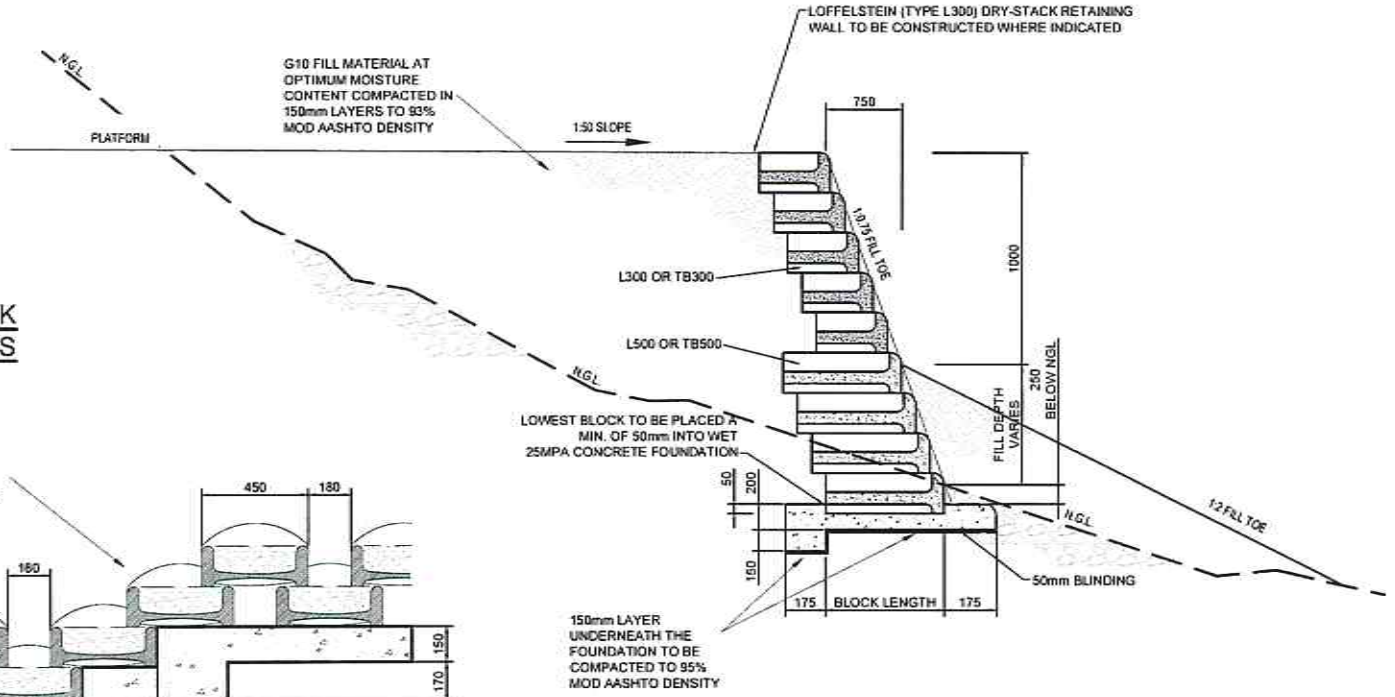


TYPICAL DETAIL SHOWING BLOCK TYPE AND SOILCRETE POSITIONS

N.T.S.



TYPICAL SIDE VIEW



TYPICAL SECTION THROUGH WALL

NOTE:
WHERE FILL DEPTH EXCEEDS 2.0m THEN USE SOILCRETE WITH 3% CEMENT, AT OPTIMUM MOISTURE CONTENT, COMPACTED BY HAND AS FILL MATERIAL BETWEEN AND BEHIND BLOCKS BELOW THIS POINT. (500mm BEHIND BLOCK AND 300mm INTO BLOCK)

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PROJECT: WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	DETAILS: TYPICAL DRY-STACK RETAINING WALL DETAILS	DATE: 2016.07.06	REVISION: B
		PROJ. No: 447	SKETCH No: Sk 905

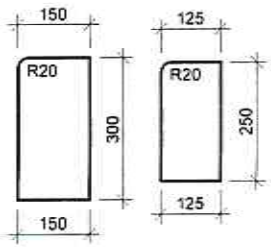


FIG. 1

FIG. 2

RECTANGULAR KERBS

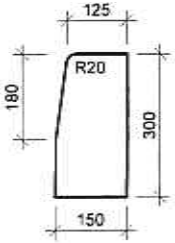


FIG. 3

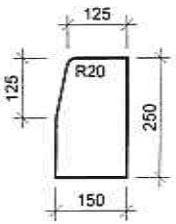


FIG. 4

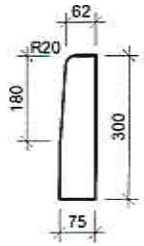


FIG. 5

HALF-BATTERED KERBS

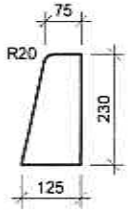


FIG. 6

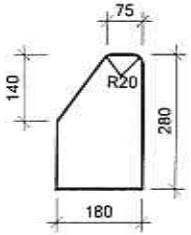


FIG. 7

BATTERED KERBS

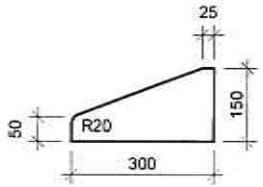


FIG. 8

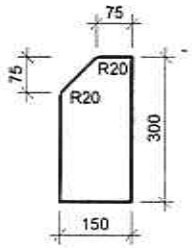


FIG. 9

MOUNTABLE KERBS

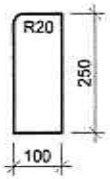


FIG. 10

RECTANGULAR

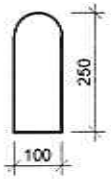


FIG. 11

HALF-ROUND EDGINGS

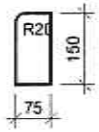


FIG. 12

RECTANGULAR

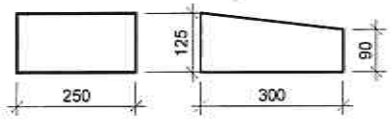


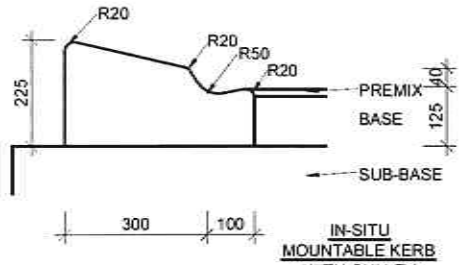
FIG. 13

RECTANGULAR

FIG. 14

TAPERED

CHANNELS



IN-SITU MOUNTABLE KERB WITH GULLEY

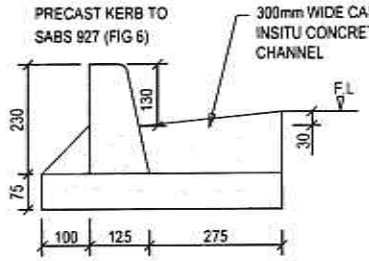


FIG 6 KERB DETAIL - WITH CHANNEL

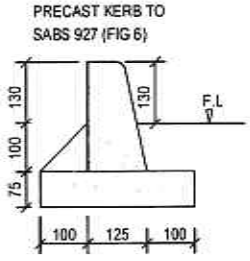


FIG 6 KERB DETAIL -NO CHANNEL

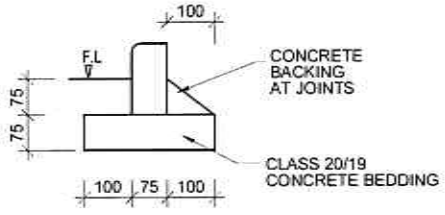


FIG 12 KERB DETAILS

NOTE

EXPANSION JOINTS OF 12mm WIDTH AT 20m INTERVALS AS PER CLAUSE 5.7 OF SABS 1200 M/C

MASS CONCRETE BACKING AT ALL JOINTS

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MAP AFRICA
CONSULTING ENGINEERS

PROJECT: WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TITLE: TYPICAL KERBING DETAILS	DATE 2016.07.06	REVISION B
		PROJ. No. 447	SKETCH No. Sk 906

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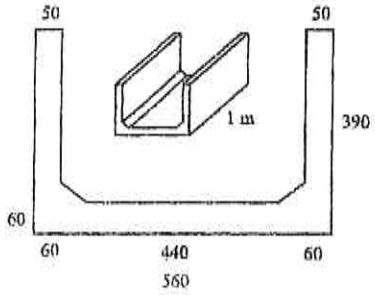
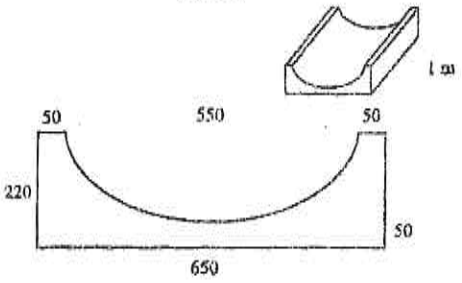
SURFACE WATER CHANNELS

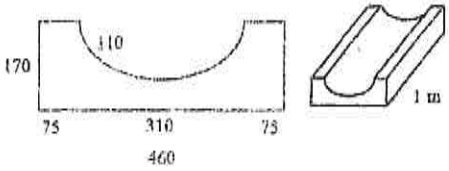
SWC 1



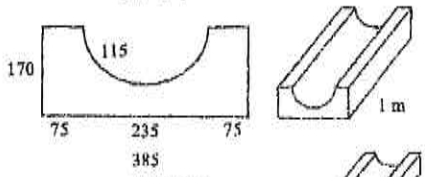
SWC 2



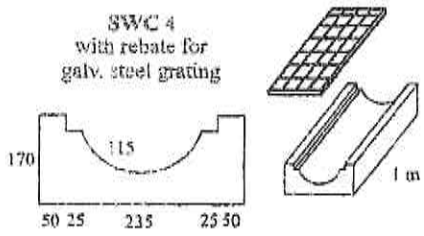
SWC 3



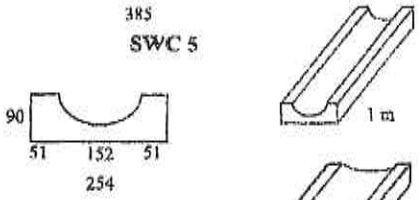
SWC 4



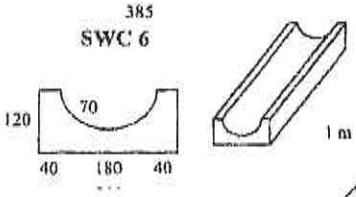
SWC 4
with rebate for
galv. steel grating



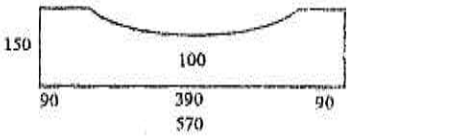
SWC 5



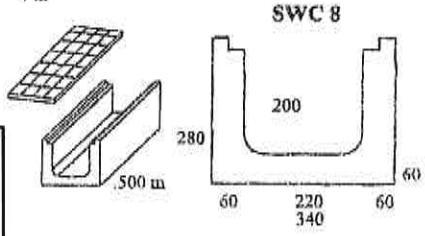
SWC 6



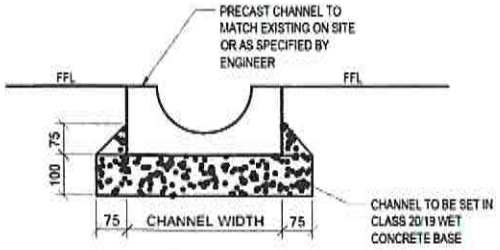
SWC 7



SWC 8



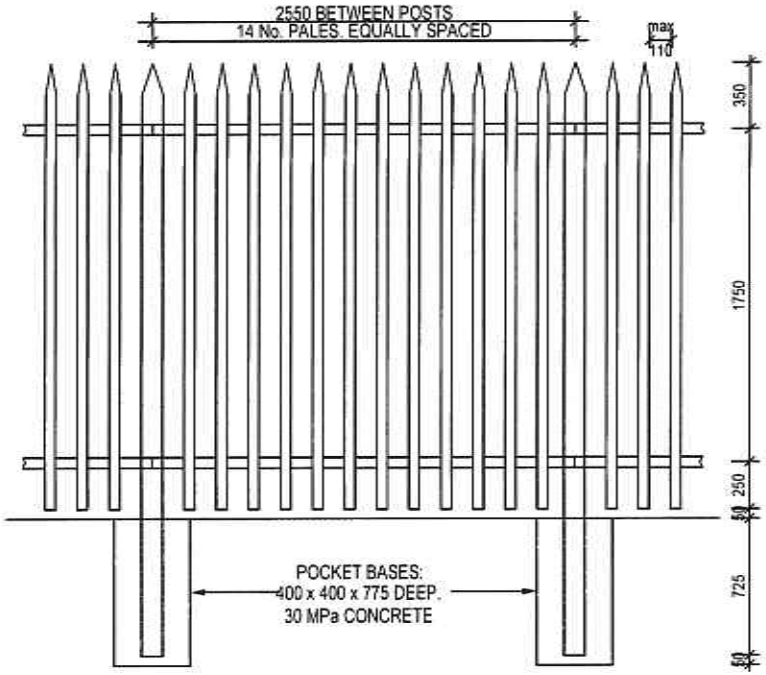
with rebate for
galv. steel grating



TYPICAL INSTALLATION DETAILS FOR PRECAST CONCRETE SURFACE WATER CHANNELS

N.T.S

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL STORMWATER SURFACE CHANNEL TYPES AND INSTALLATION DETAILS	2016.07.06	B
		PROJ. No. 447	SKETCH No. Sk 907



STEEL PALISADE FENCE – SPECIFICATION NO. 278/SPF SPECIFICATION FOR THE FABRICATION AND INSTALLATION OF STEEL PALISADE FENCING

1 DIMENSIONS AND GENERAL CHARACTERISTICS

1.1 MAIN POSTS
SHAPED IPE 100 SECTIONS. 100 X 55 X 8.1 kg/m. GRADE 300 W. HOT-ROLLED SECTIONS. SLOTTED TO RECEIVE FISH PLATES TOP AND BOTTOM.

1.2 RAILS
TOP AND BOTTOM RAIL : 60 X 60 X 5 ANGLES. GRADE 300W, HOT-ROLLED SECTIONS.

1.3 PALES
40 X 40 X 5 ANGLES. GRADE 300W. HOT ROLLED SECTIONS.

1.4 FISH PLATES
140 X 50 X 8 mm FLAT BAR

1.5 FIXINGS
PALES TO RAIL : WELDING TO SABS STANDARDS RAILS TO FISH PLATE: M12 'ANT-VANDAL' SHEAR FIXINGS, TOP AND BOTTOM GRADE 8.8

2. CONSTRUCTION

2.1 POSTS SHALL BE PROVIDED AT 2.55m CENTER TO CENTER, SHAPED TO A POINT AT THE TOP. POST TO BE EMBEDDED IN 30 MPa CONCRETE POCKET BASE (MIN. 400 X 400 X 800 DEEP) TO A MINIMUM DEPTH OF 725mm.

2.2 POSTS TO RAILS CONNECTIONS
RAILS SHALL BE SECURED TO POSTS WITH CONNECTOR PLATES OR 'FISH PLATES', BOLTED TO THE VERTICAL LEG OF THE RAIL.

2.3 PROTECTIVE TREATMENT
AFTER THE FABRICATION OF FENCING COMPONENTS, INCLUDING THE PUNCHING OR DRILLING OF ANY HOLES, THE FENCING SHALL BE HOT-DIPPED GALVANIZED TO SANS 763 STANDARDS.

2.4 GENERAL
ALL FOUNDING CONDITIONS TO BE INSPECTED BY THE ENGINEER PRIOR TO CONCRETE BEING CAST. MAP AFRICA CONSULTING ENGINEERS TO APPROVE ALL SHOP DRAWINGS PRIOR TO FABRICATION OF THE STEEL PALISADE FENCE.

NOTES:

1. POSTS : IPE 100 x 55 (8.1 kg/m), RAILS: 60 x 60 x 5 ANGLES AND PALES: 40 x 40 x 5mm
2. PALES TO BE WELDED TO RAILS AND ALL WELDS TO BE 5mm CFW
3. ALL STEELWORK TO BE HOT-DIPPED GALVANISED TO SANS 763 STANDARDS
4. LOCATION OF FENCE TO BE CONFIRMED ON SITE PRIOR TO FABRICATION
5. ENGINEER TO INSPECT FOUNDING CONDITIONS PRIOR TO CONCRETE BEING CAST

TYPICAL SECTION ON STEEL PALISADE FENCE

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MAP AFRICA CONSULTING ENGINEERS

PROJECT: WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	DETAILS: TYPICAL GALVANISED STEEL PALISADE FENCING DETAILS	DATE 2016.07.06	REVISION B
		PROJ No 447	SKETCH No Sk 908

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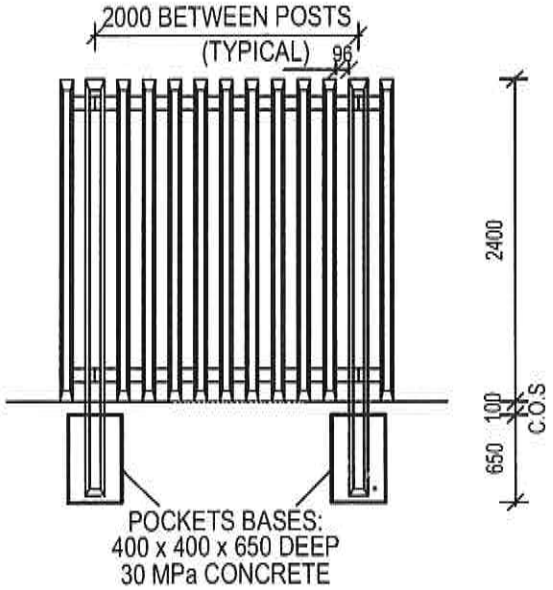
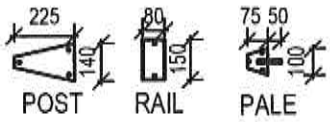
MAP AFRICA
CONSULTING ENGINEERS

1. LOCATION OF FENCE TO BE CONFIRMED ON SITE PRIOR TO FABRICATION AND/ OR CONSTRUCTION.
3. ENGINEER TO INSPECT FOUNDING CONDITIONS PRIOR TO CONCRETE.



TYPICAL ELEVATION ON CONCRETE PALISADE FENCE
SCALE 1 : 50

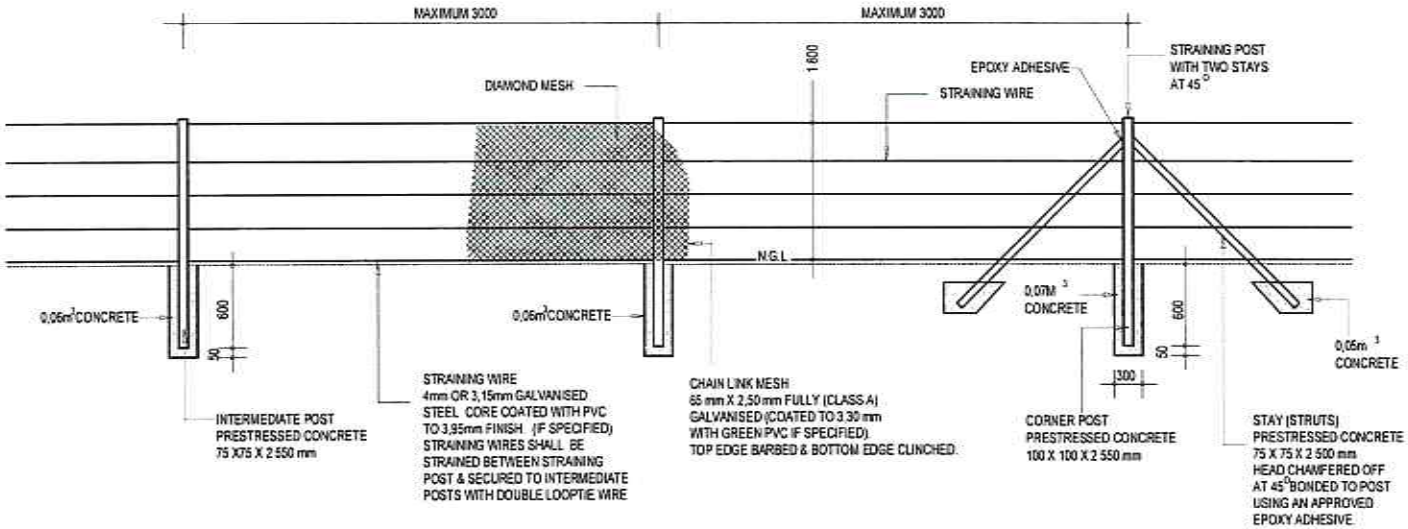


SECTIONAL DETAILS
SCALE 1 : 50

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL PRECAST CONCRETE PALISADE FENCING DETAILS	2016.07.06	B
		PROJ. No. 447	SKETCH No. Sk 909

NOTES :

1. ALL POSTS, DROPPERS AND STANDARDS TO BE ON THE INSIDE OF FENCE.
2. STRAINING POSTS TO BE USED AT EVERY CHANGE OF VERTICAL AND HORIZONTAL DIRECTION WITH A MAXIMUM SPACING OF 30 METRES.
3. INTERMEDIATE POSTS TO BE USED AT A MAXIMUM SPACING OF 3 METERS.
4. CONCERTINA GATES TO BE USED WHERE SPECIFIED.
5. SPECIFICATION FOR CORROSION PROTECTION FOR GATE TO BE SPECIFIED WHEN ORDERING.
6. SPECIFICATION FOR GATE HINGES TO BE SPECIFIED WHEN ORDERING. (EG. HOLE TYPE OR BRACKET TYPE).



CONCRETE FENCE SUPPORTS WITH CHAIN LINK MESH

N.T.S

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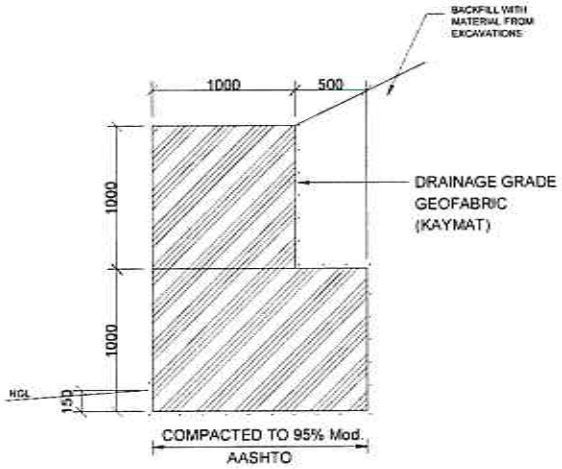
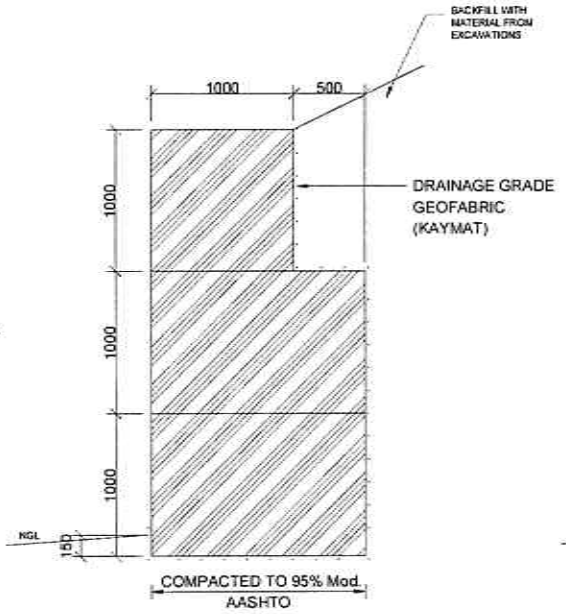
MAP AFRICA CONSULTING ENGINEERS

PROJECT: WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	DETAILS: TYPICAL WIRE MESH FENCING DETAILS	DATE 2016.07.06	REVISION B
		PROJ No 447	SKETCH No Sk 910

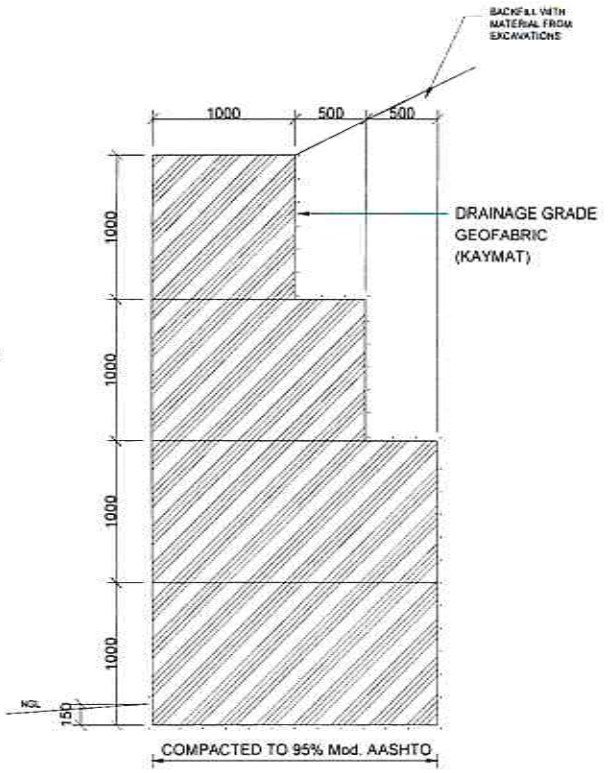
NOTES
1. FOUNDATIONS TO BE STEPPED AND PREPARED AS INSTRUCTED BY THE ENGINEER
2. GEOTEXTILE FABRIC TO BE GRADE C OR SIMILAR AS INSTRUCTED BY THE ENGINEER.
3. ALL WIRE USED IN THE MAKING OF GABIONS SHALL BE GALVANISED IN ACCORDANCE WITH THE PROVISIONS S.A.B.S 1560:1989 FOR CLASS A HEAVY GALVANISED MILD-STEEL WIRE.
4. THE STANDARD SIZES OF GABIONS ARE AS FOLLOWS
   LENGTH : 1.0m , 2.0m , 3.0m & 4.0m
   WIDTH : 1.0m 1.5m DEPTH : 0.5m & 1.0m
   DIAPHRAGM SPACING : 1.0m
5. LACING AND BRACING TO BE DONE IN ACCORDANCE WITH MANUFACTURES RECOMMENDATIONS



TYPICAL 2,0m HIGH WALL



TYPICAL 3,0m HIGH WALL



TYPICAL 4,0m HIGH WALL

TYPICAL DETAILS OF GABION RETAINING WALLS OF VARIOUS HEIGHTS

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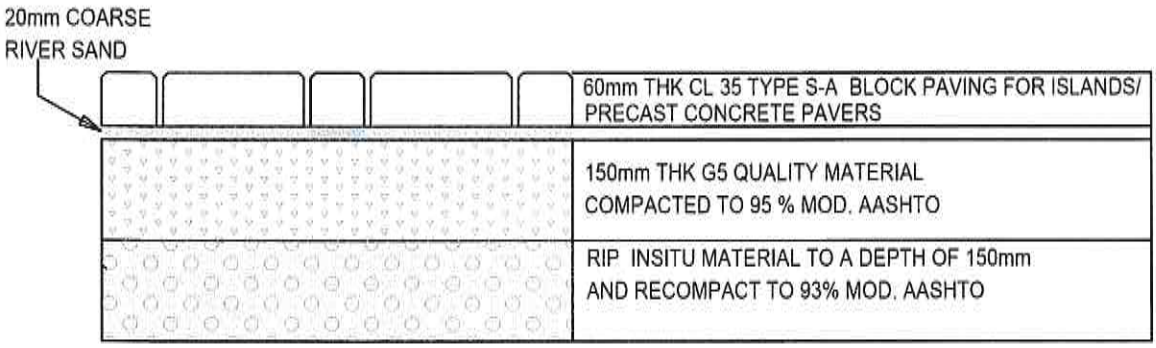
MAP AFRICA CONSULTING ENGINEERS

PROJECT: WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	DETAILS: TYPICAL GABION RETAINING WALL DETAILS	DATE 2016.07.05	REVISION B
		PROJ. No 447	SKETCH No Sk 911



TYPICAL BRICK PAVING/ PRECAST CONCTETE PAVING
LAYERWORK DETAILS
N.T.S

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION SANITATION PROGRAMME	TYPICAL BLOCK PAVING/ PRECAST CONCRETE PAVING LAYERWORK DETAILS	2016.07.06	B
		PROJ. No. 447	SKETCH No. Sk 912

PROPERTY	G1	G2	G3	G4	G5	G6	G7
MAX DIAMETER (mm)	37.5	37.5	37.5	53.0	63.0	63.0	100.0
GRADING MODULUS	GRADING ENVELOPE	GRADING ENVELOPE	GRADING ENVELOPE	GRADING ENVELOPE	>= 1.50	>= 1.20	>= 0.75
LIQUID LIMIT (MAX) (%)	25	25	25	25	30	-	-
PLASTICITY INDEX (MAX) (%)	4	6	6	6	10	12	12
10% FACT (MIN) (kN)	110	110	N.A.	N.A.	N.A.	N.A.	N.A.
LINEAR SHRINKAGE (%) (MAX)	2	3	3	3	5	6	6
ACV (MAX) (%)	29	29	N.A.	N.A.	N.A.	N.A.	N.A.
FLAKINESS INDEX (%)	<= 35.0	<= 35.0	N.A.	N.A.	N.A.	N.A.	N.A.
MIN. CBR %	N.A.	80 @ 98% MOD AASHTO	80 @ 98% MOD AASHTO	80 @ 98% MOD AASHTO	45 @ 95% MOD AASHTO	25 @ 93% MOD AASHTO	15 @ 93% MOD AASHTO
SWELL (MAX) % AT 100% MOD	N.A.	0.2	0.2	0.2	0.5	1.0	1.5
SOLUBLE SALTS (%)	< 0.2%	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
MgS_4O + $Na\ S_2O_4$ (%)	< 0.05%	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

MATERIAL PROPERTIES FOR :
CRUSHED STONE (G1,G2,G3)
NATURAL GRAVEL (G4,G5,G6)
GRAVEL SOIL (G7)

PROPERTY	G8	G9	G10	SELECTED FILL
GRADING MODULUS	NO REQUIREMENTS	NO REQUIREMENTS	NO REQUIREMENTS	0.75
MIN CBR% AT IN-SITU DENSITY	10	7	3	10
SWELL (MAX) % AT 100% MOD AASHTO	1.5	1.5	1.5	1.5
LIQUID LIMIT (MAX) (%)	N.A.	N.A.	N.A.	40
PLASTICITY INDEX (MAX) (%)	N.A.	N.A.	N.A.	18

MATERIAL PROPERTIES FOR
GRAVEL - SOIL AND SELECTED FILL

NOTES:

1. TYPE AND PERCENTAGE OF STABILIZATION TO BE DETERMINED BY LABORATORY
2. MATERIAL PROPERTIES DERIVED FROM TRH 14 & SABS. 1200

PROPERTY	C1	C2	C3	C4
MAX DIAMETER (mm)	37.5	37.5	63.0	63.0
GRADING MODULUS BEFORE TREATMENT	>= 1.50	>= 1.50	>= 1.50	>=1.50
LIQUID LIMIT (MAX) BEFORE (%)	25	25	30	45
PLASTICITY INDEX (MAX) BEFORE (%)	6	6	10	10
PLASTICITY INDEX (MAX) AFTER (%)	N.A.	N.A.	6	6
10% FACT (MIN) kN	110	110	N.A.	N.A.
ACV (MAX) (%)	29.0	29.0	N.A.	N.A.
FLAKINESS INDEX (%)	<= 35.0	<= 35.0	N.A.	N.A.
SAND ADDED EQUIVALENT (%)	>= 30.0	>= 30.0	N.A.	N.A.
UCS 100% MOD AASHTO (MPa)	> 6.0 < 12.0	> 3.0 < 6.0	> 1.5 < 3.0	> 0.75 < 1.5

MATERIAL PROPERTIES FOR
CEMENTED CRUSHED STONE OR NATURAL GRAVEL

SIEVE SIZE	% PASSING		
	G1,C1,C2	G2,G3,C1,C2	G4
53.0mm	100	100	100
37.5mm	100	100	85-100
26.5mm	84-94	100	-
19.0mm	71-84	85-95	60-90
13.2mm	59-75	71-84	-
4.75mm	36-53	42-60	30-65
2.00mm	23-40	27-45	20-50
0.425mm	11-24	13-27	10-30
0.075mm	4-12	5-12	5-15

GRADING ENVELOPE

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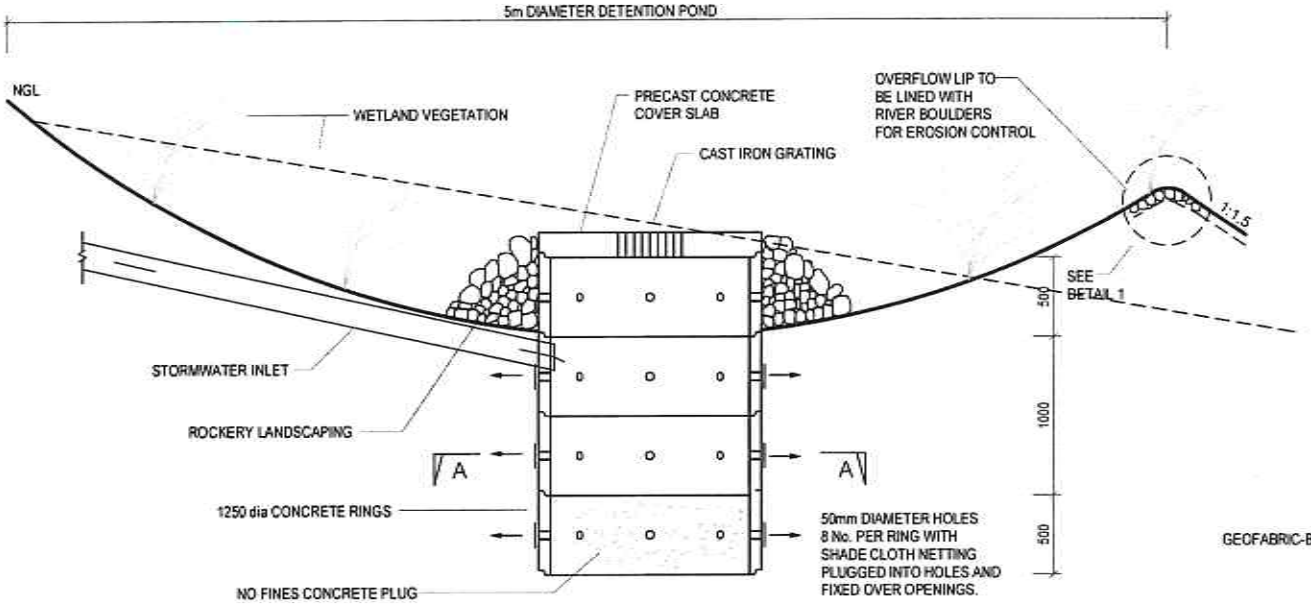
PROJECT:
WIMS NO. 064539
DEPARTMENT OF EDUCATION
WATER & SANITATION
PROGRAMME

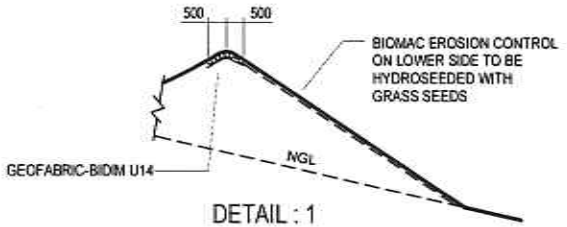
DETAILS:
MATERIAL PROPERTIES FOR LAYERWORKS

DATE: 2016.07.06
REVISION: B
PROJ No: 447
SKETCH No: Sk 913

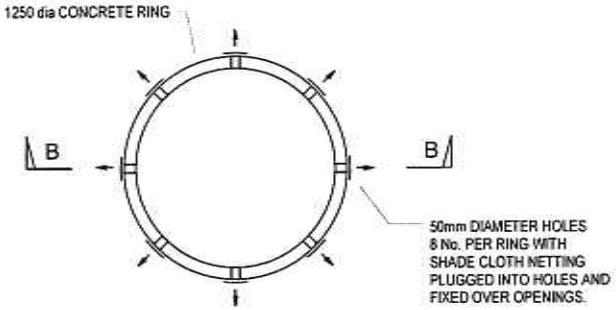


SECTION B-B
N.T.S

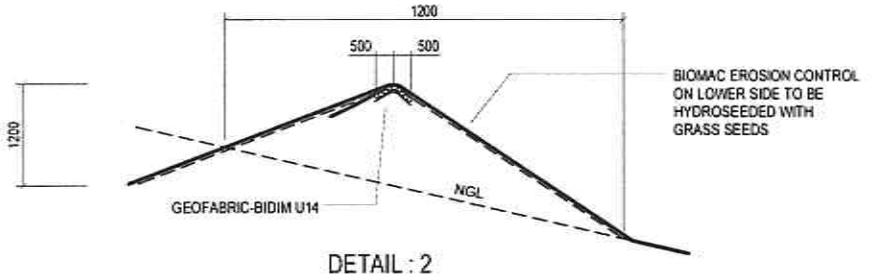
NOTE:
PIPE DIAMETER AND POSITION OF POND TO BE DETERMINED ON SITE BY ENGINEER



DETAIL : 1
N.T.S



SECTION A-A
N.T.S



DETAIL : 2
EARTH BERM AT THE SOUTH EASTERN BOUNDARY
N.T.S

TYPICAL DETAILS FOR SOAK AWAY

LDM
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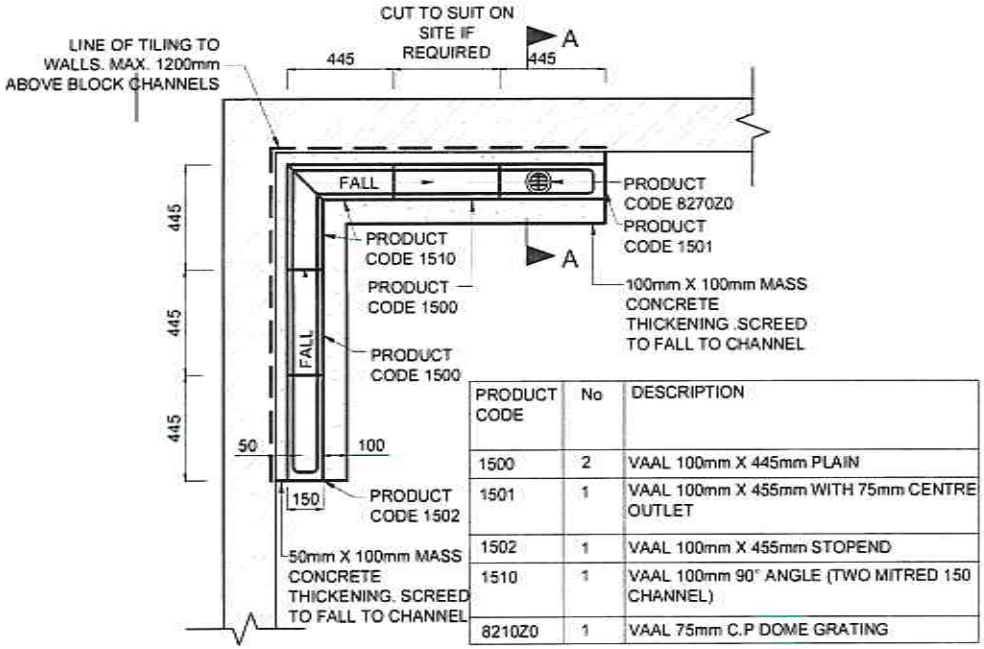
www.ldm.co.za

MAP AFRICA
CONSULTING ENGINEERS

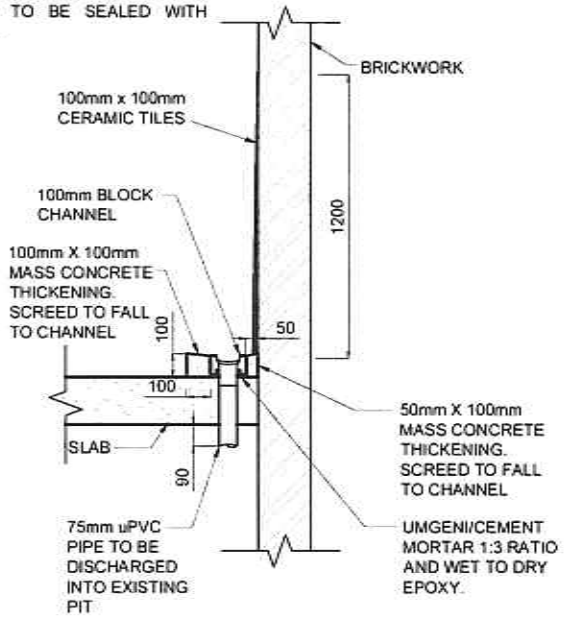
PROJECT: WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	DETAILS: TYPICAL STORMWATER SOAK AWAY DETAILS	DATE 2016.07.06	REVISION B
		PROJ. No. 447	SKETCH No. Sk 914



PRODUCT CODE	No	DESCRIPTION
1500	2	VAAL 100mm X 445mm PLAIN
1501	1	VAAL 100mm X 455mm WITH 75mm CENTRE OUTLET
1502	1	VAAL 100mm X 455mm STOPEND
1510	1	VAAL 100mm 90° ANGLE (TWO MITRED 150 CHANNEL)
8210Z0	1	VAAL 75mm C.P DOME GRATING

PLAN
SCALE 1:20

NOTE:
THE CHANNELS ARE TO BE FIXED TO THE SURFACE BED WITH UMGENI/CEMENT MORTAR 1:3 RATIO AND WET TO DRY EPOXY.THE SURFACE BED IS TO BE SCABBLED PRIOR TO APPLICATION OF MORTAR.THE CHANNEL IS TO BE LAID AS PER PLAN FALL. ALL JOINTS BETWEEN CHANNELS TO BE SEALED WITH WATERPROOF GROUT.



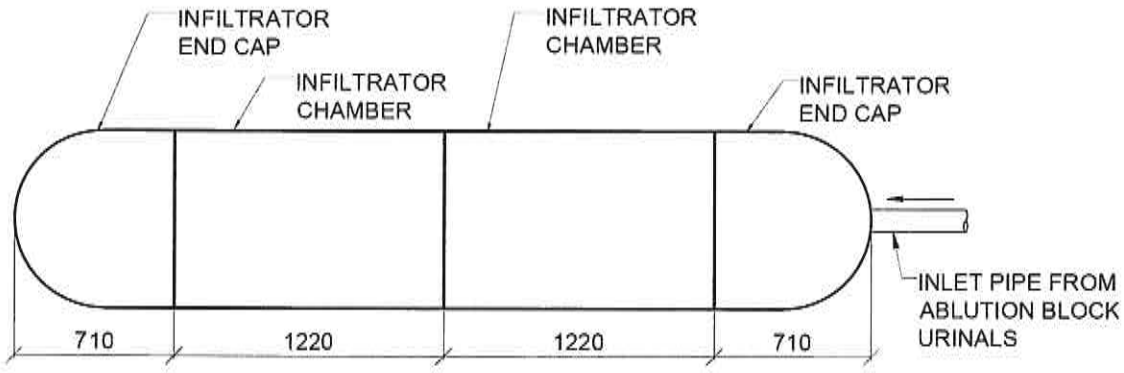
SECTION A-A
SCALE 1:20

FOR CONSTRUCTION

LDM Solutions For The Built Environment www.LDM.CO.ZA

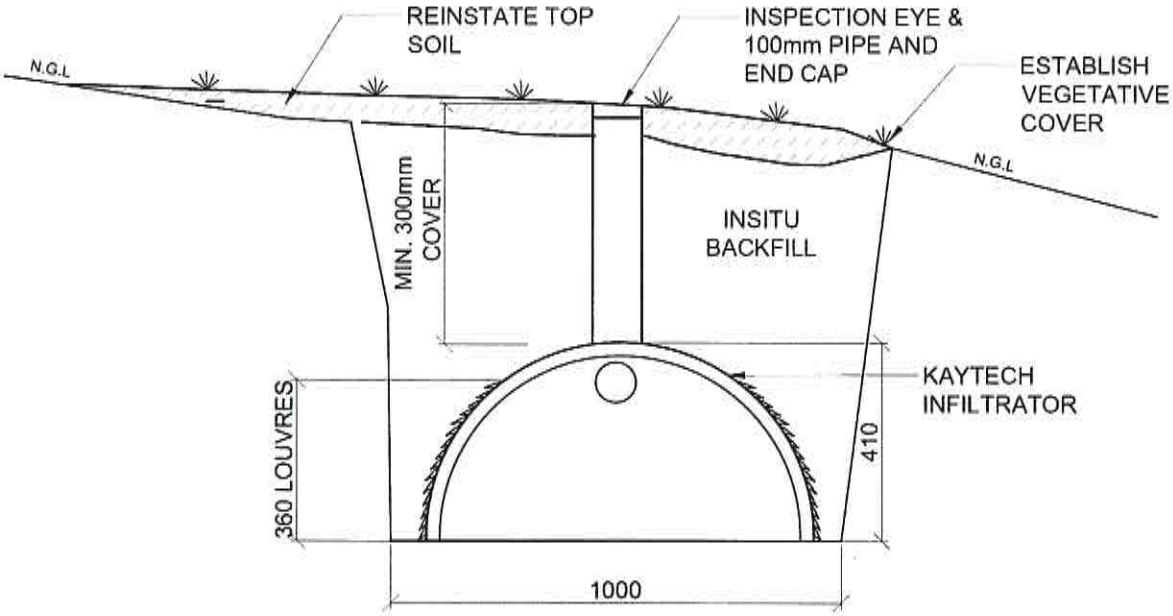
MMPAFRICA

PROJECT: WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	DETAILS: PLAN AND SECTION SHOWING URINAL TO BOYS ABLUTION	DATE 2016.07.06	REVISION B
		PROJ. No. 447	SKETCH No. Sk 915



PLAN

SCALE 1:30



SECTION

SCALE 1:15

TYPICAL SECTION THROUGH INFILTRATOR SOAKAWAY

PROJECT:	DETAILS:	DATE	REVISION
WIMS NO. 064539 DEPARTMENT OF EDUCATION WATER & SANITATION PROGRAMME	TYPICAL INFILTRATOR SOAKAWAY DETAIL FOR URINALS	2017.08.04	B
		PROJ. No. 447	SKETCH No. Sk 916