



LIMPOPO

PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF PUBLIC WORKS, ROADS & INFRASTRUCTURE

LIMPOPO PROVINCE DEPARTMENT OF PUBLIC WORKS, ROADS AND
INFRASTRUCTURE

BID NUMBER: LDPWRI-B/20047

PROVISIONAL BILLS OF QUANTITIES

for the

**CONSTRUCTION OF NEW ACCOMMODATION BLOCK C AND
RENOVATIONS TO THE EXISTING HALL AT THE LIMPOPO TRAFFIC
TRAINING COLLEGE IN THE VHEMBE DISTRICT**

for the

**THE DEPARTMENT OF TRANSPORT,
LIMPOPO PROVINCE**

CIDB CATEGORY: 7GB OR HIGHER

Cubic Professional Consultants

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CIBD Class Grading 7GB or Higher

CONTRACT NO: LDPWRI-B/20047

FOR

CONSTRUCTION OF NEW ACCOMMODATION BLOCK C AND RENOVATIONS TO
THE EXISTING HALL AT THE LIMPOPO TRAFFIC TRAINING COLLEGE IN THE
VHEMBE DISTRICT FOR THE LIMPOPO DEPARTMENT OF TRANSPORT

PROCUREMENT DOCUMENT

NAME OF TENDERER: _____

TENDER SUM: _____

ISSUED BY:

DEPARTMENT OF PUBLIC WORKS, ROADS & INFRASTRUCTURE
PRIVATE BAG X9491
POLOKWANE
015

Tel: (015) 284 7000/1



DEPARTMENT OF
PUBLIC WORKS, ROADS
AND INFRASTRUCTURE

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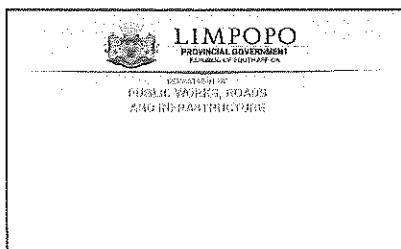
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PART T1 : TENDERING PROCEDURES

T1.1 Tender Notice and Invitation to Tender

LDPWR&I invites tenders for the **CONSTRUCTION OF NEW ACCOMMODATION BLOCK C AND RENOVATIONS TO THE EXISTING HALL AT THE LIMPOPO TRAFFIC TRAINING COLLEGE** for a period of 24 months.

It is estimated that tenderers should have a CIDB contractor grading designation of **7GB** or higher.

Only tenderers who meet the minimum requirements are eligible to submit tenders

The physical address for collection of tender documents is 43 Church street at Works Towers.

Tender documents are obtainable during the following times: 08:00 to 15:00 (Monday to Friday) as from **as per Tender Advert**

A compulsory clarification meeting with representatives of the Employer will take place at Limpopo Traffic Training College on **as per Tender Advert** starting at **as per Tender Advert**.

The closing time for receipt of tenders is **as per Tender Advert** on **as per Tender Advert** Telegraphic, telephonic, telex, facsimile, e-mail and late tenders will not be accepted.

Tenders must only be submitted on the tender documentation that is issued including priced bills of quantities.

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



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T1.2 Tender Data

Clause number	Tender Data
3.1	The Employer is Limpopo Department of Public works, Roads and Infrastructure
3.2	<p>The tender documents issued by the employer comprise the following documents:</p> <p>THE TENDER</p> <p>Part T1: Tendering procedures</p> <p>T1.1 - Tender notice and invitation to tender</p> <p>T1.2 - Tender data</p> <p>Part T2: Returnable documents</p> <p>T2.1 - List of returnable documents</p> <p>T2.2 - Returnable schedules</p> <p>THE CONTRACT</p> <p>Part C1: Agreements and Contract data</p> <p>C1.1 - Form of offer and acceptance</p> <p>C1.2 - Contract data</p> <p>PART C2: Special Notes to Bidders</p> <p>Part C3: Pricing data</p> <p>C3.1 - Provisional Bill of Quantities</p> <p>C3.2 - Electrical Installation</p>
3.3	<p>The employer's agent is :</p> <p>Name: Cubic Professional Consultants</p> <p>Address: Suite No.1, Parklane Building, 76 Hans Van Rensburg Street</p> <p>Tel: 015 297 1762</p> <p>Fax: 086 734 5100</p> <p>E-mail: cubicprofessional@telkomsa.net</p>
3.4	The language for communications is English

3.5	<p>Only those tenderers who are registered with the CIDB, or are capable of being so prior to the evaluation of submissions, in a contractor grading designation equal to or higher than a contractor grading designation determined in accordance with the sum tendered, or a value determined in accordance with Regulation 25 (1B) or 25(7A) of the Construction Industry Development Regulations, for a 7GB or higher class of construction work, are eligible to have their tenders evaluated.</p> <p>Joint ventures are eligible to submit tenders provided that:</p> <p>1. every member of the joint venture is registered with the CIDB;</p> <p>the lead partner has a contractor grading designation in the GB class of construction work; and the combined contractor grading designation calculated in accordance with the Construction Industry Development Regulations is equal to or higher than a contractor grading designation determined in accordance with the sum tendered for a 7GB class of construction work.</p>
3.6	<p>The arrangements for a compulsory clarification meeting are as stated in the Tender Notice.</p>
3.7	<p>Parts of each tender offer communicated on paper shall be submitted as an original, plus 0 copies.</p>
3.8	<p>A tender security in line with the JBCC is required and shall remain valid for a period from site handover until issue of final payment from the successful contractor.</p>
3.9	<p>The employer's details and address for delivery of tender offers and identification details that are to be shown on each tender offer package are:</p> <p>Location of tender box: DEPARTMENT OF PUBLIC WORKS, ROADS & INFRASTRUCTURE. Physical address: 43 Church street at Works Towers Identification details: Tender reference number, Title of Tender and the closing date and time of the tender</p>
3.10	<p>The tenderer is to submit the latest CSD Report</p>
3.11	<p>The closing time for submission of tender offers is as stated in the Tender Notice and Invitation to Tender.</p>
3.12	<p>The tender offer validity period is 120 days.</p>
3.13	<p>Access shall be provided for the following inspections, tests and analysis:</p>

NOTES TO BIDDERS

4.1. CRITERIA USED FOR THE EVALUATION/ ADJUDICATION OF INFRASTRUCTURE RELATED BIDS

4.1.1 The points are allocated as follows:

4.1.2 For projects above R500 000, the distribution of points is used as follows:

a. Bidders must complete SBD 6.2 – Local Content (Annexure C,D,E). Bidders who fail to comply with SBD 6.2 including annexure C will be disqualified

b. Functionality – A bidder must obtain a minimum of 70% under functionality to qualify for final evaluation.
Responsive bids will be evaluated using a point system which awards on the basis set out in the table below:

TENDER EVALUATION CRITERIA FOR QUALITY	WEIGHTING
<p>SIZE OF ENTERPRISE AND CURRENT WORKLOAD OF BIDDER</p> <ul style="list-style-type: none"> • Capacity to execute the contract (with reference to current projects) <ul style="list-style-type: none"> ○ Current value is equal or greater than twice the maximum value of the required CIDB grade = 0 ○ Current value is greater than the maximum value of the required CIDB grade but less than twice the maximum value of the required CIDB grade = 8 ○ Current value is within the required CIDB threshold = 12 ○ Current value is less than the minimum value of the required CIDB grade = 20 <p>Current value refers to current value of projects for both General Building (GB) and Civil Engineering (CE).</p> <p>Please list the current projects which your company is busy executing in the table below.</p> <p><i>NB: Completion of this table is mandatory for points to be allocated. (NB Do not refer to any attachment). If no projects at the moment the tender must indicate/write on this table (NB Misrepresentation of facts will render your bid non-responsive).</i></p>	<p>20</p>

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6000

PROFILE OF KEY STAFF (CVs and certified copies of qualifications must be attached for points to be allocated, and this must be linked to the company's organogram).

NB: Completion of this table is mandatory for points to be allocated (Do not refer to any attachment).

<p>Project's Supervisor</p> <ul style="list-style-type: none"> • Qualification <ul style="list-style-type: none"> ○ Degree in built environment =5 ○ National Diploma in built environment =3 ○ Certificate in built environment =1 • Experience <ul style="list-style-type: none"> ○ 5yrs experience or more = 5 ○ 2<5yrs Experience =3 ○ 1≤2yrs experience =1 <p>Construction Manager</p> <ul style="list-style-type: none"> • Qualification <ul style="list-style-type: none"> ○ Degree in built environment =5 ○ National Diploma in built environment =3 ○ Certificate in built environment =1 • Experience <ul style="list-style-type: none"> ○ 5yrs experience or more = 5 ○ 2<5yrs Experience =3 ○ 1≤2yrs experience =1 <p>Site Safety Officer</p> <p>Legal appointment for a Site Safety Officer appointed in terms of the Occupational, Health and Safety Act (OHS Act) and his/her CV and qualifications.</p> <ul style="list-style-type: none"> • Registration with the council <ul style="list-style-type: none"> ○ Registration with professional council in built environment=5 ○ None registration with the council=0 <p>Experience (registration or not)</p> <ul style="list-style-type: none"> • 5yrs experience or more=5 • 2<5yrs experience=3 • 1<2yrs experience=1 	<p>30</p>
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1100

Details of key staff

Name	Position	Qualifications	Professional Registration (if any)	Previous Project Experience	Role in this project	Indicate whether Full time/Part time on this project

PREVIOUS EXPERIENCE

Relevant Experience in Similar Projects completed on time (in the last 10 years) and Include the following:

- Similar Projects = 5 to 20
- If Project(s) value is greater than 1,5 times the maximum value of the required CIDB grade = 20
- If Project(s) value is greater than the maximum value of the required CIDB grade but less than 1,5 times the maximum value of the required CIDB grade = 15
- If Project(s) value is twice the minimum value of the required CIDB threshold and completed on time = 10
- If Project(s) value is equal to or greater than the minimum value of the required CIDB grading and less than twice the minimum value of the required CIDB grade = 5
- If Projects value is less than the required CIDB grade = 0
- If Projects value is for unrelated project (s) = 0

NB. Completion of this table is mandatory for points to be allocated (NB Do not refer to any attachment). Site Handover Certificate, Practical completion certificate and approved extension of time award letters (if any) must be attached as proof of completion on time for full points to be allocated

20

Details of projects completed in the last 10 years

Project Description (include type of works- GB, CE, etc.)	Project Value	Completion Certificate attached (Yes/No)	Client Name	Contact Person (Tel)	

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PROPOSAL AND METHODOLOGY <ul style="list-style-type: none"> • Project Proposal/Approach = 10 • Project Schedule/programme Gantt Chart(Acceptable Scheduling Software) = 5 • Cash-flow Projections = 5 	20
SAFETY, HEALTH AND ENVIRONMENTAL POLICY (SHEQ) <ul style="list-style-type: none"> • Bidder has submitted no information or inadequate information to determine scoring level=0 • The bidder has misunderstood certain aspects of the scope of work and does not address safety and health issues related to the works – i.e. there is no cognisance to the safety of the learners, teachers and workers and the impact of their work on the environment=5 • The safety, health and environment approach provided deal with the critical aspects of the project, such as demolishing, refurbishment and risk associated with the works. Cognisance is taken dealing with safety of the workers, learners and teachers when conducting their works such as barricading of the area, conducting safety talk with the affected parties=10 	10
TOTAL	100
N.B To qualify for final evaluation on all infrastructure projects, the bidder must obtain a minimum score of 70% on functionality.	

4.1.3	<p>NOTE: In order for the Tenderer to claim points for Experience under Functionality, the Tenderer must also attach the following proof for each of the completed projects to Form T2.1:</p> <ul style="list-style-type: none"> • Copy of Appointment Letter for current and completed projects, and • Copy of Completion Certificate for completed projects.

4.2

Second stage – Compliance to administrative requirements

Failure to comply with the following administrative requirements may disqualify the bidder

Bidders will be evaluated on the following administrative compliance:

- **Submit Power of attorney / authority for signatory**
- **Submit Full CSD Report**
- **Submit Joint Venture Agreement (If applicable)**
- **In case of a JV – A JV or Both Parties CSD Report must be submitted**
- **Submit Fully Completed Compulsory Declaration Form**
- **Alterations to the bid document or submission of a copy of the original bid document is not allowed**
- **Completion of the Bid Document must be done with a non-erasable black pen**
- **Non completion of form of offer**
- **Submission of Fully Completed and Priced Bill of Quantities**

Third stage – Evaluation in terms of the 80/20 Preference Point System:

Responsive tenders which have achieved the minimum qualification score for functionality will be evaluated further, using the 80/20 preference point system.

Step 1: Calculation of points for Price

The PPPFA prescribes that the lowest acceptable bid will score 80 points for price. Bidders that quoted higher prices will score lower points for price on a pro-rata basis. The formula to be used for calculating points scored for price is the following:

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

Where

P_s = Points scored for price of the bid or tender under consideration

P_t = Price (Rand value) of bid or tender under consideration

P_{min} = Price (Rand value) of the lowest acceptable bid or tender

Points scored must be rounded off to the nearest 2 decimal

4.3

Step 2: Calculation of points for B-BBEE status level of contributor

Points shall be awarded to a bidder for attaining the B-BBEE status level of contribution in accordance with the table below

Point System

Scoring of B-BBEE STATUS LEVEL OF CONTRCTOR: (20 points)

B-BBEE STATUS LEVEL OF CONTRCTOR	NUMBER OF POINTS
1	20
2	18
3	16
4	14
5	8
6	6
7	4
8	2
Non-compliant contributor	0

A bid shall not be disqualified from the bidding process if the bidder does not submit a certificate substantiating the B-BBEE status level of contribution nor is a non-compliant contributor. Such a bidder will score zero (0) out of a maximum of 20 points for B-BBEE.

The points scored for price shall be added to the points scored for B-BBEE status level of contribution to obtain the bidder's total points scored out of 100.

Award of contract to bids not scoring the highest number of points

- (a) A contract must be awarded to the bidder who scored the highest total number of points in terms of the 80/20 preference point system.
- (b) In exceptional circumstances a contract may, on reasonable and justifiable grounds, be awarded to a bidder that did not score the highest number of points. The reasons for such a decision must be approved and recorded for audit purposes and must be defensible in a court of law.

Evaluation of bids that scored equal points

- (a) In the event that two or more bids have scored equal total points, the successful bid must be the one that scored the highest points for B-BBEE.
- (b) If two or more bids have equal points, including equal preference points for B-BBEE, the successful bid must be the one scoring the highest score for functionality.
- (c) In the event that two or more bids are equal in all respects, the award must be decided by the drawing of lots.

4.4 Risk assessment

The bidder must be evaluated for risk as set out by the department before considering the recommendations

The tendering Service Provider's experience and performance on comparable projects during the past 5 years. Aspects to be regarded as "comparable" includes (but may be extended according to circumstances): size of projects (measured against monetary value, or other project quantifying parameters), nature of projects (building, engineering, high/low rise, etc.), locality/area of execution (site-specific influences, knowledge of local conditions, etc.), complexity of project, projects for similar client department irrespective of end purpose of buildings/facilities created or in progress of being created and time scales of projects (normal, fast track, etc.) and stage of its/their development.

[An opinion will be formed by each of the members of an evaluation panel according to his/her assessment of the experience and performance of the tendering Service Provider from information submitted with the tender (in written-, report- and/or brochure format), and upon further investigations/reference checks that may be performed, for which purpose the tendering Service Provider must include names and contact particulars of present and previous Employers to whom services are/were rendered. The Employer retains the right to contact references not mentioned by the tendering Service Provider. Members of the evaluation panel will discuss their respective risk perceptions in order to reach consensus, failing which the specific risk will be put to the vote. No risk assessment will be performed for this criterion in the absence of relevant information with the tender and will therefore render the tender as unacceptable and excluded from further consideration.]

- 4.4.1. Bidders submitting two or more offers on the same bid under different names without declaring interest / equity ownership shall be disqualified.
- 4.4.2 Bidders submitting two or more offers on the same bid under the same company name, the highest offer will not be considered.
- 4.4.3 The Department reserves the right to consider bid prices that are above the budget.
- 4.4.4 Proper completions and signing of all prescribed parts of the bid form is a compulsory requirement. Any bid offer that do not provide all the required information completely and in a form that is required, may be regarded as non-responsive.
- 4.4.5. The purchaser reserves the right to require of a bidder, either before a bid is adjudicated or at any time subsequently, to substantiate any claim in regard to preferences, in any manner required by the purchaser
- 4.4.6 Registration in the relevant grading designation or class of works in the CIDB database or any other database of relevant regulatory authorities is a compulsory requirement.
- 4.4.7 All the companies that have formed a joint venture or consortium must be registered with the CIDB.
- 4.4.8 The department of Public Works will consider inactive or suspended contractor status with the CIDB as non-registration and therefore any company with such status will not be considered for bid evaluation. It remains the onus of the contractor to ensure that his/her active CIDB status by closing of the bid.
- 4.4.9 It is a condition of this bid that the taxes of the successful bidder must be in order, or that satisfactory arrangements have been made with South African Revenue Service (SARS) to meet the bidder's tax obligations.
- 4.4.10 Only the original bid form stamped by the Department of Public Works will be accepted. All Pages of the Bid Form must be submitted in full as it is an essential part for the bid evaluation.
- 4.4.11 The bidder shall not make any alterations or additions to the bid document, except to comply with the instructions issued. Any necessary or corrected errors made by the bidder shall require the signatories of the company or firm to initial on all such alteration. Erasure and the use of masking fluid are prohibited.
- 4.4.12 The Head of Department shall upon awarding of the bid at the rand value of R2 million and above, require the bidder to provide a surety, securities and/or guarantees from an accredited financial institution prior to the signing of the contract and commencement of works.
- 4.4.13 The bidder shall be entitled to a maximum of 21 days to secure such sureties as stated in clause 14.0 of the JBCC Principal Building Agreement. Failure to provide with a surety, securities and/or guarantees from an accredited financial institution within the stipulated

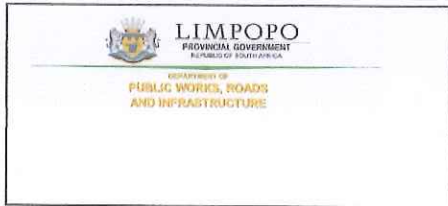
period shall, upon notification in writing by the Head of Department, nullify the award/acceptance letter of the bidder

- 4.4.14 The special conditions of contract take precedent on any of the conditions of contract that are to be applied.
 - 4.4.15 The bidder shall familiarise him/herself with the relevant conditions of contract for the awarded bid and signing of such contracts before commencement of works.
 - 4.4.16 In bids where Consortia / Joint Ventures / Sub-contractors are involved, each party must submit a separate Tax Clearance Certificate. Note that in all construction projects the joint venture or consortium members must be registered with the Construction Industry Development Board. No other Joint Venture Agreement will be considered except the one incorporated in the bid form.
 - 4.4.17 This bid is subjected to the conditions and practices of the JBCC and where applicable, the special conditions of contract.
 - 4.4.18 It remains the responsibility of the contractor to ensure compliance to Occupational Health and Safety Act, 1993 (Act no. 85 of 1993); Best Practice Labour-Based Methods and Technologies Employment Intensive Construction Works; Conditions of Employment for Special public Works Programmes in terms of the Basic Conditions of Employment Act of 1997, Labour Relations Act 1995 (Act no. 66 of 1995) and all the relevant regulations pertaining to these acts.
- 4.4. ***The Department of Public Works, Roads and Infrastructure reserves the right not to award the bid to the bidder with the lowest price, to alter the terms and conditions of the bid and to cancel the bid at any time during the contract period.***

<p>Department Special No.1</p>	<p>SMME's: It is a requirement of this contract that participation in the contract must be granted to local SMME companies. Local is defined as "having their head office within the Limpopo Province boundaries". A SMME company should be a registered company, and must also be registered with CIDB. The minimum target for local SMME participation shall be <u>15% of the Tender Sum</u>. This can be achieved through either one or more local SMME companies.</p> <p>Information in this regard needs to be provided by the contractor on forms RDP2(E),RDP 2(E1),RDP2(E2),etc. Commitments to this goals will be a condition of award.</p> <p>The department also reserves the right to terminate the contract when the contractor does not honour his commitments in this regard during construction.</p>
<p>Department Special No.2</p>	<p>Labour Content: The minimum Labour content for this project shall be <u>10% OF THE WORKS.</u> Note: All unskilled labour shall be sourced from the LOCAL COMMUNITY where LOCAL COMMUNITY means those in the immediate vicinity of the project. The contractor's own skilled personnel will not be counted towards the said 10%.</p>

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PART T2: LIST OF RETURNABLE DOCUMENTS

T2.1 Returnable Schedules required for tender evaluation purposes

The tenderer must complete the following returnable schedules as relevant:

- T2.1A** Certificate of authority
- T2.1B** Record of Addenda to Tender Documents
- T2.1C** Proposed amendments and qualifications
- T2.1D** Compulsory Declaration
- T2.1E** Preferencing Schedule: Broad Based Black Economic Empowerment Status
- T2.1F** Joint venture agreement (where applicable)

SBD 1 - INVITATION TO BID

SBD 3.1 - PRICING SCHEDULE – FIRM PRICES

SBD 4 - DECLARATION OF INTEREST

SBD 6.1 - PREFERENCE POINTS CLAIM FORM

SBD 6.2- DECLARATION CERTIFICATE FOR LOCAL PRODUCTION AND CONTENT

LOCAL CONTENT DECLARATION - SUMMARY SCHEDULE

SBD 8 - DECLARATION OF BIDDER'S PAST SUPPLY CHAIN MANAGEMENT PRACTICES

SBD 9 - CERTIFICATE OF INDEPENDENT BID DETERMINATION

DECLARATION OF SUBCONTRACTING ARRANGEMENTS

OHS SPECIFICATIONS

THE CONTRACT

Part C1: Agreements and Contract data

C1.1 Offer portion of Form of Offer and Acceptance

Part C3: Pricing data

C3.1 Provisional Bill of Quantities

C3.2 Electrical Installation

CERTIFICATE OF AUTHORITY

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

A Company	B Partnership	C Joint Venture	D Sole Proprietor	E Close Corporation
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

A. Certificate for company

I,....., chairperson of the board of directors of
, hereby confirm that by resolution of the board (copy attached)
 taken on20...., Mr/Mrs.....acting in the capacity
 of.....,was authorised to sign all documents in connection with this
 tender and any contract resulting from it on behalf of the company.

As witness

1.....
 Chairman

2.....
 Date

B. Certificate of partnership

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

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

NAME	ADDRESS	SIGNATURE	DATE

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

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C. Certificate for Joint Venture

We, the undersigned, are submitting this tender offer in Joint Venture and hereby authorise Mr/Mrs....., authorised signatory of the companyacting in the capacity of lead partner, to sign all documents in connection with the tender offer for Contract.....and any other contract resulting from it on our behalf.

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

NAME OF FIRM	ADDRESS	AUTHORISING SIGNATURE, NAME & CAPACITY

D. Certificate for sole proprietor

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

As Witness:

1..... Signature: Sole owner
2..... Date

E. Certificate for Close Corporation

We, the undersigned, being the key members in the business trading as.....hereby authorise Mr/Mrs.....acting in the capacity of....., to sign all documents in connection with the tender for Contract.....and any contract resulting from it on our behalf.

NAME	ADDRESS	SIGNATURE	DATE

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

Record of Addenda to tender documents

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

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

Attach additional pages if more space is required.

Signed _____ Date _____
 Name _____ Position _____
 Tenderer _____

Proposed amendments and qualifications

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

The Tenderer's attention is drawn to clause 5.8 of SANS 10845-3 regarding the employer's handling of material deviations and qualifications.

Page	Clause or item	Proposal

Signed

Date

Name

Position

Tenderer

T2.1C

Compulsory Declaration

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

Section 1: Enterprise Details

Name of enterprise:	
Contact person:	
Email:	
Telephone:	
Cell no	
Fax:	
Physical address	
Postal address	

Section 2: Particulars of companies and close corporations

Company / Close Corporation registration number	
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Section 3: SARS Information

Tax reference number	
VAT registration number:	<i>State Not Registered if not registered for VAT</i>

Section 4: CIDB registration number

Section 5: National Treasury Central Supplier Database

Supplier number	
Unique registration reference number	

Section 6: Particulars of principals

principal: means a natural person who is a partner in a partnership, a sole proprietor, a director of a company established in terms of the Companies Act of 2008 (Act No. 71 of 2008) or a member of a close corporation registered in terms of the Close Corporation Act, 1984, (Act No. 69 of 1984).

Full name of principal	Identity number	Personal tax reference number

Attach separate page if necessary

T2.1D

Preferencing schedule: Broad Based Black Economic Empowerment Status

Preamble

Section 10(b) of the Broad-Based Black Economic Empowerment Act of 2003 (Act No. 53 of 2003) states that "Every organ of state and public entity must take into account and, as far as is reasonably possible, apply any **relevant code of good practice** issued in terms of this Act in developing and implementing a preferential procurement policy."

A number of codes of good practice have been issued in terms of Section 9(1) of the B-BBEE Act of 2003 including a generic code of good practice and various sector codes. The sector codes vary the metrics, weightings and targets used in the generic code of good practice to establish the overall performance of an entity and its B-BBEE status. The B-BBEE status needs to be assessed in accordance with the applicable code.

1 Conditions associated with the granting of preferences

Tenderers who claim a preference shall provide sufficient evidence of their B-BBEE Status in accordance with the requirements of section 2 in respect of the applicable code as at the closing time for submissions, failing which their claims for preferences will be rejected.

2 Sufficient evidence of qualification

2.1 Exempted micro enterprises

Sufficient evidence of qualification as an Exempted Micro-Enterprise is a :

- a) a registered auditor's certificate or similar certificate issued by an accounting officer as contemplated in the Close Corporation Act of 1984 in respect of the entity's last financial year or a 12 month period which overlaps with its current financial year; or a certificate issued by a verification agency and which is valid as at the closing date for submissions; or.
- b) a sworn affidavit - B-BBEE Exempted Micro Enterprise (see www.thedti.gov.za/gazettes/Affidavit_EME.pdf)

2.2 Enterprises other than micro exempted enterprises

Sufficient evidence of B-BBEE Status is:

- a) an original or certified copy of the certificate issued by a verification agency accredited by the South African National Accreditation System (SANAS) or registered auditors approved by Independent Regulatory Board for Auditors (IRBA) and which is valid as at the closing date for submissions; or.
- b) a sworn affidavit – B-BBEE Qualifying Small Enterprise (see www.thedti.gov.za/gazettes/BBEE_QUALIFYING_SMALL_ENTERPRISE.pdf)

3 Tender preferences claimed

The scoring shall be as follows:

B-BBEE status determined in accordance with the referencing schedule for Broad-Based Black Economic Empowerment	% max points for preference
Form not completed or no-complaint contributor	0
Level 8 contributor	10
Level 7 contributor	20
Level 6 contributor	30
Level 5 contributor	40
Level 4 contributor	50
Level 3 contributor	80
Level 2 contributor	90
Level 1 contributor	100

4 Declaration

The tenderer declares that

- a) the tendering entity is a level contributor as stated in the submitted evidence of qualification as at the closing date for submissions
- b) the tendering entity has been measured in terms of the following code (tick applicable box)

Generic code of good practice

Other – specify

- c) the contents of the declarations made in terms of a) and b) above are within my personal knowledge and are to the best of my belief both true and correct

The undersigned, who warrants that he / she is duly authorized¹

to do so on behalf of the tenderer confirms that he / she understands the conditions under which such preferences are granted and confirms that the tenderer satisfies the conditions pertaining to the granting of tender preferences.

Signature :

Name :

Duly authorised to sign on behalf of :

Telephone :

Fax: Date :

Name of witness Signature of witness

- Note:** 1) Failure to complete the declaration will lead to the rejection of a claim for a preference
 2) Supporting documentation of the abovementioned claim for a preference must be submitted with the tender submission to be eligible for a preference

T2.1E

SAFCEC JOINT VENTURE AGREEMENT

JOINT VENTURE AGREEMENT made and entered into by and between:

..... of
..... (hereafter referred to as))

of the first part;

and

..... of
..... (hereafter referred to as))

of the second part;

PREAMBLE

WHEREAS the Parties have formed a Joint Venture in order to submit tenders to the
..... for the construction of
..... (hereafter
referred to as the "works").

NOW THEREFORE, IT IS AGREED AS FOLLOWS:

1. FORMATION OF JOINT VENTURE

1.1 The Parties hereby associate themselves into and as a Joint Venture in accordance with the provisions of this Agreement under the style or firm name of
JOINT VENTURE.

1.2 The Parties hereto agree and undertake that they will not disclose the contents of this Agreement to persons with whom they may have any dealings directly or indirectly arising from the conclusion of this Agreement and the operation and establishment of the Works.

1.3 Notwithstanding that the parties may be jointly and severally bound to the, should the Joint Venture be awarded the contract by the for the construction of the Works, nothing herein contained shall be interpreted as giving rise to a general partnership between the parties or limiting the rights or powers of either party to carry on its separate business for its sole benefit.

2. OBJECT AND MOTIVATION

The sole object for which this Joint Venture is established and the sole business of the Joint Venture is to negotiate for and conclude a contract for the execution of the Works and to carry out such Works to finality, all in accordance with the terms of this Agreement.

3. PROFITS AND LOSSES

3.1 The profits and losses of the Joint Venture shall be borne by and In the proportions% and% respectively (hereinafter referred to as "the Specified Proportions").

3.2 In addition to any other provisions contained in this Agreement, the functions, duties, obligations and responsibilities of and under this Joint Venture agreement and in the execution of the Works will be to provide all bridging finance, guarantees and resources necessary to successfully carry out the project in proportion to the specified proportions, in which proportions all profits, losses, costs, liabilities and assets and any other responsibilities, whether pecuniary or otherwise, shall be shared equally, as far as possible.

4 DURATION

The operation of this Agreement shall be deemed to have commenced on the Day of 200..., and shall terminate, except insofar as the provisions of Clauses 5 and 6 apply, upon the happening of any of the following events, whichever shall be earlier:

4.1 Award of the Contract by for the construction of the Works to an outside party or parties, or

4.2 In the case of contract award, at the time the contract is terminated and all rights and obligations of the parties in connection with such contract and in connection with this Agreement have ceased, but in no case before the conclusion of any maintenance period in the contract and the cancellation

and/or refund of all guarantees and bonds. The Joint Venture existence shall also be deemed to continue insofar as the Joint Venture is responsible for latent defects under the contract.

5. EXCLUSIVITY

The Parties agree and undertake in favour of each other that neither of them shall, except in accordance with the intention expressed in this agreement, be associated in any manner, either directly or indirectly, with any investigation, negotiation, tender or proposal for the performance of or incidental to the execution of the Works and including any variation by way of addition or omission from the scope of the Works or the extension to the Works, nor invest in any company, enterprise or partnership in any manner related thereto, either as previously agreed by the Management Committee in writing.

6. PRE-CONTRACT COSTS

6.1 All costs incurred by the Parties prior to the day of 200....., shall be for their own account.

6.2 Costs incurred by the Parties after the day of 200... and approved by the Management Committee, shall be borne by the Parties in the Specified Proportions.

7. MANAGEMENT COMMITTEE

7.1 The day-to-day affairs of the Joint Venture shall be under the control of a Management Committee which shall consist of one representative of each of the parties. Within the terms of this agreement and the contract, if awarded, each such member shall have full authority to bind the party and/or parties he represents in all matters relating to the affairs of the Joint Venture.

No party to this agreement may bind the other party hereto without the prior consent of such other party, nor may the Management Committee bind the Joint Venture or any party beyond the terms of this agreement or the contract without the prior written consent of both parties.

The parties hereto shall be obliged immediately upon signature of this Agreement, to appoint their representatives and the first meeting of the Management Committee will be held immediately thereafter. The parties shall be obliged at all times to maintain a representative on the Management Committee.

7.2 Each representative on the Management Committee shall be entitled to appoint, and from time to time remove and replace, an alternate who shall, at any meeting of the Management Committee at which the representative whom he represents is absent, be vested with all rights and powers and subject to all obligations of the representative whom he represents.

7.3 The Chairman at meetings of the Management Committee shall be a representative from and respectively on a six months rotation basis commencing with

7.4 Meetings of the Management Committee shall take place at such times and places as the Committee shall determine, provided that the Chairman shall be obliged to convene a meeting of

the Management Committee not later than 10 days after being required to do so by any one of the parties to this agreement. Not less than five days notice of any meeting of the Management Committee shall be given to the representatives thereof and their alternates.

- 7.5 Decisions of the Management Committee shall be unanimous, provided that if the representatives or the alternates fail to agree on any decision, the meeting at which that decision is sought shall be adjourned for a period of 24 hours and should the representatives then not agree on the course of action to be taken the matter shall be referred to the Executive Board for a decision. The decision of such Executive Board shall be placed before a further adjourned meeting, which shall take place no later than 72 hours after the initial adjourned meeting, and shall bind the Management Committee which shall adopt such decision without variation.
- 7.6 Subject to 7.7 below, decisions of the Management Committee may be reached telephonically, telegraphically, by facsimile or in writing.
- 7.7 Decisions of the Management Committee, whether at a meeting or otherwise, shall be recorded in written minutes which shall be distributed by the Chairman, for the time being to the members of the Management Committee not later than seven days after those decisions have been taken. Such minutes shall be deemed to have been affirmed unless dissented from not later than seven days after they are deemed to have been received by the dissenter.
- 7.8 The Management Committee may, as it wishes, decide to increase the number of its members for or invite other parties to attend any of its meetings. Such co-opted members or observers shall not have a vote.
- 7.9 The Management Committee shall have the power to delegate such of its powers and duties as it may determine in the best interests of the parties.
- 7.10 No remuneration shall be paid by the Joint Venture to the parties' representatives on the Management Committee in their capacities as such.
- 7.11 The administrative function regarding the operation of the Management Committee shall be fulfilled by the Chairman.

8 POWERS OF THE MANAGEMENT COMMITTEE AND DIRECTION OF THE PROJECT MANAGER

The functions, responsibilities and powers of the Management Committee shall be:

- 8.1 To appoint the Project Manager who shall be nominated by and and who shall attend all meetings of the Management Committee for the implementation of its policies and act only in accordance with its directives and its established procedures. The Project Manager shall be removed in terms of 10 hereof and his successor(s) shall be nominated by and And approved by the Management Committee.
- 8.2 To formulate and dictate to the Project Manager overall policy in regard to the following:
 - 8.2.1 The general day-to-day management of the affairs of the Joint Venture.
 - 8.2.2 Representation of the Joint Venture in dealing with the Resident Engineer/Engineer/Client and third parties on matters affecting the Joint Venture as a whole.

- 8.2.3 Co-ordination of the activities of the parties.
- 8.2.4 Preparation by agreement with the parties and supervision of the programme of the Works.
- 8.2.5 Ensuring that the responsibility of each of the parties in regard to technical and contractual matters is preserved.
- 8.3 To make such provisions as are necessary to enable the Project Manager to perform his tasks.
- 8.4 To approve the balance sheets and accounts of the Joint Venture.
- 8.5 To approve the tender submitted by the Joint Venture and to approve or withhold approval for and amendment proposed thereto.
- 8.6 To approve the appointment of legal advisers and auditors where such appointments are necessary.
- 8.7 To determine the nature and extend of any additional duties and functions of each of the parties in relation to this Joint Venture.
- 8.8 To determine the terms and conditions of employment of personnel as well as emoluments seconded by the parties to the Joint Venture.
- 8.9 Subject to the terms and conditions of this agreement, to determine and approve:
 - 8.9.1 The amount and type of working capital requirements of the Joint Venture.
 - 8.9.2 All borrowings, guarantees and like obligations undertaken by the parties to the Joint Venture.
 - 8.9.3 The insurance to be taken out by the Joint Venture.
 - 8.9.4 The nature, method and amount of all claims.
 - 8.9.5 When and in what amount to distribute dividends to the parties hereto, save that any decision in terms of which the Joint Venture will undertake further work outside of the original scope of the contract or any variation or amendment of this agreement of the contract, shall require the unanimous agreement of the parties before becoming effective and binding the Joint Venture.
 - 8.9.6 The approval and appointment of all sub-contractors.

9 THE EXECUTIVE BOARD

- 9.1 The Executive Board shall consist of one representative of each of the parties who shall be the Chief Executive Officer of each Joint Venture partner or their nominated deputy but shall not be the same representative as appointed to the Management Committee in terms of Clause 7.1 hereof. The Executive Board shall be the mediation authority of the Joint Venture which shall decide on all issues which are referred to it by the Management Committee as well as on all issues where the Management Committee is not unanimous.
- 9.2 Decisions of the Executive Board, whether original decisions or decisions taken after referral from the Management Committee shall be implemented by the Management Committee as per Clause
- 9.3 Decisions of the Executive Board shall be unanimous.
- 9.4 Effect shall be given to a resolution arrived at unanimously.

- 9.5 In the event of the Executive Board not being unanimous in its decision the matter is to be referred to arbitration in terms of Clause 16 hereof.
- 9.6 Subject to 9.7 as read in conjunction with 7.7 and, provided that they are unanimous, decisions of the Executive Board may be reached telephonically, telegraphically or in writing. If reached telephonically or otherwise orally such decision must be confirmed in writing within 24 hours.
- 9.7 The Minutes of meetings of the Executive Board shall be handled mutatis mutandis in the manner per Clause 7.7.
- 9.8 The administrative functions regarding the operation of the Executive Board shall be fulfilled by the Chairman of the Management Committee, who shall not be entitled to a voice or a vote at Executive Board meetings.

10 PERSONNEL

- 10.1 The Project Manager shall be appointed as provided in Clause 8.1 hereof.
- 10.2 The person nominated to the office of Project Manager shall be subject to removal from such office by decision of the Management Committee.
- 10.3 All the remuneration and emoluments of employment of the Project Manager shall be an expense of and paid by the Joint Venture, provided that a party shall be entitled by notice in writing delivered to the other parties to elect that the person to be nominated by it to fill the offices of project Manger shall be seconded to the Joint Venture in which event the remuneration and emoluments which would otherwise have been paid to such persons while filling such offices shall be paid to the member responsible for their nomination or otherwise as such member shall direct and subject to such payment being duly and promptly paid to the member or its nominee, the member will hold harmless and keep indemnified the Joint Venture and the other members from all actions, proceedings, claims and demands by such persons or otherwise howsoever in respect of such remuneration and emoluments. The remuneration and emoluments to be paid and allowed by the Joint Venture to the Project Manager shall be determined from time to time by the Management Committee and borne by the parties hereto in the Specified Propositions.
- 10.4 The members of the Management Committee and Executive Board and their proxies and alternates a shall not be employees of the Joint Venture and shall not be entitled to claim any salary or remuneration from the Joint Venture by virtue of such appointments unless the Management Committee shall otherwise decide in writing.
- 10.5 shall be appointed as Secretaries to the Joint Venture. Save for matters pertaining to the works and the contract, Shall be consulted on all matters of an administrative and financial nature arising in connection with the business of the Joint Venture where their particular experience, knowledge, facilities and skills in matters of this nature shall be considered to be of benefit to the Joint Venture.

11 FINANCING

11.1 Working Capital

- 11.1.1 Banking accounts shall be opened in the name of the Joint Venture with banks and at such places as may be determined by it, and the parties shall be responsible for the payment in the Specified Properties of such sums to the credit of such banking accounts as shall from time to time be required by way of working capital for the Joint Venture.
- 11.1.2 Any amounts from time to time advanced by the parties to the Joint Venture in terms of this agreement shall be placed to the credit of their respective capital accounts in the Joint Venture.
- 11.1.3 The banking accounts referred to in sub-clause 11.1.1 hereof shall be operated, and cheques thereon shall be drawn in accordance with the instructions to the bankers in question. Withdrawals from these banking accounts shall be effected on the authority of persons nominated thereto by the Management Committee.
- 11.1.4 Should any party fail to make payment to the Joint Venture of any amount which it is obliged to pay in terms of sub-clause 11.1.1 hereof, after the expiry of a period of seven days from the date of notice requiring it to make such payment, the party to default shall be liable for payment of interest to the other parties on the amount so withheld at the rate of Prime Bank rate charged by Joint Venture Bankers per annum should such other parties have advanced the aforesaid sum.
- 11.1.5 All revenue derived by the Joint Venture from the contract shall forthwith be deposited to the credit of the banking accounts referred to in sub-Clause 1.1.1 hereof.
- 11.1.6 The amount for the time being standing to the credit of the Joint Venture's banking accounts shall be applied:
- 11.1.6.1 In discharging the obligations of the Joint Venture in accordance with their tenor; provided that the Management Committee shall be entitled to require the payment of any liability prior to its due date if such anticipated payment will result in the allowance by the creditor in question of an advantageous discount to the Joint Venture for prompt payment;
- 11.1.6.2 As to any surplus of funds for the time being in the said banking account, subject to the agreement of the parties as payment to the parties in the Specified Proportions or in proportion to their participation of the time being in the Joint Venture, save that any such surplus shall first be utilised for the purpose of eliminating or reducing any disproportion in the ratios of the parties respective capital accounts.

11.2 Capital and Advances

- 11.2.1 The amount of capital required by the Joint Venture to attain its object (and which includes all loans, guarantees, indemnities, reserves) shall be determined from time to time by the Management Committee, and upon being so determined shall forthwith be contributed by the parties to the Joint Venture in the Specified Proportions.
- 11.2.2 If at any time any party to the Joint Venture shall, due to an emergency or with the consent in writing of the other parties advance any sum of money or to incur any liability on behalf of the Joint Venture over and above its due contribution to capital, then where money has been

advanced, the same shall be a debt due from the Joint Venture to the party advancing the money, and shall be repayable on thirty days' notice and shall bear interest at Prime Bank rate as charged by Joint Venture's bankers per annum from date of advance to date of payment. Where a party has incurred a contingent liability on the above basis, the other parties shall, within thirty days of being requested to do so in writing, relieve such party of its obligations thereunder to the extent that the obligations of the parties are in the Specified Proportions.

12. ACCOUNTS

12.1 The Joint Venture shall cause proper books of account and complete records to be kept as are customary in the Republic of South Africa relating to all the assets and liabilities of the Joint Venture and expenses incurred or income received by the Joint Venture.

Such book and records shall not be related to the affairs of the parties individually. The said books of account and records, together with all letters, papers or writings concerning or belonging to the Joint Venture shall be kept at site and such other place from time to time as determined by the Management Committee, and each of the parties to the Joint Venture shall at all times have free access and the right to inspect and copy the same.

12.2 Within thirty days of the end of every quarter during the continuance of the Joint Venture, the Joint Venture shall furnish to the Management Committee all necessary documents such as balance sheets, profit and loss accounts, bank balances and comparisons with budget and forecasts of cash flow and profits as are necessary to keep the Management Committee informed of the financial affairs of the Joint Venture. Every such profit and loss account and balance sheet shall be agreed to and signed by the members of the Management Committee on behalf of the Joint Venture members, and when so signed, shall be binding on all the parties, except that if any manifest error therein be detected and pointed out by any party to the others at any time after such signature, such error shall forthwith be rectified.

12.3 After the completion of the contract and the release of all bonds, guarantees and obligations given for the performance of the parties in the Joint Venture, the joint Venture shall procure the preparation and auditing of a final balance sheet and profit and loss account, which shall be approved by the Management Committee, and from which the final profit and loss sustained by the Joint Venture shall be ascertained, and distributed to or contributed by the parties in proportion to their participation in the Joint Venture. This clause shall not be construed as prohibiting the interim distribution of profits or contribution towards losses in the discretion of the Management Committee.

13. WINDING UP

Upon the determination of the Joint Venture in accordance with the provisions of this agreement, a full and general account shall be taken of the assets and liabilities of the Joint Venture and of the transactions and dealings thereof, and with all convenient speed, such assets shall be sold and realised and the proceeds applied in paying and discharging such liabilities and the expenses of and incidental to the

winding-up of the Joint Venture affairs and thereafter in paying to each Joint Venture member its share of such proceeds in the Specified Proportions. The Joint Venture members respectively undertake to do all such things as may be necessary so as to give effect to the above.

14. BREACH

14.1 If a party ("the guilty party") shall commit a breach of any material provision of this agreement, and fail to remedy the same within a period of thirty (30) days after the receipt by it of written notice requiring it to do so, or be placed in liquidation or under judicial management, whether provisionally or finally, or propose any compromise with its creditors, the other parties ("the aggrieved parties") shall have the right, without prejudice to any of its other remedies arising from such breach, forthwith to terminate this agreement, in which event:

14.2 The guilty party's interest in the joint venture shall be taken over by the remaining parties. The aggrieved parties shall, in addition, have the right, if it so requires, to take over the capital account of the party in default.

Such capital account shall be valued on the basis of the nett assets revealed in an audited balance sheet and profit and loss account prepared as at the end of the month in which the default or other breach occurred; provided that the profit and loss account shall take into account the Joint Venture's share in the valuation of the work in progress, as shown in the Joint Venture accounts, at the date of preparation of the balance sheet and profit and loss account, after providing for any known or contemplated future losses to be incurred on the work undertaken or to be undertaken by the Joint Venture and provided further that should upon the completion of the contract or contracts, the provision for losses made in the valuation or work in progress as aforesaid prove to be incorrect, such provisions shall be adjusted. Provided the aggrieved parties have proved that the tender rates as escalated from time to time were inadequate, the guilty party shall be liable to the extent of the participation of such party for all losses incurred on the whole of the contract, including any losses incurred subsequent to the termination of the agreement in accordance with these provisions, but such party shall not be entitled to share in any profits earned subsequent to such termination.

14.3 The aggrieved parties shall have the right to recruit in its employment personnel seconded to the Joint Venture by the guilty party and, as a stipulation in favour of such personnel, the guilty party waives any claims it might otherwise have had against such personnel arising from their summary termination of their employment with the guilty party.

14.3 All plant hired by the guilty party to the Joint Venture shall remain on hire to and under the control of the aggrieved parties until the completion of the contract, or until the aggrieved parties shall release such plant from the operation of this sub-clause. Payment shall be made thereof monthly.

15. DISPUTES

- 15.1 Having regard to the high degree of good faith which must exist between the parties, the parties agree to do their utmost to ensure that the disputes between them are settled equitably and amicably and where possible without resort to arbitration.
- 15.2 In the event of any differences or dispute of whatever nature arising from this agreement (which shall include any failure to agree on any matter which requires the parties' agreement for the purposes of implementation of this agreement) or any other matter related thereto which cannot be settled by direct negotiation between the parties, such differences or dispute shall be referred to arbitration in terms of Clause 16 hereof.

16 ARBITRATION

- 16.1 Save as hereinafter provided, any dispute at any time between any of the parties hereto in regard to any matter arising out of this agreement or its interpretation or rectification shall be submitted to and decided by arbitration.
- 16.2 The arbitration referred to in 16.1 shall be held -
- 16.2.1 At.....
- 16.2.2 In a summary manner, i.e. on the basis that it shall not be necessary to observe or carry out either -
- 16.2.2.1 the usual formalities or procedure (e.g. there shall not be any pleadings or discovery); or
- 16.2.2.2 the strict rules of evidence.
- 16.2.3 Immediately and with a view to its being completed within twenty-one business days after it is demanded;
- 16.2.4 Otherwise (but subject to © (d) and (e) under the provisions of the Arbitration Act No. 42 of 1965 or the Republic of South Africa as amended from time to time).
- 16.3 The Arbitrator shall be, if the question in issue is -
- 16.3.1 Primarily an accounting matter, an independent accountant;
- 16.3.2 Primarily a legal matter, a practising Senior Counsel of not than five years standing as such;
- 16.3.3 Any other matter, an independent person unanimously agreed upon between the parties and failing agreement appointed by the President for the time being of the South African Federation of Civil Engineering Contractors.
- 16.4 If agreement cannot be reached within seven business days after the arbitration has been demanded as to whether the question in issue falls under 16.3.1, 16.3.2 or 16.3.3, then a practising Senior Counsel of not less than five years' standing as such agreed upon between the parties, and failing agreement appointed by the President for the time being of the Society of Chartered Accountants as soon as possible thereafter, shall determine whether the question in issue falls under 16.3.1, 16.3.2 or 16.3.3 so that an arbitrator can be appointed and the arbitration can be held and concluded, if possible, within the prescribed period of twenty-one days.

16.5 The arbitrator shall decide the matters submitted to him according to what he considers just and equitable in the circumstances and, therefore, the strict rules of law need not be observed or be taken into account by him in arriving at his decision.

16.6 The parties irrevocably agree that the decision in those arbitration proceedings -

16.6.1 shall be binding on them;

16.6.2 shall be carried into effect;

16.6.3 can be made an order of any court of competent jurisdiction.

17. CONFIDENTIALITY

17.1 All matters relating to this agreement, any negotiations and the contract for the construction of the Works resulting therefrom shall be regarded by the parties hereto as being highly confidential, and shall not be disclosed without prior written consent of the management Committee to any party, person or entity who or which is not a signatory to this Agreement, except where such disclosure is necessary for the fulfilment of this Agreement.

No party shall at any time hereinafter use any technical information, save that in the public domain, acquired from the other parties hereto except for the purposes of fulfilment of the contract.

17.2 No party shall have the right to advertise, or otherwise permit, the dissemination of publicity concerning its participation in the Joint Venture unless:

17.2.1 the relevant material shall make due reference to and acknowledgement of the work of the other parties;

17.2.2 the relevant material shall, for its dissemination is within the control of the party in question, have been approved by the other parties, which approval shall not be unreasonably withheld.

18. ASSIGNMENT

18.1 No party shall cede, assign or in any other way make over any of its rights or obligations under this agreement without the written consent of the other parties except insofar as such assignment or alienation is to any wholly-owned subsidiary company of that party.

18.2 In the event of such assignment or alienation taking place, the initial party shall jointly and severally and in solidum guarantee the obligations of the assignee towards the remaining parties.

19. GENERAL

19.1 No party shall have a claim against the other parties arising out of a failure to secure the contract, except insofar as the parties are liable to bear the joint venture expenses in the Specified Proportions.

19.2 Any changes and supplementary provisions concerning this agreement shall require the written approval of all the parties hereto.

19.3 Variations not effective unless in writing

No variation, modification or waiver of any provision of this agreement, or consent to any departure

therefrom, shall in any event be of any force or effect unless unanimous and confirmed in writing and signed by the parties; then such variation, modification, waiver or consent shall be effective only in the specific instance and for the purpose and to the extent for which made or given.

19.4 Additions to the Joint Venture

No additional parties shall be admitted to the Joint Venture unless the parties to this agreement unanimously agree and subject to the Conditions of Contract for the Works. All sub-contractors must be approved by the Management Committee in accordance with procedures to be established by the said Committee.

19.5 Company formation

Should the parties at any time unanimously agree to form a company to take over the interest of the Joint Venture in the contract and the assets of the joint Venture, the parties undertake to enter into a Shareholders Agreement embodying insofar as it is reasonably possible and practicable the terms hereof and, in addition, including therein a provision affording each party a right of pre-emption to any shares in the company which the other may from time to time wish to dispose of. For the Works the formation of a company shall be subject to the General Conditions of Contract for the Works.

19.6 Domicilium

19.6.1 The parties hereto respectively choose domicilium citandi et executandi for all purposes of and in connection with this agreement as follows:

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

19.6.2 The parties hereto shall be entitled to change their domicilium from time to time, and any such change shall only be effective upon receipt of notice in writing by the other parties of such change.

19.6.3 All payments to be made pursuant to this agreement, and all notices, demands or communications intended for any party, shall be made or given at such party's domicilium for the time being, and if forwarded by prepaid registered post, shall be deemed to have been made or given seven days after the date of posting unless proved to the contrary.

19.7 Currency

All amounts referred to in this agreement and all monies payable to or by the parties to the Joint Venture in connection with the Joint Venture shall be both calculated and paid in currencies from time to time and at places to be agreed by the Management Committee.

19.8 Governing Law

This agreement shall be construed in accordance with and governed by the laws of Republic of South Africa. The English language version of this agreement shall prevail.

19.9 All correspondence between the parties in regard to this agreement and the contract shall be in the English language.

19.10 Each party shall bear its own costs incurred in the preparation and negotiation of this agreement.

19.11 This agreement over-rides any previous agreement or arrangements concluded between the parties in regard to the works and contract. Notwithstanding the provisions of Clause 19 hereof, the parties agree that any variations to the provision of this agreement and any decisions in terms of which this Joint Venture will undertake further work outside the original scope of the contract referred to earlier, shall require the unanimous agreement of the parties before becoming effective and binding on the parties.

19.12 In the interpretation of this agreement, works in the singular shall include the plural and vice versa as the context may require. The headings to clauses shall not be considered part thereof nor shall the words which they contain be taken into account in the interpretation of any clause.

THUS DONE AND SIGNED AT THISDAY OF
.....20....

For and behalf of:

.....

AS WITNESS:

1.

2.

THUS DONE AND SIGNED AT THISDAY OF
.....20....

For and behalf of:

.....

AS WITNESS:

1.

2.

**PART A
INVITATION TO BID**

YOU ARE HEREBY INVITED TO BID FOR REQUIREMENTS OF THE (NAME OF DEPARTMENT/ PUBLIC ENTITY)					
BID NUMBER:	LDPWRI-B/20047	CLOSING DATE:	16 APRIL 2021	CLOSING TIME:	11H00
DESCRIPTION	CONSTRUCTION OF NEW ACCOMMODATION BLOCK C AND RENOVATIONS TO THE EXISTING HALL AT THE LIMPOPO TRAFFIC TRAINING COLLEGE IN THE VHEMBE DISTRICT.				
BID RESPONSE DOCUMENTS MAY BE DEPOSITED IN THE BID BOX SITUATED AT (STREET ADDRESS)					
DEPARTMENT OF PUBLIC WORKS, ROADS & INFRASTRUCTURE.					
Physical address: CNR RIVER & BLAAUBERG STREET LADANNA 0699					
BIDDING PROCEDURE ENQUIRIES MAY BE DIRECTED TO			TECHNICAL ENQUIRIES MAY BE DIRECTED TO:		
CONTACT PERSON	MOLOTO MV		CONTACT PERSON	NTHABALALA R	
TELEPHONE NUMBER	015 284 7142		TELEPHONE NUMBER	015 284 7375	
FACSIMILE NUMBER	N/A		FACSIMILE NUMBER	N/A	
E-MAIL ADDRESS	molotoMV@dpw.limpopo.gov.za		E-MAIL ADDRESS	nthabalalar@dpw.limpopo.gov.za	
SUPPLIER INFORMATION					
NAME OF BIDDER					
POSTAL ADDRESS					
STREET ADDRESS					
TELEPHONE NUMBER	CODE		NUMBER		
CELLPHONE NUMBER					
FACSIMILE NUMBER	CODE		NUMBER		
E-MAIL ADDRESS					
VAT REGISTRATION NUMBER					
SUPPLIER COMPLIANCE STATUS	TAX COMPLIANCE SYSTEM PIN:		OR	CENTRAL SUPPLIER DATABASE No:	MAAA
B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE	TICK APPLICABLE BOX] <input type="checkbox"/> Yes <input type="checkbox"/> No		B-BBEE STATUS LEVEL SWORN AFFIDAVIT		[TICK APPLICABLE BOX] <input type="checkbox"/> Yes <input type="checkbox"/> No
[B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE/ SWORN AFFIDAVIT (FOR EMES & QSEs) MUST BE SUBMITTED IN ORDER TO QUALIFY FOR PREFERENCE POINTS FOR B-BBEE]					
ARE YOU THE ACCREDITED REPRESENTATIVE IN SOUTH AFRICA FOR THE GOODS /SERVICES /WORKS OFFERED?	<input type="checkbox"/> Yes <input type="checkbox"/> No [IF YES ENCLOSE PROOF]		ARE YOU A FOREIGN BASED SUPPLIER FOR THE GOODS /SERVICES /WORKS OFFERED?		<input type="checkbox"/> Yes <input type="checkbox"/> No [IF YES, ANSWER THE QUESTIONNAIRE BELOW]
QUESTIONNAIRE TO BIDDING FOREIGN SUPPLIERS					
IS THE ENTITY A RESIDENT OF THE REPUBLIC OF SOUTH AFRICA (RSA)?				<input type="checkbox"/> YES	<input type="checkbox"/> NO
DOES THE ENTITY HAVE A BRANCH IN THE RSA?				<input type="checkbox"/> YES	<input type="checkbox"/> NO
DOES THE ENTITY HAVE A PERMANENT ESTABLISHMENT IN THE RSA?				<input type="checkbox"/> YES	<input type="checkbox"/> NO
DOES THE ENTITY HAVE ANY SOURCE OF INCOME IN THE RSA?				<input type="checkbox"/> YES	<input type="checkbox"/> NO
IS THE ENTITY LIABLE IN THE RSA FOR ANY FORM OF TAXATION?				<input type="checkbox"/> YES	<input type="checkbox"/> NO
IF THE ANSWER IS "NO" TO ALL OF THE ABOVE, THEN IT IS NOT A REQUIREMENT TO REGISTER FOR A TAX COMPLIANCE STATUS SYSTEM PIN CODE FROM THE SOUTH AFRICAN REVENUE SERVICE (SARS) AND IF NOT REGISTER AS PER 2.3 BELOW.					

DOES THE ENTITY HAVE A PERMANENT ESTABLISHMENT IN THE RSA?

YES NO

DOES THE ENTITY HAVE ANY SOURCE OF INCOME IN THE RSA?

YES NO

IS THE ENTITY LIABLE IN THE RSA FOR ANY FORM OF TAXATION?

YES NO

IF THE ANSWER IS "NO" TO ALL OF THE ABOVE, THEN IT IS NOT A REQUIREMENT TO REGISTER FOR A TAX COMPLIANCE STATUS SYSTEM PIN CODE FROM THE SOUTH AFRICAN REVENUE SERVICE (SARS) AND IF NOT REGISTER AS PER 2.3 BELOW.

PART B TERMS AND CONDITIONS FOR BIDDING

1. BID SUBMISSION:

- 1.1. BIDS MUST BE DELIVERED BY THE STIPULATED TIME TO THE CORRECT ADDRESS. LATE BIDS WILL NOT BE ACCEPTED FOR CONSIDERATION.
- 1.2. ALL BIDS MUST BE SUBMITTED ON THE OFFICIAL FORMS PROVIDED-(NOT TO BE RE-TYPED) OR IN THE MANNER PRESCRIBED IN THE BID DOCUMENT.
- 1.3. THIS BID IS SUBJECT TO THE PREFERENTIAL PROCUREMENT POLICY FRAMEWORK ACT, 2000 AND THE PREFERENTIAL PROCUREMENT REGULATIONS, 2017, THE GENERAL CONDITIONS OF CONTRACT (GCC) AND, IF APPLICABLE, ANY OTHER SPECIAL CONDITIONS OF CONTRACT.
- 1.4. THE SUCCESSFUL BIDDER WILL BE REQUIRED TO FILL IN AND SIGN A WRITTEN CONTRACT FORM (SBD7).

2. TAX COMPLIANCE REQUIREMENTS

- 2.1 BIDDERS MUST ENSURE COMPLIANCE WITH THEIR TAX OBLIGATIONS.
- 2.2 BIDDERS ARE REQUIRED TO SUBMIT THEIR UNIQUE PERSONAL IDENTIFICATION NUMBER (PIN) ISSUED BY SARS TO ENABLE THE ORGAN OF STATE TO VERIFY THE TAXPAYER'S PROFILE AND TAX STATUS.
- 2.3 APPLICATION FOR TAX COMPLIANCE STATUS (TCS) PIN MAY BE MADE VIA E-FILING THROUGH THE SARS WEBSITE WWW.SARS.GOV.ZA.
- 2.4 BIDDERS MAY ALSO SUBMIT A PRINTED TCS CERTIFICATE TOGETHER WITH THE BID.
- 2.5 IN BIDS WHERE CONSORTIA / JOINT VENTURES / SUB-CONTRACTORS ARE INVOLVED, EACH PARTY MUST SUBMIT A SEPARATE TCS CERTIFICATE / PIN / CSD NUMBER.
- 2.6 WHERE NO TCS PIN IS AVAILABLE BUT THE BIDDER IS REGISTERED ON THE CENTRAL SUPPLIER DATABASE (CSD), A CSD NUMBER MUST BE PROVIDED.
- 2.7 NO BIDS WILL BE CONSIDERED FROM PERSONS IN THE SERVICE OF THE STATE, COMPANIES WITH DIRECTORS WHO ARE PERSONS IN THE SERVICE OF THE STATE, OR CLOSE CORPORATIONS WITH MEMBERS PERSONS IN THE SERVICE OF THE STATE."

NB: FAILURE TO PROVIDE / OR COMPLY WITH ANY OF THE ABOVE PARTICULARS MAY RENDER THE BID INVALID.

SIGNATURE OF BIDDER:

.....

CAPACITY UNDER WHICH THIS BID IS SIGNED:

.....

(Proof of authority must be submitted e.g. company resolution)

DATE:

.....

**PRICING SCHEDULE – FIRM PRICES
(PURCHASES)**

NOTE: ONLY FIRM PRICES WILL BE ACCEPTED. NON-FIRM PRICES (INCLUDING PRICES SUBJECT TO RATES OF EXCHANGE VARIATIONS) WILL NOT BE CONSIDERED

IN CASES WHERE DIFFERENT DELIVERY POINTS INFLUENCE THE PRICING, A SEPARATE PRICING SCHEDULE MUST BE SUBMITTED FOR EACH DELIVERY POINT

Name of bidder.....	Bid number.....
Closing Time 11:00	Closing date.....

OFFER TO BE VALID FOR.....DAYS FROM THE CLOSING DATE OF BID.

ITEM NO.	QUANTITY	DESCRIPTION	BID PRICE IN RSA CURRENCY ** (ALL APPLICABLE TAXES INCLUDED)
-	Required by:	
-	At:	
-	Brand and model	
-	Country of origin	
-	Does the offer comply with the specification(s)?		*YES/NO
-	If not to specification, indicate deviation(s)	
-	Period required for delivery	*Delivery: Firm/not firm
-	Delivery basis	

Note: All delivery costs must be included in the bid price, for delivery at the prescribed destination.

** "all applicable taxes" includes value-added tax, pay as you earn, income tax, unemployment insurance fund contributions and skills development levies.

*Delete if not applicable

SBD 4

DECLARATION OF INTEREST

1. Any legal person, including persons employed by the state¹, or persons having a kinship with persons employed by the state, including a blood relationship, may make an offer or offers in terms of this invitation to bid (includes a price quotation, advertised competitive bid, limited bid or proposal). In view of possible allegations of favouritism, should the resulting bid, or part thereof, be awarded to persons employed by the state, or to persons connected with or related to them, it is required that the bidder or his/her authorised representative declare his/her position in relation to the evaluating/adjudicating authority where-
- the bidder is employed by the state; and/or
 - the legal person on whose behalf the bidding document is signed, has a relationship with persons/a person who are/is involved in the evaluation and or adjudication of the bid(s), or where it is known that such a relationship exists between the person or persons for or on whose behalf the declarant acts and persons who are involved with the evaluation and or adjudication of the bid.

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

- 2.1 Full Name of bidder or his or her representative:
- 2.2 Identity Number:
- 2.3 Position occupied in the Company (director, trustee, shareholder²):
- 2.4 Company Registration Number:
- 2.5 Tax Reference Number:
- 2.6 VAT Registration Number:
- 2.6.1 The names of all directors / trustees / shareholders / members, their individual identity numbers, tax reference numbers and, if applicable, employee / persal numbers must be indicated in paragraph 3 below.

¹"State" means –

- (a) any national or provincial department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act No. 1 of 1999);
- (b) any municipality or municipal entity;
- (c) provincial legislature;
- (d) national Assembly or the national Council of provinces; or
- (e) Parliament.

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

2.7 Are you or any person connected with the bidder presently employed by the state? YES / NO

2.7.1 If so, furnish the following particulars:

Name of person / director / trustee / shareholder/ member:
Name of state institution at which you or the person connected to the bidder is employed :
Position occupied in the state institution:

Any other particulars:
.....
.....
.....

2.7.2 If you are presently employed by the state, did you obtain the appropriate authority to undertake remunerative work outside employment in the public sector? YES / NO

2.7.2.1 If yes, did you attached proof of such authority to the bid document? YES / NO

(Note: Failure to submit proof of such authority, where applicable, may result in the disqualification of the bid.

2.7.2.2 If no, furnish reasons for non-submission of such proof:
.....
.....
.....

2.8 Did you or your spouse, or any of the company's directors / trustees / shareholders / members or their spouses conduct business with the state in the previous twelve months? YES / NO

2.8.1 If so, furnish particulars:
.....
.....
.....

2.9 Do you, or any person connected with the bidder, have any relationship (family, friend, other) with a person employed by the state and who may be involved with the evaluation and or adjudication of this bid? YES / NO

2.9.1 If so, furnish particulars.
.....
.....
.....

2.10 Are you, or any person connected with the bidder, aware of any relationship (family, friend, other) between any other bidder and any person employed by the state who may be involved with the evaluation and or adjudication of this bid? YES/NO

2.10.1 If so, furnish particulars.
.....
.....
.....

2.11 Do you or any of the directors / trustees / shareholders / members of the company have any interest in any other related companies whether or not they are bidding for this contract? YES/NO

2.11.1 If so, furnish particulars:

.....

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

Full Name	Identity Number	Personal Reference Number	Tax	State Number / Number	Employee / Persal

4 DECLARATION

I, THE UNDERSIGNED (NAME).....

CERTIFY THAT THE INFORMATION FURNISHED IN PARAGRAPHS 2 and 3 ABOVE IS CORRECT.
 I ACCEPT THAT THE STATE MAY REJECT THE BID OR ACT AGAINST ME IN TERMS OF PARAGRAPH 23 OF THE GENERAL CONDITIONS OF CONTRACT SHOULD THIS DECLARATION PROVE TO BE FALSE.

.....
 Signature

.....
 Date

.....
 Position

.....
 Name of bidder

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

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

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

1. GENERAL CONDITIONS

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

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

1.2

- a) The value of this bid is estimated to **exceed/not exceed** R50 000 000 (all applicable taxes included) and therefore the preference point system shall be applicable; or
- b) Either the 80/20 or 90/10 preference point system will be applicable to this tender (*delete whichever is not applicable for this tender*).

1.3 Points for this bid shall be awarded for:

- (a) Price; and
- (b) B-BBEE Status Level of Contributor.

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

	POINTS
PRICE	
B-BBEE STATUS LEVEL OF CONTRIBUTOR	
Total points for Price and B-BBEE must not exceed	100

1.5 Failure on the part of a bidder to submit proof of B-BBEE Status level of contributor together with the bid, will be interpreted to mean that preference points for B-BBEE status level of contribution are not claimed.

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

4. POINTS AWARDED FOR B-BBEE STATUS LEVEL OF CONTRIBUTOR

4.1 In terms of Regulation 6 (2) and 7 (2) of the Preferential Procurement Regulations, preference points must be awarded to a bidder for attaining the B-BBEE status level of contribution in accordance with the table below:

B-BBEE Status Level of Contributor	Number of points (90/10 system)	Number of points (80/20 system)
1	10	20
2	9	18
3	6	14
4	5	12
5	4	8
6	3	6
7	2	4
8	1	2
Non-compliant contributor	0	0

5. BID DECLARATION

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

6. B-BBEE STATUS LEVEL OF CONTRIBUTOR CLAIMED IN TERMS OF PARAGRAPHS 1.4 AND 4.1

6.1 B-BBEE Status Level of Contributor: . =(maximum of 10 or 20 points)

(Points claimed in respect of paragraph 7.1 must be in accordance with the table reflected in paragraph 4.1 and must be substantiated by relevant proof of B-BBEE status level of contributor.

7. SUB-CONTRACTING

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

(Tick applicable box)

YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
-----	--------------------------	----	--------------------------

7.1.1 If yes, indicate:

- i) What percentage of the contract will be subcontracted.....%
- ii) The name of the sub-contractor.....
- iii) The B-BBEE status level of the sub-contractor.....
- iv) Whether the sub-contractor is an EME or QSE

(Tick applicable box)

YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
-----	--------------------------	----	--------------------------

v) Specify, by ticking the appropriate box, if subcontracting with an enterprise in terms

of Preferential Procurement Regulations, 2017:

Designated Group: An EME or QSE which is at least 51% owned by:	EME √	QSE √
Black people		
Black people who are youth		
Black people who are women		
Black people with disabilities		
Black people living in rural or underdeveloped areas or townships		
Cooperative owned by black people		
Black people who are military veterans		
OR		
Any EME		
Any QSE		

8. DECLARATION WITH REGARD TO COMPANY/FIRM

8.1 Name of company/firm:.....

8.2 VAT registration number:.....

8.3 Company registration number:.....

8.4 TYPE OF COMPANY/ FIRM

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

[TICK APPLICABLE BOX]

8.5 DESCRIBE PRINCIPAL BUSINESS ACTIVITIES

.....

8.6 COMPANY CLASSIFICATION

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

[TICK APPLICABLE BOX]

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

8.8 I/we, the undersigned, who is / are duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the B-BBE status level of contributor indicated in paragraphs 1.4 and 6.1 of the foregoing certificate, qualifies the company/ firm for the preference(s) shown and I / we acknowledge that:

- i) The information furnished is true and correct;
- ii) The preference points claimed are in accordance with the General Conditions as indicated in paragraph 1 of this form;
- iii) In the event of a contract being awarded as a result of points claimed as shown in paragraphs 1.4 and 6.1, the contractor may be required to furnish documentary proof to the satisfaction of the purchaser that the claims are correct;
- iv) If the B-BBEE status level of contributor has been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the purchaser may, in addition to any other remedy it may have –
 - (a) disqualify the person from the bidding process;
 - (b) recover costs, losses or damages it has incurred or suffered as a result of that person's conduct;
 - (c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;
 - (d) recommend that the bidder or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted by the National Treasury from obtaining business from any organ of state for a period not exceeding 10 years, after the *audi alteram partem* (hear the other side) rule has been applied; and
 - (e) forward the matter for criminal prosecution.

WITNESSES
1.
2.

..... SIGNATURE(S) OF BIDDERS(S)
DATE:
ADDRESS
.....
.....

DECLARATION CERTIFICATE FOR LOCAL PRODUCTION AND CONTENT FOR DESIGNATED SECTORS

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

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

1. General Conditions

- 1.1. Preferential Procurement Regulations, 2017 (Regulation 8) make provision for the promotion of local production and content.
- 1.2. Regulation 8.(2) prescribes that in the case of designated sectors, organs of state must advertise such tenders with the specific bidding condition that only locally produced or manufactured goods, with a stipulated minimum threshold for local production and content will be considered.
- 1.3. Where necessary, for tenders referred to in paragraph 1.2 above, a two stage bidding process may be followed, where the first stage involves a minimum threshold for local production and content and the second stage price and B-BBEE.
- 1.4. A person awarded a contract in relation to a designated sector, may not sub-contract in such a manner that the local production and content of the overall value of the contract is reduced to below the stipulated minimum threshold.
- 1.5. The local content (LC) expressed as a percentage of the bid price must be calculated in accordance with the SABS approved technical specification number SATS 1286: 2011 as follows:

$$LC = [1 - x / y] * 100$$

Where

x is the imported content in Rand

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

Prices referred to in the determination of x must be converted to Rand (ZAR) by using the exchange rate published by South African Reserve Bank (SARB) on the date of advertisement of the bid as indicated in paragraph 3.1 below.

The SABS approved technical specification number SATS 1286:2011 is accessible on [http://www.thedti.gov.za/industrial development/ip.jsp](http://www.thedti.gov.za/industrial%20development/ip.jsp) at no cost.

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

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

<u>Description of services, works or goods</u>	<u>Stipulated minimum threshold</u>
_____	_____ %
_____	_____ %
_____	_____ %

3. Does any portion of the goods or services offered have any imported content?

(Tick applicable box)

YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
-----	--------------------------	----	--------------------------

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

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

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

Currency	Rates of exchange
US Dollar	
Pound Sterling	
Euro	
Yen	
Other	

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

4. Where, after the award of a bid, challenges are experienced in meeting the stipulated minimum threshold for local content the dti must be informed accordingly in order for the dti to verify and in consultation with the AO/AA provide directives in this regard.

LOCAL CONTENT DECLARATION
(REFER TO ANNEX B OF SATS 1286:2011)

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

IN RESPECT OF BID NO.

ISSUED BY: (Procurement Authority / Name of Institution):
.....

NB

- 1 The obligation to complete, duly sign and submit this declaration cannot be transferred to an external authorized representative, auditor or any other third party acting on behalf of the bidder.
- 2 Guidance on the Calculation of Local Content together with Local Content Declaration Templates (Annex C, D and E) is accessible on http://www.thedti.gov.za/industrial_development/ip.isp. Bidders should first complete Declaration D. After completing Declaration D, bidders should complete Declaration E and then consolidate the information on Declaration C. **Declaration C should be submitted with the bid documentation at the closing date and time of the bid in order to substantiate the declaration made in paragraph (c) below.** Declarations D and E should be kept by the bidders for verification purposes for a period of at least 5 years. The successful bidder is required to continuously update Declarations C, D and E with the actual values for the duration of the contract.

I, the undersigned, (full names),
do hereby declare, in my capacity as
of (name of bidder
entity), the following:

- (a) The facts contained herein are within my own personal knowledge.
- (b) I have satisfied myself that:
 - (i) the goods/services/works to be delivered in terms of the above-specified bid comply with the minimum local content requirements as specified in the bid, and as measured in terms of SATS 1286:2011; and
 - (c) The local content percentage (%) indicated below has been calculated using the formula given in clause 3 of SATS 1286:2011, the rates of exchange indicated in paragraph 3.1 above and the information contained in Declaration D and E which has been consolidated in Declaration C:

Bid price, excluding VAT (y)	R
Imported content (x), as calculated in terms of SATS 1286:2011	R
Stipulated minimum threshold for local content (paragraph 3 above)	
Local content %, as calculated in terms of SATS 1286:2011	

If the bid is for more than one product, the local content percentages for each product contained in Declaration C shall be used instead of the table above.
The local content percentages for each product has been calculated using the formula given in clause 3 of SATS 1286:2011, the rates of exchange indicated in paragraph 3.1 above and the information contained in Declaration D and E.

- (d) I accept that the Procurement Authority / Institution has the right to request that the local content be verified in terms of the requirements of SATS 1286:2011.
- (e) I understand that the awarding of the bid is dependent on the accuracy of the information furnished in this application. I also understand that the submission of incorrect data, or data that are not verifiable as described in SATS 1286:2011, may result in the Procurement Authority / Institution imposing any or all of the remedies as provided for in Regulation 14 of the Preferential Procurement Regulations, 2017

promulgated under the Preferential Policy Framework Act (PPPFA), 2000 (Act No. 5 of 2000).

SIGNATURE: _____

WITNESS No. 1 _____

DATE: _____

WITNESS No. 2 _____

DATE: _____

Annex C

Local Content Declaration - Summary Schedule

(C1) Tender No. LDPWRI-B/20047

(C2) Tender description: CONSTRUCTION OF ACCOMMODATION BUILDING BLOCK C AND RENOVATIONS TO THE HALL INCLUDING ELECTRICAL INSTALLATION, MECHANICAL INSTALLATION, CIVIL AND STRUCTURAL WORKS AND EXTERNAL WORKS

(C3) Designated product(s)

(C4) Tender Authority:

(C5) Tendering Entity name:

(C6) Tender Exchange Rate:

(C7) Specified local content %

Pula EU GBP

Note: VAT to be excluded from all calculations

LIMPOPO DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

Tender item no's	List of items	Tender price - each (excl VAT)	Calculation of local content				Local content % (per item)	Total tender value	Total exempted imported content	Total Imported content	
			Exempted imported value	Tender value net of exempted imported content	Imported value	Local value					
(C8)	(C9)	(C10)	(C11)	(C12)	(C13)	(C14)	(C15)	(C16)	(C17)	(C18)	(C19)
2-2-67-20	1.93kg/m ³ mesh reinforcement							142			
2-2-67-22	150mm Brick Reinforcement							471			
2-3-72-5	1.93kg/m ³ mesh reinforcement							150.00			
2-4-76-10	75mm Brick Reinforcement							334.00			
2-4-76-11	150mm Brick Reinforcement							965			
2-6-80-1	Roof covering							970			
2-6-80-2	Ridge Cap							47			
2-6-80-3	Side wall flashing							92			
2-7-87-7	762 x 2032mm Door							10.00			
2-7-87-8	813 x 2032mm Door							1			
2-7-87-9	914 x 2032mm Door							1			
2-7-87-10	19mm Quadrant bead							142			
2-11-99-3	762 x 2032mm Door frame							10			
								(C20) Total tender value	R 0		
								(C21) Total Exempt imported content	R 0		
								(C22) Total Tender value net of exempt imported content	R 0		
								(C23) Total Imported content	R 0		
								(C24) Total local content	R 0		
								(C25) Average local content % of tender			

Signature of tenderer from Annex B

Date:

Annex C

Local Content Declaration - Summary Schedule

LDPWRI-B/20047

CONSTRUCTION OF ACCOMMODATION BUILDING BLOCK C AND RENOVATIONS TO THE HALL INCLUDING ELECTRICAL INSTALLATION, MECHANICAL INSTALLATION, CIVIL AND STRUCTURAL WORKS AND EXTERNAL WORKS

LIMPOPO DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

(C1) Tender No.
 (C2) Tender description:
 (C3) Designated product(s)
 (C4) Tender Authority:
 (C5) Tendering Entity name:
 (C6) Tender Exchange Rate:
 (C7) Specified local content %

Pula EU GBP

Note: VAT to be excluded from all calculations

Tender item no's	List of items	Tender price - each (excl VAT)	Calculation of local content				Local content % (per item)	Tender Qty	Total tender value	Total exempted imported content	Total Imported content
			Exempted imported value	Tender value net of exempted imported content	Imported value	Local value					
(C8)	(C9)	(C10)	(C11)	(C12)	(C13)	(C14)	(C16)	(C17)	(C18)	(C19)	
2-11-99-4	914 x 2032mm Door frame						1				
2-11-99-5	813 x 2032mm Door frame						1				
2-14-113-10	Angle regulating valve						26				
2-14-113-13	22mm Stopcock						1				
2-14-113-14	22mm Fullway gate valve						1				
2-14-113-15	22mm Non-return valve						1				
3-2-136-21	Type 193 fabric reinforcement						467				
3-4-144-9	75mm Wide reinforcement						2 686				
3-2-136-23	115mm Wide reinforcement						5 126				
3-6-150-1	Roof covering						608				
3-6-150-2	Ridge Cap						123				
3-6-150-3	Side wall flashing						80				
2-14-113-17	PA3-132 "Masterflo 1" pressure control valve						1				
								(C20) Total tender value	R 0		
								(C21) Total Exempt imported content	R 0		
								(C22) Total Tender value net of exempt imported content	R 0		
								(C23) Total Imported content	R 0		
								(C24) Total local content	R 0		
								(C25) Average local content % of tender	R 0		

Signature of tenderer from Annex B

Date:

Annex C

Local Content Declaration - Summary Schedule

LDPWRI-B/20047

CONSTRUCTION OF ACCOMMODATION BUILDING BLOCK C AND RENOVATIONS TO THE HALL INCLUDING ELECTRICAL INSTALLATION, MECHANICAL INSTALLATION, CIVIL AND STRUCTURAL WORKS AND EXTERNAL WORKS

LIMPOPO DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

- (C1) Tender No.
- (C2) Tender description:
- (C3) Designated product(s)
- (C4) Tender Authority:
- (C5) Tendering Entity name:
- (C6) Tender Exchange Rate:
- (C7) Specified local content %

Pula EU GBP

Note: VAT to be excluded from all calculations

Tender item no's	List of items	Tender price - each (excl VAT)	Calculation of local content				Local content % (per item)	Tender Qty	Total tender value	Total exempted imported content	Total imported content
			Exempted imported value	Tender value net of exempted imported content	Imported value	Local value					
(C8)	(C9)	(C10)	(C11)	(C12)	(C13)	(C14)	(C15)	(C16)	(C17)	(C18)	(C19)
2-14-114-27	Iron valve box							1			
3-1-129-26	8mm mild steel diameter bars							8			
3-1-129-27	12mm Diameter high tensile bars							17			
3-1-129-28	16mm Diameter high tensile bars							3			
3-1-129-31	75mm Wide reinforcement							11			
3-1-129-32	115mm Wide reinforcement							751			
3-1-136-15	8mm mild steel diameter bars							4			
3-1-136-16	10mm Diameter high tensile bars							5			
3-1-136-17	12mm Diameter high tensile bars							6			
3-1-136-18	16mm Diameter high tensile bars							3			
3-1-136-19	20mm Diameter high tensile bars							4			
3-1-136-20	25mm Diameter high tensile bars							7			
								(C20) Total tender value	R 0		
								(C21) Total Exempt imported content	R 0		
								(C22) Total Tender value net of exempt imported content	R 0		
								(C23) Total Imported content	R 0		
								(C24) Total local content	R 0		
								(C25) Average local content % of tender			

Signature of tenderer from Annex B

Date: _____

Annex C

Local Content Declaration - Summary Schedule

(C1) Tender No. LDPWRI-B/20047
 (C2) Tender description: CONSTRUCTION OF ACCOMMODATION BUILDING BLOCK C AND RENOVATIONS TO THE HALL INCLUDING ELECTRICAL INSTALLATION, MECHANICAL INSTALLATION, CIVIL AND STRUCTURAL WORKS AND EXTERNAL WORKS
 (C3) Designated product(s)
 (C4) Tender Authority: LIMPOPO DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE
 (C5) Tendering Entity name:
 (C6) Tender Exchange Rate:
 (C7) Specified local content %

Note: VAT to be excluded from all calculations

Pula EU GBP

Tender item no's	List of items	Tender price each (excl VAT)	Calculation of local content				Local content % (per item)	Tender Qty	Total tender value	Total exempted imported content	Total imported content
			Exempted imported value	Tender value net of exempted imported content	Imported value	Local value					
(C8)	(C9)	(C10)	(C11)	(C12)	(C13)	(C14)	(C15)	(C16)	(C18)	(C19)	
3-14-204-25	"Cobra Ref. 231/350" Angle regulating valve							16			
3-14-204-34	22mm Stopcock							4,00			
3-7-160-21	Mild steel bracket							16			
3-9-176-53	Steel locker							20			
3-10-179-4	50mm Hollow section rails							52			
3-10-179-5	50mm Hollow section post fixed to base plate							38			
3-10-179-6	12mm External diameter x 2,0mm rods							60			
								(C20) Total tender value	R 0		
								(C21) Total Exempt imported content	R 0		
								(C22) Total Tender value net of exempt imported content	R 0		
								(C23) Total imported content	R 0		
								(C24) Total local content	R 0		
								(C25) Average local content % of tender	R 0		

Signature of tenderer from Annex B

Date: _____

Annex C

Local Content Declaration - Summary Schedule

(C1) Tender No. LDPWRI-B/20047

(C2) Tender description: CONSTRUCTION OF ACCOMMODATION BUILDING BLOCK C AND RENOVATIONS TO THE HALL INCLUDING ELECTRICAL INSTALLATION, MECHANICAL INSTALLATION, CIVIL AND STRUCTURAL WORKS AND EXTERNAL WORKS

(C3) Designated product(s)

(C4) Tender Authority:

(C5) Tendering Entity name:

(C6) Tender Exchange Rate:

(C7) Specified local content %

LIMPOPO DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

Pula

EU

GBP

Note: VAT to be excluded from all calculations

Tender item no's	List of Items	Calculation of local content					Local content % (per item)	Tender Qty	Total tender value	Total exempted imported content	Total imported content
		Tender price - each (excl VAT)	Exempted imported value	Tender value net of exempted imported content	Imported value	Local value					
(C8)	(C9)	(C10)	(C11)	(C12)	(C13)	(C14)	(C16)	(C17)	(C18)	(C19)	
3-10-179-8	38mm Bracket						30				
3-10-179-9	Extra over for rounded closed end						21				
3-10-179-10	Extra for rounded bend to 90 degrees over flat edge						14				
3-10-179-11	50 x 70 x 5mm Thick plate section						40				
3-10-179-12	M6 expansion anchor with bolt						160				
3-10-180-14	Frame for door 762 x 2032mm high						8				
3-10-180-15	Frame for door 813 x 2032mm high						33				
3-10-180-16	Frame for door 914 x 2032mm high						2				
3-10-180-17	Frame for door 762 x 2032mm high						14				
3-10-180-18	Frame for door 813 x 2032mm high						13				
(C20) Total tender value								R 0			
(C21) Total Exempt imported content									R 0		
(C22) Total Tender value net of exempt imported content										R 0	
(C23) Total Imported content										R 0	
(C24) Total local content										R 0	
(C25) Average local content % of tender											

Signature of tenderer from Annex B

Date: _____

Annex C

Local Content Declaration - Summary Schedule

(C1) Tender No. LDPWRI-B/20047
 (C2) Tender description: CONSTRUCTION OF ACCOMMODATION BUILDING BLOCK C AND RENOVATIONS TO THE HALL INCLUDING ELECTRICAL INSTALLATION, MECHANICAL INSTALLATION, CIVIL AND STRUCTURAL WORKS AND EXTERNAL WORKS
 (C3) Designated product(s)
 (C4) Tender Authority: LIMPOPO DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE
 (C5) Tendering Entity name:
 (C6) Tender Exchange Rate:
 (C7) Specified local content %

Note: VAT to be excluded from all calculations

Pula EU GBP

Tender item no's	List of items	Tender price - each (excl VAT)	Calculation of local content				Local content % (per item)	Tender Qty	Total tender value	Total exempted imported content	Total Imported content
			Exempted imported value	Tender value net of exempted imported content	Imported value	Local value					
(C8)	(C9)	(C10)	(C11)	(C12)	(C13)	(C14)	(C16)	(C17)	(C18)	(C19)	
3-10-180-19	Frame for door 914 x 2032mm high						4				
3-10-181-20	Double door 1525mm x 2135mm						1				
3-11-188-1	254 x 146mm x 31kg/m I-section columns						0.50				
3-11-188-2	203 x 203mm x 54kg/m H-section columns						0.60				
3-11-188-3	20mm Diameter holding down bolt						20.00				
3-11-188-4	Lipped channel section purlins						0.03				
3-11-188-5	Angle section bracing						0.04				
3-11-188-7	"Hilti" HEA/HAS M16/190 chemical anchor						10.00				
3-11-188-8	"Hilti" HEA/HAS M20/190 chemical anchor						12.00				
								(C20) Total tender value	R 0		
								(C21) Total Exempt imported content	R 0		
								(C22) Total Tender value net of exempt imported content	R 0		
								(C23) Total Imported content	R 0		
								(C24) Total local content	R 0		
								(C25) Average local content % of tender			

Signature of tenderer from Annex B

Date: _____

Annex C

Local Content Declaration - Summary Schedule

(C1) Tender No. LDPWRI-B/20047
 (C2) Tender description: CONSTRUCTION OF ACCOMMODATION BUILDING BLOCK C AND RENOVATIONS TO THE HALL INCLUDING ELECTRICAL INSTALLATION, MECHANICAL INSTALLATION, CIVIL AND STRUCTURAL WORKS AND EXTERNAL WORKS
 (C3) Designated product(s)
 (C4) Tender Authority: LIMPOPO DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE
 (C5) Tendering Entity name:
 (C6) Tender Exchange Rate:
 (C7) Specified local content %

Pula EU GRP

Note: VAT to be excluded from all calculations

Tender item no's	List of items	Tender price - each (excl VAT)	Calculation of local content				Local content % (per item)	Tender Qty	Total tender value	Total exempted imported content	Total Imported content
			Exempted imported value	Tender value net of exempted imported content	Imported value	Local value					
(C8)	(C9)	(C10)	(C11)	(C12)	(C13)	(C14)	(C15)	(C16)	(C17)	(C18)	(C19)
3-14-204-35	22mm Fullway gate valve							4			
3-14-205-36	22mm Non-return valve							4			
3-14-205-37	15mm 1050R8 in-line strainer							2			
3-14-205-46	300 x 300 x 50mm Precast concrete inspection eye marke							2			
3-14-205-47	100mm Cast iron "ABC" cleaning eye							2			
3-14-205-48	Type 3B cast iron valve box							2			
3-14-210-89	Fullway gate valve							2			
4-2-227-19	150mm Wide reinforcement							83			
3-14-205-44	Mesh standard square fabric mesh mass 3.95 kg/m ²							18			
								(C20) Total tender value	R 0		
								(C22) Total Exempt imported content	R 0		
								(C23) Total Imported content	R 0		
								(C24) Total local content	R 0		
								(C25) Average local content % of tender	R 0		

Signature of tenderer from Annex B

Date:

Annex D

Imported Content Declaration - Supporting Schedule to Annex C

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

Note: VAT to be excluded from all calculations

A. Exempted imported content

Calculation of imported content										Summary	
Tender Item no's	Description of Imported content	Local supplier	Overseas Supplier	Foreign currency value as per Commercial Invoice	Tender Exchange Rate	Local value of Imports	Freight costs to port of entry	All locally incurred landing costs & duties	Total landed cost excl VAT	Tender Qty	Exempted Imported value
(D7)	(D8)	(D9)	(D10)	(D11)	(D12)	(D13)	(D14)	(D15)	(D16)	(D17)	(D18)
(D19) Total exempt imported value:										R 0	

This total must correspond with Annex C - C21

B. Imported directly by the Tenderer

Calculation of imported content										Summary	
Tender Item no's	Description of Imported content	Unit of measure	Overseas Supplier	Foreign currency value as per Commercial Invoice	Tender Rate of Exchange	Local value of Imports	Freight costs to port of entry	All locally incurred landing costs & duties	Total landed cost excl VAT	Tender Qty	Total Imported value
(D20)	(D21)	(D22)	(D23)	(D24)	(D25)	(D26)	(D27)	(D28)	(D29)	(D30)	(D31)
(D32) Total Imported value by tenderer:										R 0	

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

Calculation of imported content										Summary	
Description of Imported content	Unit of measure	Local supplier	Overseas Supplier	Foreign currency value as per Commercial Invoice	Tender Rate of Exchange	Local value of Imports	Freight costs to port of entry	All locally incurred landing costs & duties	Total landed cost excl VAT	Quantity Imported	Total Imported value
(D33)	(D34)	(D35)	(D36)	(D37)	(D38)	(D39)	(D40)	(D41)	(D42)	(D43)	(D44)
(D45) Total Imported value by 3rd party:										R 0	

D. Other foreign currency payments

Calculation of foreign currency payments					Summary of payments	
Type of payment	Local supplier making the payment	Overseas beneficiary	Foreign currency value paid	Tender Rate of Exchange	Local value of payments	
(D46)	(D47)	(D48)	(D49)	(D50)	(D51)	
(D52) Total of foreign currency payments declared by tenderer and/or 3rd party:						

Signature of tenderer from Annex B _____

Date: _____

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

This total must correspond with Annex C - C23

Annex E

Local Content Declaration - Supporting Schedule to Annex C

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

Note: VAT to be excluded from all calculations

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

(E10) **Manpower costs** (Tenderer's manpower cost) R 0

(E11) **Factory overheads** (Rental, depreciation & amortisation, utility costs, consumables etc.) R 0

(E12) **Administration overheads and mark-up** (Marketing, insurance, financing, interest etc.) R 0

(E13) Total local content R 0

This total must correspond with Annex C - C24

Signature of tenderer from Annex B

Date: _____

Section 7: Record in the service of the state

Indicate by marking the relevant boxes with a cross, if any principal is currently or has been within the last 12 months in the service of any of the following:

- a member of any municipal council
- a member of any provincial legislature
- a member of the National Assembly or the National Council of Province
- a member of the board of directors of any municipal entity
- an official of any municipality or municipal entity
- an employee of any department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act of 1999 (Act No. 1 of 1999)
- a member of an accounting authority of any national or provincial public entity
- an employee of Parliament or a provincial legislature

If any of the above boxes are marked, disclose the following:

Name of principal	Name of institution, public office, board or organ of state and position held	Status of service <i>(tick appropriate column)</i>	
		Current	Within last 12 months

*insert separate page if necessary

Section 8: Record of family member in the service of the state

family member: a person's spouse, whether in a marriage or in a customary union according to indigenous law, domestic partner in a civil union, or child, parent, brother, sister, whether such a relationship results from birth, marriage or adoption

Indicate by marking the relevant boxes with a cross, if any family member of a principal as defined in section 5 is currently or has been within the last 12 months been in the service of any of the following:

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

Name of family member	Name of institution, public office, board or organ of state and position held	Status of service (tick appropriate column)	
		Current	Within last 12 months

*insert separate page if necessary

Section 9: Record of termination of previous contracts with an organ of state

Was any contract between the tendering entity including any of its joint venture partners terminated during the past 5 years for reasons other than the employer no longer requiring such works or the employer failing to make payment in terms of the contract.

- Yes No (Tick appropriate box)

If yes, provide particulars (insert separate page if necessary)

Section 10: Declaration

The undersigned, who warrants that he / she is duly authorised to do so on behalf of the tendering entity confirms that the contents of this Declaration are within my personal knowledge, and save where stated otherwise in an attachment hereto, are to the best of my belief both true and correct, and:

- i) neither the name of the tendering entity or any of its principals appears on:
 - a) the Register of Tender Defaulters established in terms of the Prevention and Combating of Corrupt Activities Act of 2004 (Act No. 12 of 2004)
 - b) National Treasury's Database of Restricted Suppliers (see www.treasury.gov.za)
- ii) neither the tendering entity or any of its principals has within the last five years been convicted of fraud or corruption by a court of law (including a court outside of the Republic of South Africa);
- iii) any principal who is presently employed by the state has the necessary permission to undertake remunerative work outside such employment (attach permission to this declaration);
- iv) the tendering entity is not associated, linked or involved with any other tendering entities submitting tender offers
- v) has not engaged in any prohibited restrictive horizontal practices including consultation, communication, agreement, or arrangement with any competing or potential tendering entity regarding prices, geographical areas in which goods and services will be rendered, approaches to determining prices or pricing parameters, intentions to submit a tender or not, the content of the submission (specification, timing, conditions of contract etc) or intention to not win a tender;
- vi) has no other relationship with any of the tenderers or those responsible for compiling the scope of work that could cause or be interpreted as a conflict of interest;
- vii) neither the tenderer or any of its principals owes municipal rates and taxes or municipal service charges to any municipality or a municipal entity and are not in arrears for more than 3 months;
- viii) SARS may, on an on-going basis during the term of the contract, disclose the tenderer's tax compliance status to the Employer and when called upon to do so, obtain the written consent of any subcontractors who are subcontracted to execute a portion of the contract that is entered into in excess of the threshold prescribed by the National Treasury, for SARS to do likewise.

Name

Position

Enterprise name

NOTE 2: Section 30(1) of the Public Service Act, 1994, prohibits an employee (person who is employed in posts on the establishment of departments) from performing or engaging remunerative work outside his or her employment in the relevant department, except with the written permission of the executive authority of the department. When in operation, Section 8(2) of the Public Administration Management Act, 2014, will prohibit an employee of the public administration (i.e. organs of state and all national departments, national government components listed in Part A of Schedule 3 to the Public Service Act, provincial departments including the office of the premier listed in Schedule 1 of the Public Service Act and provincial departments listed in schedule 2 of the Public Service Act, and provincial government components listed in Part B of schedule 3 of the Public Service Act) or persons contracted to executive authorities in accordance with the provisions of section 12A of the Public Service Act of 1994 or persons performing similar functions in organs of state from conducting business with the State or to be a director of a public or private company conducting business with the State. The offence for doing so is a fine or imprisonment for a period not exceeding 5 years or both. It is also a serious misconduct which may result in the termination of employment by the employer.

NOTE 3: Regulation 44 of Supply Chain Management regulations issued in terms of the Municipal Finance Management Act of 2003 requires that organs of state and municipal entities not award a contract to a person who is the service of the state, a director, manager or principal shareholder in the service of the state or who has been in the service of the state in the previous twelve months.

NOTE: 4: Regulation 45 of Supply Chain Management regulations requires a municipality or municipal entity to disclose in the notes to the annual statements particulars of any award made to a close family member in the service of the state.

NOTE: 5 Corrupt activities which give rise to an offence in terms of the Prevention and Combating of Corrupt Activities Act of 2004) include improperly influencing in any way the procurement of any contract, the fixing of the price, consideration or other moneys stipulated or otherwise provided for in any contract and the manipulating by any means of the award of a tender.

NOTE: 6 Section 4 of the Competition Act of 1998 prohibits restrictive horizontal practice including agreements between parties in a horizontal relationship which have the effect of substantially preventing or lessening competition, directly or indirectly fixing prices or dividing markets or constitute collusive tendering. Section 5 also prohibits restrictive vertical practices. Any restrictive practices that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties.

DECLARATION OF BIDDER'S PAST SUPPLY CHAIN MANAGEMENT PRACTICES

- 1 This Standard Bidding Document must form part of all bids invited.
- 2 It serves as a declaration to be used by institutions in ensuring that when goods and services are being procured, all reasonable steps are taken to combat the abuse of the supply chain management system.
- 3 The bid of any bidder may be disregarded if that bidder, or any of its directors have-
 - a. abused the institution's supply chain management system;
 - b. committed fraud or any other improper conduct in relation to such system; or
 - c. failed to perform on any previous contract.
- 4 In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.

Item	Question	Yes	No
4.1	<p>Is the bidder or any of its directors listed on the National Treasury's Database of Restricted Suppliers as companies or persons prohibited from doing business with the public sector?</p> <p>(Companies or persons who are listed on this Database were informed in writing of this restriction by the Accounting Officer/Authority of the institution that imposed the restriction after the <i>audi alteram partem</i> rule was applied).</p> <p>The Database of Restricted Suppliers now resides on the National Treasury's website (www.treasury.gov.za) and can be accessed by clicking on its link at the bottom of the home page.</p>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
4.1.1	If so, furnish particulars:		
4.2	<p>Is the bidder or any of its directors listed on the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004)?</p> <p>The Register for Tender Defaulters can be accessed on the National Treasury's website (www.treasury.gov.za) by clicking on its link at the bottom of the home page.</p>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
4.2.1	If so, furnish particulars:		
4.3	Was the bidder or any of its directors convicted by a court of law (including a court outside of the Republic of South Africa) for fraud or corruption during the past five years?	Yes <input type="checkbox"/>	No <input type="checkbox"/>

4.3.1	If so, furnish particulars:		
4.4	Was any contract between the bidder and any organ of state terminated during the past five years on account of failure to perform on or comply with the contract?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
4.4.1	If so, furnish particulars:		

SBD 8

CERTIFICATION

I, THE UNDERSIGNED (FULL NAME).....
CERTIFY THAT THE INFORMATION FURNISHED ON THIS DECLARATION FORM IS TRUE AND CORRECT.
I ACCEPT THAT, IN ADDITION TO CANCELLATION OF A CONTRACT, ACTION MAY BE TAKEN AGAINST ME SHOULD THIS DECLARATION PROVE TO BE FALSE.

.....
Signature

.....
Date

.....
Position

.....
Name of Bidder

CERTIFICATE OF INDEPENDENT BID DETERMINATION

- 1 This Standard Bidding Document (SBD) must form part of all bids¹ invited.
- 2 Section 4 (1) (b) (iii) of the Competition Act No. 89 of 1998, as amended, prohibits an agreement between, or concerted practice by, firms, or a decision by an association of firms, if it is between parties in a horizontal relationship and if it involves collusive bidding (or bid rigging).² Collusive bidding is a *pe se* prohibition meaning that it cannot be justified under any grounds.
- 3 Treasury Regulation 16A9 prescribes that accounting officers and accounting authorities must take all reasonable steps to prevent abuse of the supply chain management system and authorizes accounting officers and accounting authorities to:
 - a. disregard the bid of any bidder if that bidder, or any of its directors have abused the institution's supply chain management system and or committed fraud or any other improper conduct in relation to such system.
 - b. cancel a contract awarded to a supplier of goods and services if the supplier committed any corrupt or fraudulent act during the bidding process or the execution of that contract.
- 4 This SBD serves as a certificate of declaration that would be used by institutions to ensure that, when bids are considered, reasonable steps are taken to prevent any form of bid-rigging.
- 5 In order to give effect to the above, the attached Certificate of Bid Determination (SBD 9) must be completed and submitted with the bid:

¹ Includes price quotations, advertised competitive bids, limited bids and proposals.

² Bid rigging (or collusive bidding) occurs when businesses, that would otherwise be expected to compete, secretly conspire to raise prices or lower the quality of goods and / or services for purchasers who wish to acquire goods and / or services through a bidding process. Bid rigging is, therefore, an agreement between competitors not to compete.

CERTIFICATE OF INDEPENDENT BID DETERMINATION

I, the undersigned, in submitting the accompanying bid:

(Bid Number and Description)

in response to the invitation for the bid made by:

(Name of Institution)

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

I certify, on behalf of: _____ that:

(Name of Bidder)

1. I have read and I understand the contents of this Certificate;
2. I understand that the accompanying bid will be disqualified if this Certificate is found not to be true and complete in every respect;
3. I am authorized by the bidder to sign this Certificate, and to submit the accompanying bid, on behalf of the bidder;
4. Each person whose signature appears on the accompanying bid has been authorized by the bidder to determine the terms of, and to sign the bid, on behalf of the bidder;
5. For the purposes of this Certificate and the accompanying bid, I understand that the word "competitor" shall include any individual or organization, other than the bidder, whether or not affiliated with the bidder, who:
 - (a) has been requested to submit a bid in response to this bid invitation;
 - (b) could potentially submit a bid in response to this bid invitation, based on their qualifications, abilities or experience; and
 - (c) provides the same goods and services as the bidder and/or is in the same line of business as the bidder

6. The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement or arrangement with any competitor. However communication between partners in a joint venture or consortium³ will not be construed as collusive bidding.
7. In particular, without limiting the generality of paragraphs 6 above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:
 - (a) prices;
 - (b) geographical area where product or service will be rendered (market allocation)
 - (c) methods, factors or formulas used to calculate prices;
 - (d) the intention or decision to submit or not to submit, a bid;
 - (e) the submission of a bid which does not meet the specifications and conditions of the bid; or
 - (f) bidding with the intention not to win the bid.
8. In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications and conditions or delivery particulars of the products or services to which this bid invitation relates.
9. The terms of the accompanying bid have not been, and will not be, disclosed by the bidder, directly or indirectly, to any competitor, prior to the date and time of the official bid opening or of the awarding of the contract.

³ Joint venture or Consortium means an association of persons for the purpose of combining their expertise, property, capital, efforts, skill and knowledge in an activity for the execution of a contract.

SBD 9

10. I am aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to bids and contracts, bids that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties in terms of section 59 of the Competition Act No 89 of 1998 and or may be reported to the National Prosecuting Authority (NPA) for criminal investigation and or may be restricted from conducting business with the public sector for a period not exceeding ten (10) years in terms of the Prevention and Combating of Corrupt Activities Act No 12 of 2004 or any other applicable legislation.

Signature

Date

Position

Name of Bidder

Js914w 2

DECLARATION OF SUBCONTRACTING ARRANGEMENTS

The Limpopo Department of Public Works, Roads & Infrastructure is tasked with achieving government socio-economic transformation and development initiatives through its procurement spend. The department therefore endeavours to promote such initiatives through its procurement, by means of one or a combination of the following, in terms of the Preferential Procurement Policy Framework Act (PPPFA), 2000: Preferential Procurement Regulations (PPR), 2017:

1. Application of Subcontracting as a Condition of Tender, in line with the PPPFA: PPR 2017;
 - 1.1 The basis and conditions for sub-contracting as a condition of tender, is further detailed under item 1.1 below.

The Tenderer if successful in this bid offer, will be required to provide the Signed Subcontracting Agreement(s) and Supporting Documents, in line with the information detailed in this Returnable within 60 calendar days of the site handover. Failure to adhere to this will result in the immediate cancellation of the acceptance of offer (appointment letter).

Additional information to subcontracting requirement in terms of Regulations 4 or 9 PPR 2017:

- i. It is the responsibility of the tenderer to select competent subcontractors that meet all the requirements of the tender. The fact that the Department/Employer may make a list of potential subcontractors available as registered on the National Treasury CSD or on a CIDB database does not result in any liability of the Department/Employer or a warranty that the listed suppliers are competent.
- ii. Subcontractors may not be allocated work which contradicts any regulations, regulatory body and/or compliance requirements relevant to the work being sub-contracted for i.e. requirements by CIDB Regulations, accreditations and registrations to professional / regulatory institutions in the case of professional services etc.
- iii. The tenderer will be responsible for all due diligence on the selected subcontractors and will be held liable for any non-performance.
- iv. With reference to the **Preferential Procurement Regulations 2017, Regulation 6(5), 7(5) and 12(3)**; "A person awarded a contract may not subcontract more than 25% of the value of the contract to any other enterprise, that does not have an equal or higher B-BBEE status level of contributor than the person concerned."
 - "Unless the contract is subcontracted to an EME that has the capability and ability to execute the subcontract".
 - Or the tenderer may not be awarded points for B-BBEE status level of contribution.
- v. Tenderers are to complete and submit a Schedule of Proposed Subcontracting Arrangement(s)), also stipulating the percentage and equivalent Rand value to be subcontracted.
- vi. Tenderers are to provide, on award within 60 calendar days of the site handover, formal proof of Signed Subcontracting Agreement(s) together with the following documentation for each of the relevant, as a minimum:

Supporting Documents to Subcontracting Agreement/s
Certified Copy of valid B-BBEE Certificate/ Affidavit.
Copy of valid/ active CIDB registration in the case of construction work.
Copy of valid/ active registration to applicable regulatory institutions (where stipulated) in the case of professional services work.

A valid and active Tax Compliance Status Pin issued by SARS.

Submission of National Treasury Central Supplier Database (CSD) Summary Report.

Note: It is incumbent and expected that the Tenderer will apply the same due care and diligence in selecting and managing its sub-contractors / joint venture partner as would have been the case in their own appointment.

1. SUBCONTRACTING AS A CONDITION OF TENDER

In line with the Preferential Procurement Policy Regulations 2017, Regulation 9, Subcontracting may only be to one or a combination of the following (as per National Treasury CSD and CIDB databases):

NO.	CATEGORIES FOR SUBCONTRACTING
1	A tenderer subcontracting a minimum of 30% of the value of the contract to one or a combination of the designated categories below:
1.1	An EME or QSE which is at least 51% owned by black people; or
1.2	an EME or QSE which is at least 51% owned by black people who are youth; or
1.3	an EME or QSE which is at least owned by black people who are women; or
1.4	an EME or QSE which is at least 51% owned by black people with disabilities; or
1.5	an EME or QSE which is 51% owned by black people living in rural or underdeveloped areas or townships; or
1.6	a cooperative which is at least 51% owned by black people; or
1.7	an EME or QSE which is at least 51% owned by black people who are military veterans; or
1.8	an EME or QSE.

Tenderers are formally required to allow for subcontracting of the allocated work as set out in the Scope of 30% of the Tender Value offered.

1.1 BASIS AND CONDITIONS FOR SUBCONTRACTING AS A CONDITION OF TENDER The basis and conditions for sub-contracting as a condition of tender is detailed as follow:

1.1.1 The advancement of certain designated groups in terms of Regulation 4 PPR 2017;

1.1.2 The advancement of suppliers or enterprises in the geographical area or Province where the project site is located;

1.1.3 All requirements stipulated under clauses 1 and 1.1 of this Returnable, must be read in conjunction with the information documented within this Declaration on **Item 3 – Schedule of Proposed Subcontracting Work.**

2. SUBCONTRACTING AFTER AWARD OF TENDER

In line with the Preferential Procurement Policy Regulations 2017, Regulation 12, Subcontracting after Award, the following are contractual obligations for notification:

- 2.1 A person awarded a contract may only enter into a subcontracting arrangement with the approval of the organ of state.
- 2.2 A person awarded a contract in relation to a designated sector, may not subcontract in such a manner that the local production and content of the overall value of the contract is reduced to below the stipulated minimum threshold.
- 2.3 A person awarded a contract may not subcontract more than 25% of the value of the contract to any other enterprise that does not have an equal or higher B-BBEE status level of contributor than the person concerned, unless the contract is subcontracted to an EME that has the capability and ability to execute the subcontract.

3. SCHEDULE OF PROPOSED SUBCONTRACTING WORK

The tenderer is required to complete the table below indicating the nature and extent of work to be subcontracted and value and percentage of work to the tender amount. The total percentage of the value of work to be subcontracted must be to a minimum of 30% or more of the tender amount. Failure to comply with the 30% minimum value of the work to be subcontracted will lead to the disqualification of the tender.

	NATURE AND EXTENT OF WORK	SUB-CONTRACTORS CONTRACT VALUE	SUB-CONTRACTORS PERCENTAGE (%) OF CONTRACT VALUE
1.			
2.			
3.			
4.			
5.			
TOTAL SUBCONTRACT VALUE & PERCENTAGE IN RELATION TO CONTRACT VALUE			

I, THE UNDERSIGNED (FULL NAME OF AUTHORISED PERSON)

.....
ON BEHALF OF (FULL NAME OF TENDERING ENTITY)

.....
FORMALLY CONFIRM THAT THIS TENDER SUBMISSION IS FULLY COMPLIANT AND ADHERES IN FULL, TO ALL THE REQUIREMENTS STIPULATED IN THIS BID IN ITS ENTIRITY.

I ACCEPT THAT, FAILURE TO COMPLETE AND SUBMIT THIS DECLARATION ON SUBCONTRACTING ARRANGEMENTS AND SCHEDULE OF PROPOSED SUBCONTRACTING WORK WILL RESULT IN THE DISQUALIFICATION OF MY TENDER SUBMISSION.

I ACCEPT THAT, FAILURE TO SUBMIT THE SIGNED SUBCONTRACTING AGREEMENTS AND ITS SUPPORTING DOCUMENTS ON AWARD, IN ACCORDANCE WITH THE REQUIREMENTS OF THE BID, WILL LEAD TO THE CANCELLATION OF THE CONTRACT.

SIGNATURE: _____

DATE: _____

THE CONTRACT

C1.1 FORM OF OFFER AND ACCEPTANCE

Offer

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

CONSTRUCTION OF NEW ACCOMMODATION BLOCK C AND RENOVATIONS TO THE HALL AT THE LIMPOPO TRAFFIC TRAINING COLLEGE IN THE VHEMBE DISTRICT FOR THE LIMPOPO DEPARTMENT OF TRANSPORT

The tenderer, identified in the offer signature block, has examined the documents listed in the tender data and addenda thereto as listed in the tender schedules, and by submitting this offer has accepted the conditions of tender.

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

THE OFFERED TOTAL OF THE PRICE INCLUSIVE OF VALUE ADDED TAX IS (CONTRACT PRICE)

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

(in figures) R.....
This offer may be accepted by the employer by signing the acceptance part of this form of offer and acceptance and returning one copy of this document to the tenderer before the end of the period of validity stated in the tender data, whereupon the tenderer becomes the party named as the contractor in the conditions of contract identified in the contract data.

For the Tenderer:

Signature(s).....

Name(s)

Capacity for (brief description of Contract)

Name and address of organization

failure to sign the form of offer will render the tender "non-responsive"

Acceptance

By signing this part of this form of offer and acceptance, the employer identified below accepts the tenderer's offer. In consideration thereof, the employer shall pay the contractor the amount due in accordance with the conditions of contract identified in the contract data. Acceptance of the tenderer's offer shall form an agreement between the employer and the tenderer upon the terms and conditions contained in this agreement and in the contract that is the subject of this agreement.

The terms of the contract are contained in:

- PART C1 Agreements and contract data, (which includes this agreement)
- PART C2 Pricing data
- PART C3 Scope of work
- PART C4 Site information

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

Deviations from and amendments to the documents listed in the tender data and any addenda thereto as listed in the tender schedules as well as any changes to the terms of the offer agreed by the tenderer and the employer during this process of offer and acceptance, are contained in the schedule of deviations attached to and forming part of this agreement. No amendments to or deviations from said documents are valid unless contained in this schedule, which must be signed by the authorised representative(s) of both parties.

The tenderer shall within two weeks after receiving a completed copy of this agreement, including the schedule of deviations (if any), contact the employer's agent (whose details are given in the contract data) to arrange the delivery of any bonds, guarantees, proof of insurance and any other documentation to be provided in terms of the conditions of contract identified in the contract data at, or just after, the date this agreement comes into effect. Failure to fulfil any of these obligations in accordance with those terms shall constitute a repudiation of this agreement.

Notwithstanding anything contained herein, this agreement comes into effect on the date when the tenderer receives one copy of the fully signed original document, including the schedule of deviations (if any). Unless the tenderer (now contractor) within five days of the date of such receipt notifies the employer in writing of any reason why he cannot accept the contents of this agreement, this agreement shall constitute a binding contract between the parties.

For the Employer

Signature

Name

Capacity

Name and address of organization

Signature and Name of Witness

Signature

Name

Capacity

Schedule of Deviations

Notes:

1. The extent of deviations from the tender documents issued by the Employer prior to the tender closing date is limited to those permitted in terms of the Conditions of Tender,
2. A Tenderer's covering letter shall not be included in the final contract document. Should any matter in such, letter, which constitutes a deviation as aforesaid become the subject of agreements reached during the process of, offer and acceptance, the outcome of such

agreement shall be recorded here,

- 3. Any other matter arising from the process of offer and acceptance either as a confirmation, clarification or change to the tender documents and which it is agreed by the Parties becomes an obligation of the contract shall also be recorded here,
- 4. Any change or addition to the tender documents arising from the above agreements and recorded here, shall also be incorporated into the final draft of the Contract,

- 1 Subject
- Details
- 2 Subject
- Details

By the duly authorised representatives signing this schedule of deviations, the employer and the tenderer agree to and accept the foregoing schedule of deviations as the only deviations from and amendments to the documents listed in the tender data and addenda thereto as listed in the tender schedules, as well as any confirmation, clarification or changes to the terms of the offer agreed by the tenderer and the employer during this process of offer and acceptance.

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

For the Tenderer:

..... Signature
 Name
 Capacity

For the Employer

.....

Name and address of organisation:

.....

Name and address of organisation

..... Witness Signature
 Witness Name
 Date

.....

Confirmation of Receipt

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

the (day)
 of (month)
 20..... (year)
 at (place)

For the Contractor:

.....
 Signature

 Name

 Capacity

Signature and name of witness:

.....
 Signature

OCCUPATIONAL HEALTH & SAFETY SPECIFICATION

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1. Introduction

In terms of the Construction Regulations promulgated under the Occupational Health and Safety Act (Act no. 85 of 1993), the Client or its Agent is required to compile an occupational health and safety specification for any intended project classified as construction work and to provide the specification to prospective tenderers.

Compliance to the requirements of the Occupational Health and Safety Act 85 of 1993 is in addition to the requirements of this Health and Safety Specification.

2. Definition

"Agent" –

means any person who acts as a representative for a client;

"Client" –

means any person for whom construction work is performed;

"Construction Work" is defined as any work in connection with –

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

"Contractor" –

means an employer, as defined in Section 1 of the Act, who performs construction work and includes Principal Contractors;

"Health and Safety File" –

means a file, or other record in permanent form, containing the information required as contemplated in the regulations;

"Health and Safety Plan" –

means a documented plan which addresses hazards identified and includes safe work procedures to mitigate, reduce or control the hazards identified;

"Health and Safety Specification" –

means a documented specification of all health and safety requirements pertaining to the associated works on a construction site, so as to ensure the health and safety of persons;

"Method Statement" –

means a document detailing the key activities to be performed in order to reduce as reasonably as practicable the hazards identified in any risk assessment;

"Principal Contractor" –

means an employer, as defined in section 1 of the Act who performs construction work and is appointed by the client to be in overall control and management of a part of or the whole of a construction site;

"Risk Assessment" –

means a program to determine any risk associated with any hazard at a construction site, in order to identify the steps needed to be taken to remove, reduce or control such hazard.

3. Purpose

The purpose of this site specific Health and Safety Specification is to address the reasonable and foreseeable aspects of occupational health, safety and environmental management which will be affected by this construction work, and to comply with legal requirements.

The Contractor must take into account all information in this specification to ensure that their tender includes adequate resource and relevant competence to carry out this construction work. The contractor must ensure that all costs related to compliance with Occupational Health Act 85 of 1993 and the Construction Regulations 2014, as well as this Health and Safety Specification, are taken into consideration at Tender stage.

4. Background

Due to poor practices and high levels of reportable incidents in the past, it is required that highest levels of health and safety standards be maintained throughout the construction period. The Client, contractor and all other parties involved in this project are committed to ensure that these highest Health and Safety standards will be maintained.

5. Implementation

This Health and Safety Specification forms an integral part of the Contract. Contractors shall also make it an integral part of their Contracts with their Sub Contractors. The successful Contractor will be required to compile a Health and Safety Plan based on the requirements of the Occupational Health Act 85 of 1993 and these Specifications, which will need to be approved by Client prior to commencement with construction work.

6. Management and Supervision of Construction Work

6.1 Principal Contractor's Safety Management Plan

The principal contractor appointed by the Client in terms of the Construction Regulations (2014) shall prepare an occupational health and safety plan adhering to the requirements contained in the provided

Health and Safety Specification. This plan shall be prepared in terms of the Occupational Health and Safety Act (Act no. 85 of 1993) and Construction Regulation (2014) and be specific to this project. The Client and the contractor shall agree on the occupational health and safety plan before any work may commence on site.

6.2 Minimum contents of the Health and Safety File

As required by the Construction Regulations (2014), the principal contractor and sub-contractor/s will each keep a project specific Health and Safety File on site containing the following minimum documentation:

- Approval letter by the Client on contents of Health and Safety Management Plan;
- Notification of construction work to the relevant Department of Labour (stamped)
- Scope of work to be performed;
- Occupational Health & Safety Policy and other Policies;
- Updated copy of the Occupational Health and Safety Act (Act no. 85 of 1993) and its Regulations.
- Updated copy of the Compensation for Occupational Injuries and Diseases Act (Act no. 130 of 1993) and its Regulations;
- Proof of registration and good standing with the Compensation Commissioner or another licensed Insurer;
- Risk Assessments
- A list of contractors (sub-contractors) including copies of the agreements between the parties and the type of work being done by each contractor;
- Copies of occupational health and safety committee meetings and other relevant minutes;
- Copies of written designations and appointments of competencies;
- Management structure (inclusive of OH&S responsibility & meeting structure);
- Induction training and site safety rules;
- Occupational health and safety training;
- Arrangements with contractors and/or mandataries;
- Description of security measures;
 - Accident and/or incident register;
 - Occupational health and safety representative inspection register;
 - Construction vehicles and mobile plan inspections;
 - Daily inspections of excavations by competent person;
 - Record of entry to confined space;
 - Record of training;
 - Record of toolbox talks
 - Inspection and maintenance of explosive powered tools;
 - Fall protection inspections;
 - First-aid box content;
 - Record of first-aid treatment;
 - Fire equipment inspection and maintenance;
 - Record of hazardous chemical substances kept and used on site;
 - Ladder inspection;

- Inspection of excavation
- Inspection of stacking and storage;
- Inspection of housekeeping and general safeguarding on construction site
- Inspection of construction employees' facilities
- Records of issuing of Personal Protective Equipment;
- Monthly reporting and recording of statistics;
- Emergency preparedness and response programmes;
- Investigation and reporting of incidents and/or accidents to the Client and Department of Labour/Compensation Commissioner
- All other applicable records.

***Note:** The contractor shall hand over the consolidated health and safety file to the client on completion of the construction work (include drawings, designs, materials used, etc.)

7. Organogram

The Contractor shall submit an organogram, prior to construction work commencement, outlining the Health and Safety Site Team that will be assigned to the project.

7.1 Construction Manager

The contractor must in writing appoint one full-time competent person as the construction manager with the duty of managing all the construction work on a single site, including the duty of ensuring occupational health and safety compliance, and in the absence of construction manager an alternate must be appointed by the principal contractor.

No construction manager appointed under sub regulation 8(1) may manage any construction work on or in any construction site other than the site in respect of which he or she has been appointed. A construction manager must in writing appoint construction supervisor/s responsible for construction activities and ensuring occupational health and safety compliance on the construction site.

7.2 Construction Supervisor

The construction supervisor and/or assistant construction supervisor/s appointed in terms of the Construction Regulations (2014) are responsible for supervising the construction work which he or she has been appointed and especially to ensure that all work undertaken complies with the requirements of the Occupational Health and Safety Act (Act no. 85 of 1993) and all other applicable legislative requirements and regulations.

***This construction site shall not be left without supervision.**

7.3 Construction Safety Officer

The Principal contractor must appoint a **full time** construction health and safety officer in writing to assist in the control of all health and safety related aspects. The appointed Construction Safety Officer must have relevant qualifications and relevant construction safety experience.

8. Appointment and functions of the Safety Committee

The principal contractor must establish an occupational health and safety committee consisting of all the designated occupational health and safety representatives together with a number of management representatives. The management representatives shall not exceed the number of occupational health and safety representatives on the committee. The members of the occupational health and safety committee must be appointed in writing.

The occupational health and safety committee must meet at least **once** per 2 months and will consider, at least, the following agenda items:

1. Opening and welcome;
2. Members present, apologies and absent;
3. Minutes of previous meeting;
4. Matters arising from the previous meeting;
5. Outcomes of previous audit and behavioural based safety inspections;
6. Incident and/or accident reports and investigations;
7. Incident, accident and/or injury statistics;
8. Health and Safety Plan (revisions and new requirements);
9. Training (awareness, competence);
10. Emergency Preparedness Plan;
11. Non-Conformances and notices;
12. Toolbox Talks;
13. Close and next meeting.

9. Risk Assessment

Risk assessments shall identify occupational health and safety hazards and risks and environmental aspects and impacts emanating from this project.

The risk assessment (inclusive of impact assessment) shall include (at a minimum):

- Identification of the relevant Project with regard to Project number, Project name and area;
- Date on which risk assessments were conducted/reviewed;
- The identification of the risks/hazards and aspects/impacts to which persons may be exposed to per activity;
- An analysis and evaluation of the risks and hazards and aspects/impacts identified on a documented method;
- Existing control measures and proposed corrective measures

- A plan to review the risk assessments as the work progresses and changes are introduced;
- A documented plan and Safe Working Procedures (SWP), and its relevance to the risk assessment, to mitigate, reduce or control the risks and hazards that have been identified;
- A plan to monitor the application of the Safe Working Procedures (SWP);
- Signature of appointed competent person conducting risk assessment; and
- Signature of management and employees involved in risk assessment.
- Review plan;

The risk assessments, together with the site-specific occupational health and safety rules, shall be submitted before mobilisation on site commences. These must be included in the health and safety plan. The contractor shall ensure through his risk management process the hierarchy of controls stipulated as follows, are implemented;

- **Eliminate** - The complete elimination of the hazard.
- **Substitute** - Replacing the material or process with a less hazardous one.
- **Redesign** - Redesign the equipment or work process.
- **Separate** - Isolating the hazard by guarding or enclosing it.
- **Administrate** - Providing control such as training, procedures etc.
- **Personal Protective Equipment (PPE)** - Use of appropriate and properly fitted PPE where other controls are not practical. (PPE as the last resort)

i. Baseline risk assessments

The Client is required to prepare a baseline risk assessment before the commencement of construction activities. The hazards and risk to which persons, plant, vehicles and facilities may be exposed during the construction shall be identified and evaluated. The aspects and impacts resulting in environmental pollution or degradation shall also be identified and evaluated. Measures to reduce or control these risks or hazards must be defined during this assessment. The contractor shall ensure that all employees under his or her control are informed instructed and trained by a competent person regarding any hazard and the related work procedure and or control measure before any work commences, and thereafter at the times determined in the risk assessment monitoring and review plan of the relevant site.

The contractor shall ensure that all sub-contractors are informed regarding any hazard that are stipulated in the risk assessment before any work commences, and thereafter at the times that may be determined in the risk assessment monitoring and review plan. The contractor shall ensure that copies of the risk assessment of the relevant site are available on for inspection by an Inspector, the Client, the Client's Agent, any sub-contractor/s, any employee, a health and safety representative or any member of the health and safety committee.

The Client shall review the relevant risk assessment where changes are effected to the design and/or construction that result in a change to the risk profile or when an incident has occurred. The effectiveness of

the measures defined and the baseline risk assessment prepared shall be monitored and reviewed from time to time to ensure that it remains relevant and accurate.

10. Medical Fitness Certificate

The contractor must ensure that their employees on site have a valid medical certificate of fitness, specific to the construction work being performed, issued by an occupational health practitioner in the form of Annexure 3.

11. Training

The principal contractor and its sub-contractor/s shall ensure that all its employees are adequately trained and experienced to perform their work. Where semi-skilled employees are employed, adequate supervision must be available to maintain standards of work and to ensure compliance with Health and Safety standards on this project.

11.1 Site-specific Induction

The contractor may under any circumstances allow or permit any employee or person to enter site unless they have undergone health and safety induction training pertaining to the hazards prevalent on site at the

time of entry. This includes visitors to site. The Contractor must ensure that visitors to site have the necessary protective equipment (PPE). Records of induction must be kept in the safety file.

11.2 Toolbox Talks

The contractor shall conduct toolbox talks with their employees on **weekly** basis and records of these must be kept in the safety file. Employees must acknowledge the receipt of toolbox talks and this record must also be kept in the Safety file

11.3 Other training

All operators, drivers and users of construction vehicles, mobile plant and other equipment are to be in possession of valid proof of training and, where applicable, valid licenses. All employees in jobs requiring training in terms of the Occupational Health and Safety Act (Act no 85 of 1993) and any other applicable legislative requirements are to be in possession of valid proof of training.

11.4 Competence

The contractor must ensure that his personnel are trained and competent to carry out work safely and without risk to health before work commences. Follow-up and refresher training shall be conducted as the work progresses and whenever the scope or nature of the work changes. Records of all training must be kept in the Safety File.

12. Communication and Consultation

12.1 Notification of construction work

The Principal contractor shall, before carrying out any work, notify the Department of Labour in writing 7 days prior, of any construction work that involves:

- a) excavation work;
- b) working at a height where there is risk of falling;
- c) demolition of a structure;

Only a certified copy stamped by the Department of Labour will be acceptable. No faxed or emailed notifications will be accepted. No work shall commence before notification of construction work has been done to the relevant Department of Labour by the principal contractor. The Client will not approve the Safety File if no notification of construction work has been done.

12.2 Consultative forums

The following arrangements with respect to communication and liaison shall apply:

- Occupational health and safety liaison between The Client, The Principal contractor, the sub-contractor/s, the designer and other concerned parties will be through the occupational health and safety committee
- In addition to the above, communication may be directly to The Client, The Principal contractor or sub-contractor/s, verbally or in writing, as and when the need arises.
- Consultation with the workforce on occupational health, safety and environmental matters will be through their supervisors, occupational health and safety officer or/and the occupational health and safety committee
- The contractor will be responsible for the dissemination of all relevant occupational health, safety and environmental information to the sub-contractor/s. The transfer of information must take place before the contractor or sub-contractor/s commence work, for example, on design changes agreed with the Client and the designer, exchange of information between contractors, the reporting of hazardous and/or dangerous conditions and/or situations etc.

12.3 Contractor / Mandatory control

Whenever the principal contractor appoints sub-contractors, it is a requirement that an Occupational Health and Safety Act (Act no. 85 of 1993) Section 37(2) agreement (i.e. Agreement with Mandatory) is included in his agreement with the sub-contractor.

13. Site Security & Access Control

The contractor must establish site access rules and implement and maintain these throughout the construction period. Access control must, amongst other, include the rule that every person entering the construction site must sign the register at the entrance indicating the following:

- Surname and Name
- Id number
- Vehicle registration number
- From which company
- Reason for entering the construction site
- Time in and Time out
- Signature

Non-employees will not be allowed on site unaccompanied. These rules and procedures must be maintained throughout the construction period. The contractor shall provide a **guard house** for a security working during the day and at night if recommended. The guard house should be in good condition and at-least meet minimum requirements as per environmental regulations for workplaces.

14. Fall protection

The contractor must ensure that employees are protected from falling into open excavations.

15. Construction vehicles and mobile plant

Construction vehicles and mobile plant will be inspected by the appointed person prior to being allowed on a project site. Suppliers of hired vehicles, plant and equipment will be required to comply with this specification as well as the Occupational Health and Safety Act (Act no. 85 of 1993) and Construction Regulations (2014).

Construction vehicles and mobile plant to be:

- Of acceptable design and construction;
- Maintained in good working order;
- Used in accordance with their design and intention for which they were designed having due regard to safety and health;
- Operated and/or driven by trained, certified competent and in possession of proof of competency and is authorised in writing to operate those construction vehicles and mobile plant. A person who has a medical certificate of fitness to operate those construction vehicles and mobile plant, issued by an occupational practitioner in the form of Annexure 3
- Provided with safe and suitable means of access and egress;
- Fitted with properly organised and controlled in any work situation by providing adequate signalling devices or other control arrangements to guard against the dangers relating to the movement of vehicles and plant in order to ensure that their continued safe operations.
- are prevented from falling into excavations, water or any other area lower than the working surface by installing adequate edge protection, which may include guardrails and crash barriers;
- Fitted with structures designed to protect the operator from falling material or from being crushed should the vehicle or mobile plant overturn;
- Equipped with an acoustic warning device which can be activated by the operator;
- Equipped with an automatic acoustic reversing alarm; and

- Inspected by the authorised operator or driver on a daily basis using a relevant checklist prior to use and that the findings of such inspection are recorded in a register kept in the construction vehicle or mobile plant.

The contractor must ensure that –

- (a) No person rides or is required or permitted to ride on a construction vehicle or mobile plant otherwise than in a safe place provided thereon for that purpose;
- (b) Every construction site is organized in such a way that, as far as is reasonably practicable, pedestrians and vehicles can move safely and without risks to health;
- (c) The traffic routes are suitable for the persons, construction vehicles or mobile plant using them, are sufficient in number, in suitable positions and of sufficient size;
- (d) Every traffic route is, where necessary, indicated by suitable signs;
- (e) All construction vehicles and mobile plant left unattended at night, adjacent to a public road in normal use or adjacent to construction areas where work is in progress, have appropriate lights or reflectors, or barricades equipped with appropriate lights or reflectors, in order to identify the location of the vehicles or plant;
- (f) All construction vehicles or mobile plant when not in use, have buckets, booms or similar appendages fully lowered or blocked, controls in a neutral position, motors stopped, wheels chocked, brakes set and ignition secured;
- (g) Whenever visibility conditions warrant additional lighting, all mobile plant are equipped with at least two headlights and two taillights when in operation;
- (h) Tools, material and equipment are secured and separated by means of a physical barrier in order to prevent movement when transported in the same compartment with employees;
- (i) Vehicles used to transport employees have seats firmly secured and adequate for the number of employees to be carried; and

16. Symbolic Signage

The contractor shall use mandatory and prescribed symbolic safety signs at their lay down and site areas.

The display of the following signs is mandatory:

- “Eye Protection” symbolic signs shall be displayed at all grinding machines and at any area where it is mandatory to wear eye protection or where there is danger of an eye injury being sustained.
- “Ear Protection” symbolic signs shall be displayed at all areas where there is a danger of noise induced hearing loss being sustained.
- All toilets or urinals shall be marked in a conspicuous place with painted or stencilled letters to indicate the sex for which they are intended.
- The location of every first aid box is to be clearly indicated by means of a sign.
- In any room, cabinet or enclosure where flammable substances are used or stored shall be fixed a suitable and conspicuous sign prohibiting smoking or the use of naked flames in the area.
- Emergency contact telephone numbers.

- Adequate fire fighting equipment signs.
- "Excavations in progress"
- Warning notices at openings through which people may fall.

17. Use and temporary storage of flammable liquids on construction sites

The contractor must ensure that, in addition to compliance with the provisions for the use and storage of flammable liquids in the General Safety Regulations, 2003, ensure that:

- Where flammable liquids are being used, applied or stored at the workplace concerned, it is done in a manner that does not cause a fire or explosion hazard, and that the workplace is effectively ventilated;
- No person smokes in any place in which flammable liquid is used or stored, and the contractor must affix a suitable and conspicuous notice at all entrances to any such areas prohibiting such smoking;
- An adequate amount of efficient fire-fighting equipment is installed in suitable locations around the flammable liquids store with the recognized symbolic signs;
- Only the quantity of flammable liquid needed for work on one day is taken out of the store for use;
- All containers holding flammable liquids are kept tightly closed when not in actual use and, after their contents have been used up, are removed from the construction site and safely disposed of;
- Where flammable liquids are decanted, the metal containers are bonded and earthed; and
- No flammable material, including cotton waste, paper, cleaning rags or similar material is stored together with flammable liquids.

18. Fuel Storage

No petrol shall be stored in drums in excess of a total of two hundred litres in any building or other place except with the prior written approval of the Department of Labour Chief Inspector. Every storage tank provided at any filling station on the surface for the purpose of containing petrol or fuel oil shall be suitably constructed to an acceptable standard that would ensure the safe storage thereof. Suitable means for fire fighting shall be installed at a safe location for the extinguishing of fire in the event of an incident. Fire equipment supply shall be appropriate to the quantity being stored.

19. Housekeeping and General Safeguarding on Construction Sites

The Contractor must, in addition to compliance with the Environmental Regulations for Workplaces, 1987, promulgated by Government Notice No. R. 2281 of 16 October 1987, ensure that suitable housekeeping is continuously implemented on each construction site, including:

- The proper storage of materials and equipment;
- The removal of scrap, waste and debris at appropriate intervals;

- Ensuring that materials required for use, are not placed on the site so as to obstruct means of access to and egress from workplaces and passageways;
 - Ensuring that materials which are no longer required for use, do not accumulate on and are removed from the site at appropriate intervals;
 - Ensuring that construction sites in built-up areas adjacent to a public way are suitably and sufficiently fenced off and provided with controlled access points to prevent the entry of unauthorized persons;
- and

20. Stacking and storage on construction site

The contractor shall provide a suitable and adequate lock-up store for the storage of items, equipment and material, which would be damaged or pilfered if stored in the open. The contractor is responsible for the proper storage and maintenance of all equipment until issue of the Certificate of Practical Completion.

The contractor must, in addition to compliance with the provisions for the stacking of articles in the General Safety Regulations, 2003, ensure that:

- A competent person is appointed in writing with the duty of supervising all stacking and storage on a construction site;
- Adequate storage areas are provided;
- There are demarcated storage areas; and
- Storage areas are kept neat and under control.

All equipment and materials will be stored on suitable wood poles or pallets which will not protrude more than a meter from any of the stored material. Safe access ways shall be maintained between all stored items preventing employees from having to climb over or under equipment to retrieve the necessary.

21. Employees' facilities

(1) The contractor must, in addition to the construction site provisions in the Facilities Regulations, 2004, promulgated by Government Notice No. R. 924 of 3 August 2004, provide at or within reasonable access of every construction site, the following clean, hygienic and maintained facilities:

- (a) At least one sanitary facility for each sex and for every 30 workers;

22. Personal and other Protective Equipment

Employees do not have the right to refuse to use and/or wear the equipment prescribed by the employer and, if it is impossible for an employee to use or wear the prescribed protective equipment through health or any other reason, the employee cannot be allowed to continue working under the hazardous condition(s) for which the equipment was prescribed.

All employees shall, as a minimum, be required to wear the following personal protective:

- Protective overalls;

- Protective footwear;
- Protective hand gloves;
- Protective headwear; and
- Eye, face and ear protection.

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

PPE issue register must be kept in the safety file.

23. Portable electrical tools and equipment

Portable electrical tools and equipment includes every unit that takes electrical power from a 15 ampere plug point and is moved around for use in the workplace for example; drills, saws, grindstones, portable lights, etcetera. Other electrical appliances such as fridges, hotplates, heaters, and etcetera must be inspected and maintained to the same standards as portable electrical tools and appliances.

The use, inspection and maintenance of portable electrical tools and equipment shall be as follows:

- Regular inspections must be carried out by a competent person appointed in writing;
- Inspection results must be recorded in a register;
- Only competent authorised persons are allowed to use portable electrical tools and equipment; and
- The correct protective equipment must be worn or used whilst operating portable electrical tools and equipment.

This equipment -

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

24. Public health and safety

The contractor is responsible for ensuring that surrounding community shall be made aware of the dangers likely to arise from on site activities and the precautions to be observed to avoid or minimize those dangers.

This includes:

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

Appropriate signage must be posted to this effect and all employees on site must be instructed to ensure that non-employees are protected at all times. All non-employees entering the site must receive induction into the hazards and risks of the site and the control measures to be observed.

25. Excavations

The contractor must:

- (a) Ensure that all excavation work is carried out under the supervision of a competent person who has been appointed in writing for that purpose; and
- (b) Evaluate, as far as is reasonably practicable, the stability of the ground before excavation work begins.

Every Contractor who performs excavation work must take reasonable and sufficient steps in order to prevent, as far as is reasonably practicable, any person from being buried or trapped by a fall or dislodgement of material in an excavation. May not require or permit any person to work in an excavation which has not been adequately shored or braced: Provided that shoring and bracing may not be necessary where:

- (i) The sides of the excavation are sloped to at least the maximum angle of repose measured relative to the horizontal plane; or
- (ii) Such an excavation is in stable material: Provided that:
 - (a) permission has been given in writing by the appointed competent person contemplated in sub regulation (1) upon evaluation by him or her of the site conditions;
 - (b) where any uncertainty pertaining to the stability of the soil still exists, the decision from a professional engineer or a professional technologist competent in excavations is decisive and such a decision must be noted in writing and signed by both the competent person contemplated in sub regulation (1) and the professional engineer or technologist, as the case may be;
 - (c) Must take steps to ensure that the shoring or bracing contemplated in paragraph (b) is designed and constructed in a manner that renders it strong enough to support the sides of the excavation in question;
 - (d) Must ensure that no load, material, plant or equipment is placed or moved near the edge of any excavation where it may cause its collapse and consequently endangers the safety of any person, unless precautions such as the provision of sufficient and suitable shoring or bracing are taken to prevent the sides from collapsing;
 - (e) Must ensure that where the stability of an adjoining building, structure or road is likely to be affected by the making of an excavation, steps are taken to ensure the stability of such building, structure or road and the safety of persons;
 - (f) Must cause convenient and safe means of access to be provided to every excavation in which persons are required to work, and such access may not be further than six meters from the point where any worker within the excavation is working;

(g) Must ascertain, as far as is reasonably practicable, the location and nature of electricity, water, gas or other similar services which may in any way be affected by the work to be performed, and must before

the commencement of excavation work that may affect any such service, take the steps that are necessary to render the circumstances safe for all persons involved;

(h) Must ensure that every excavation, including all bracing and shoring, is inspected –

(i) daily, prior to the commencement of each shift;

(ii) after every blasting operation;

(iii) after an unexpected fall of ground;

(iv) after damage to supports; and

(v) after rain, by the competent person contemplated in sub regulation (1), in order to ensure the safety of the excavation and of persons, and those results must be recorded in a register kept on site and made available on request to an inspector, the client, the client's agent, any other contractor or any employee;

(i) Must cause every excavation which is accessible to the public or which is adjacent to public roads or thoroughfares, or whereby the safety of persons may be endangered, to be –

(i) Adequately protected by a barrier or fence of at least one metre in height and as close to the excavation as is practicable; and

(ii) provided with warning illuminants or any other clearly visible boundary indicators at night or when visibility is poor, or have resort to any other suitable and sufficient precautionary measure where sub-paragraph (i) and (ii) are not practicable;

(j) Must ensure that all precautionary measures stipulated for confined spaces as determined in the general safety regulations, 2003, are complied with by any person entering any excavation;

(k) Must, where the excavation work involves the use of explosives, appoint a competent person in the use of explosives for excavation, and must ensure that a method statement is developed by that person in accordance with the applicable explosives legislation; and

(l) Must cause warning signs to be positioned next to an excavation within which or where persons are working or carrying out inspections or tests.

Where areas are unsafe, they should be enclosed with barricading. Examples are Man at work, Narrow, Arrow etc. Where there is a risk of injury, the area should be barricaded off with secure solid barricades. The barricade must be constructed a minimum of 1,5m away from the area. Barricading for the prevention of access into areas with a potential risk of injury shall as a minimum be constructed of a hand-rail, knee-rail and appropriately supported as to prevent any person from falling into the restricted/risk area.

All physical barricades shall be covered with netting ensuring visibility by personnel and operators of machinery. Appropriate signage shall be affixed to the barricade indicating the risk associated (i.e. deep excavation, lifting operations etc.) and the responsible Supervisor and contact details shall be displayed. All

barricading shall have a "No Entry" signs on all sides and at each change of direction. Signage shall be placed at 20 m intervals where lengths exceed. All signage shall be a minimum size of 290 mm x 290 mm.

Danger tape shall not be utilised to prevent personnel from entering into areas. Where no risk exist of injury to personnel such as stacking and storage areas, the use of wire for hand and knee rails with snow netting shall be acceptable to demarcate the area. All barricades will have a dedicated entrance where it is required that personnel enter the areas.

It is the contractor's responsibility to remove all redundant barricades directly after use. The Safety Officer will maintain a marked-up site plan indicating where barricades are erected.

26. Traffic precautions

No open manhole in streets, lanes or any place where the public or other persons have access shall be left unguarded. The necessary road signs and speed limitation boards must also be in place. Any construction area must have all barricading requirements and a person assigned as flagman in every entrance to the site.

27. Hand Tools

The contractor must inspect all hand tools before it is brought onto the site.

- ✚ As far as possible all hand tools must be numbered and placed on register to be inspected monthly by a person designated to do so.
- ✚ Any tools found to be in an unsafe condition must immediately be removed from service and either discarded or rectified.
- ✚ No chisels with "mushroomed" heads must be used.
- ✚ No hammer shall be used with a cracked or damaged handle.
- ✚ All files must be fitted with handles.
- ✚ All trolleys, pushcarts, etc. used on site must be identifiable, placed on register and inspected at least once every month.
- ✚ Non-sparking tools must be used in areas where the risk of fire or explosion is present.
- ✚ No home-made hand tools are allowed on the project.
- ✚ All tools shall be attached to a suitable lanyard when utilised in elevated positions

28. Barricading

Solid barricades will be used where it is applicable, snow netting will be accepted where practical. The barricade must be constructed a minimum of 1,5m away from the area. All physical barricades shall be covered with netting ensuring visibility by personnel and operators of machinery.

Appropriate signage shall be affixed to the barricade indicating the risk associated (i.e. deep excavation, lifting operations etc.) and the responsible Supervisor and contact details shall be displayed. All barricading

shall have a "No Entry" signs on all sides and at each change of direction. Signage shall be placed at 20 m intervals where lengths exceed. All signage shall be a minimum size of 290 mm x 290 mm.

Danger tape shall not be utilised to prevent personnel from entering into areas. Where no risk exist of injury to personnel such as stacking and storage areas, the use of wire for hand and knee rails with snow netting shall be acceptable to demarcate the area. All barricades will have a dedicated entrance where it is required that personnel enter the areas.

29. Environmental Conditions

The Contractor must be mindful of adverse weather conditions upon the health and safety of the workforce. This includes inclement weather, strong wind, heat stress, extreme cold, etc. The Contractor's risk assessment process must take into account the risks associated with such weather conditions. The same is true when working in an environment where there is a risk to employees' health and safety from presence of poisonous flora, or wildlife (including bees, snakes, etc). The Contractor's risk assessment process must take these risks into account.

30. Occupational Health

Exposure of workers to occupational health hazards and risks are very common in any work environment, especially in construction. Occupational health hazards and risks exposure is a major problem and all Contractors are to ensure that proper health and hygiene measures are put in place to prevent exposure to these hazards and risks.

The occupational hazards and risks may enter the body in three ways:

- Inhalation through breathing e.g. cement dust;
- Ingestion through swallowing maybe through food intake;
- Absorption through the skin (pores) e.g. painting or use of thinners.

The contractor is required to ensure that all his personnel are medically fit prior to being allowed onto the work site.

***Corona Virus** – The contractor must ensure that employees are made aware and informed of this deadly Virus. Toolbox talks must include precautionary measures against this virus.

31. Emergency preparedness, contingency planning and response

The contractor must appoint a competent person to act as emergency controller and/or coordinator.

The contractor must conduct an emergency identification exercise and establish what emergencies could possibly develop. The contractor must then develop detailed contingency plans and emergency procedures.

The contractor must hold regular practice drills of contingency plans and emergency procedures to test them and familiarise employees with them.

32. First-aid

The contractor must provide first-aid equipment and have a **qualified first-aider** on site as required by General Safety Regulations promulgated in terms of the Occupational Health and Safety Act (Act no. 85 of 1993). Proper plans for speedy and timeous transporting of injured and/or ill person(s) to a medical facility or of getting emergency medical aid to person(s) who may require it must be in place.

The contractor must have written arrangements in place with his sub-contractor/s regarding the responsibility towards their own injured and/or ill employees.

33. Monthly OH&S reporting

The contractor is required to provide the Client with a **monthly** Safety Report.

34. Medical screening

The contractor must ensure that medical screening is conducted to:

- Any employee exposed to hazards and risks or operating machinery where any legislative requirement requires medical surveillance;
- Any employee exposed hazardous chemical hazards.
- Any employee exposed to Coronavirus

35. Safe Work Behaviour and Behavioural Observations

The contractor and his employees, including those of his sub-contractor/s, must observe and comply with the requirements of all relevant Government Acts, Rules and Regulations including, but not limited to, the Occupational Health & Safety Act, Construction Regulations (2014).

- A total of **two** Planned Task/Job Observations shall be completed and logged on site by each manager, supervisor and foreman on a **Weekly** basis.
- It's the construction Manager's responsibility to ensure action plans are in place and closed out accordingly on areas that requires attention.

35.1 Monthly compliance assessment

The Client will conduct a monthly assessment in terms of Construction Regulations to confirm that the contractor has implemented and is maintaining the agreed and approved SHE management plan.

Other assessments and inspections

The Client reserves the right to conduct other ad-hoc assessments and inspections as deemed necessary. This may include, amongst other measures, site safety walks.

35.2 Conducting an assessment

A representative of the contractor must accompany the Health and Safety Consultant on all assessments and inspections and may conduct his own inspection at the same time. Each party will process the results of their own assessment or inspection through their normal channels.

35.3 Contractor's assessments and inspections

The contractor is to conduct his own internal assessments and inspections to verify compliance with his own occupational health and safety plan and management system as well as compliance with the requirements of this specification. He will also assess and inspect the compliance of sub-contractor/s under his control.

35.4 Inspections by occupational health and Safety Officer

Occupational health and safety officer must conduct **weekly** inspections and report thereon to the construction manager, supervisor/s. Other appointees must conduct inspections and report thereon as specified in their appointments. For example, vehicle, plant and machinery drivers, operators and users must conduct daily inspections before start-up.

35.5 Recording and review of inspection results

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

36. Reporting of accidents and incidents

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

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

or where -

- a major incident occurred

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

to the Client within two days and to the **Provincial Director of the Department of Labour** within seven days from date of incident (Section 24 of the Occupational Health and Safety Act (Act no. 85 of 1993) and General Administrative Regulations), except that, where a person has died, has become unconscious for any reason or has lost a limb or part of a limb or may die or suffer a permanent physical defect, the incident must be reported to both the Client and the **Provincial Director of the Department of Labour** forthwith by telephone, fax or e-mail. The contractor shall provide the Client with copies of all statutory reports required in terms of the Occupational Health and Safety Act (Act no. 85 of 1993) during audits.

The contractor is required to provide the Client with copies of all internal and external accident/incident investigation reports during audits.

37. Accident and incident investigation

The contractor is responsible for the investigation of all accidents and/or incidents where employees and non-employees were injured to the extent that they had to receive medical treatment other than first aid. The results of the investigation are to be entered into the accident and/or incident register. The contractor is responsible for the investigation of all minor and non-injury incidents as described in Section 24 (1) (b) and (c) of the Occupational Health and Safety Act (Act no. 85 of 1993) and for keeping a record of the results of the investigations including the steps taken to prevent similar accidents in future.

The contractor is also responsible for the investigation of all road traffic accidents, related to the construction activities, and for keeping a record of the results of the investigations including the steps taken to prevent similar accidents in future.

The Client reserves the right to hold its own investigation into an incident or call for an independent external investigation.

38. Covid-19 Direction on Occupational Health and Safety In The Work Place

On 1 October 2020 the Minister of Employment and Labour published a new consolidated COVID-19 Direction on Occupational Health and Safety in the Workplace (Revised OHS Direction). The Revised OHS Direction replaces the Direction that was published on 4 June 2020.

The Revised OHS Direction takes into account recent developments communicated by the National Department of Health (NDoH). This is in light of new information about the virus from sources like the World Health Organisation.

The Revised OHS Direction aims to assist the NDoH in its collation and analysis of workplace data to prevent the escalation of the pandemic. The Revised OHS Direction accordingly places additional obligations upon employers whose employees have returned to work.

These obligations supplement the health and safety measures already required by the previous Direction, and generally in terms of the Occupational Health and Safety Act (OHSA).

We highlight the most notable changes and additions below.

Risks assessments and plans for protective measures

There is still a requirement for all employers to undertake a risk assessment and to develop a Workplace Plan on the basis of that assessment, outlining the protective measures in place for the phased return of employees before opening.

What is new, is that there is now an additional item that must be included in an employer's Workplace Plan – a description of the procedure to be followed to resolve any issue that may arise from the exercise by an employee of the right to refuse to work in the circumstances contemplated in direction 14(1) (see further information below).

Administrative measures – employers with more than 50 employees

Notably, there are new reporting obligations imposed on employers with more than 50 employees:

Such employers must submit a record of their risk assessment, together with a written policy concerning the protection of the health and safety of employees from COVID-19 as contemplated in section 7(1) of OHSA to (i) their health and safety committee; and (ii) the Department of Employment and Labour (DEL).

The submission to the DEL must be made by email to the address of the appropriate Provincial Chief Inspector (available here) within 21 days of the commencement of the Revised OHS Direction, i.e. by no later than 21 October 2020.

Previously, this obligation only arose where an employer employed more than 500 employees.

In addition, while the obligation to provide screening and testing data previously only applied to employers with more than 500 employees in certain sectors, all employers with more than 50 employees in a workplace must now submit the following categories of data to the National Institute for Occupational Health (NIOH)

electronically (to OHSworkplace@nioh.ac.za or via the online platform) in the manner set out in the NDoH Guidelines (available here):

- each employee's vulnerability status for serious outcomes of a COVID-19 infection;
 - details of the symptom screening of employees who are symptomatic;
 - details of employees who test positive for COVID-19;
 - the number of employees identified as high-risk contacts (and who have been quarantined) as a result of exposure to a worker who has tested positive for COVID-19; and
 - details on the post-infection outcomes of those testing positive, including the return to work assessment outcome.
- Vulnerability status data must be provided once in respect of each employee. The remaining data is to be submitted weekly, as soon as possible before Tuesday in respect of the data collected in the previous calendar week commencing on Sunday.

The above data may also be submitted by an employer via an employers' association, if the association has entered into an agreement with the NIOH to receive, process and submit the data to the NIOH and has undertaken to submit the data on behalf of the employer.

Importantly, employers must inform their employees that their personal information will be submitted to the NIOH in accordance with the employer's legal obligations and that the NIOH will comply with the provisions of the Protection of Personal Information Act.

Reporting of positive cases at the workplace

While previously employers were required to report each instance in which an employee tested positive for COVID-19 to the NDoH via the COVID-19 hotline number, positive cases must now be reported to the NIOH in the same manner as the reports made by employers with more than 50 employees (described above).

In addition, the Revised OHS Direction requires employers to inform the Compensation Commissioner whenever a worker has been diagnosed with COVID-19 at the workplace, in accordance with the Directive on Compensation for Workplace-acquired Novel Corona Virus Disease.

Referral of workers to a public health facility

The Revised OHS Direction has clarified that, in the event that a worker displays symptoms of COVID-19 at the workplace, the employer's obligation is to isolate the worker and to arrange for the worker to be transported to a public health facility (i.e. one of the established testing sites). From there, the worker will either be directed to self-isolate or will undergo a medical examination and/or testing.

Isolation and quarantine periods

The Revised OHS Direction has now been brought in line with the updated guidelines by the NDoH, by reducing the periods of self-isolation (for workers who have tested positive) and self-quarantine (for close contacts/workers with high-risk exposure to a positive case) from 14 days to 10 days. Health workers with high risk exposure must remain in quarantine for 7 days, which can, by agreement with the worker, be reduced to 5 days.

Employers with 10 or less employees

More limited obligations still apply to employers who employ 10 or less employees. The only change is that the employer must now contact the relevant provincial inspectorate (and not the general COVID-19 hotline number) to obtain instructions when an employee presents with symptoms at work.

38. Conclusion

The Client supplied the Contractor with a Health and Safety Specification. This Specification furthermore contains the requirements under which is required to operate. By signing an agreement with the Client, the contractor reiterates its commitment to compliance and will operate within the requirements of this provided Specification.

***Note**

The Client will stop construction work that does not comply with Health and Safety requirements as per OHS Act 85 of 1993, Construction Regulations and Covid-19 Regulations.

SPECIAL NOTES TO BIDDERS



CUBIC
PROFESSIONAL CONSULTANTS

NOTES TO BIDDERS

1. **NAMES OF PARTIES**

Employer

Limpopo Province Department of Roads & Transport
Private Bag X9490
POLOKWANE
0700

Cnr. Boodenstein & Church Street
POLOKWANE
0699

Tel: (015) 293 0711
Fax: (015) 293 1077

Quantity Surveyors/ Principal Agent

Cubic Professional Consultants
P.O Box 55039
POLOKWANE
0699

Suite No.1
Parklane Building
76 Hans Van Rensburg Street
POLOKWANE
0700

Tel: (015) 297 1762
Fax: 086 734 5100

Electrical Engineers

Pienaar & Erwee
Postnet Suite 52
Private Bag X9676
Polokwane
0700

Tel: (015) 296 3092
Fax: (015) 296 3092

Architects

The Creative Axis
P O Box 201
MOKOPANE
0600

40A Van Riebeeck Street
Mokopane
0600

Tel: (015) 491 2090
Fax: (015) 491 5979

Structural / Civil Engineers

Muavha Ramollo Consulting
P. O. Box 2386
TZANEEN
0850

Tel: (015) 307 7535
Fax: 086 624 3198

2. SPECIAL CONTRACT DOCUMENTS

Note:

The clauses in these Special Contract Conditions form part of the contract requirements and shall have preference over any contradicting clauses in these Bills of Quantities, the Preliminaries and the Conditions of Contract.

2.1 CONTRACT DOCUMENTS

The Contract Document will consist of:

- i) The agreement shall be the JBCC Series 2000 Principal Building Agreement prepared by the Joint Building Contracts Committee (July 2007 edition) amended as hereinafter described.
- ii) Documents to be provided by the Contract in terms of the requirements of these Provisional Bills of Quantities. Where reference is made to the "sub-contract agreement" this is deemed to mean the "JBCC Series 2000 Nominated/Selected Sub-Contract Agreement" (July 2007 edition)
- iii) The JBCC Series 2000 Preliminaries prepared by the Joint Building Contracts Committee (May 2005 edition) amended as hereinafter described, shall be deemed to be incorporated herein.
- iv) Tenderers are referred to the above-mentioned documents for the full intent and meaning of each clause thereof. These clauses are hereinafter referred to by clause numbers and headings only, for which, such allowance must be made as may be considered necessary.
- v) Where standard clauses or alternatives are not entirely applicable to this contract such modifications, corrections or supplements as will apply are given as far as possible under each relevant clause. Where modifications or amendments as described are made, such modifications and/or amendments shall supersede any conflicting provision in the relevant clauses of the JBCC Series 2000 Preliminaries or the JBCC Series 2000 Principal Building Agreement and the tenderer shall make due allowance for whatever costs and charges he may consider necessary for the carrying out and observance of the provisions of the clauses as modified and / or amended
- vi) Where any clause is not relevant to this specific contract such clause is marked N/A (signifying "not applicable").
- vii) "The Model Preambles for Trades" as recommended and published by the Association of South African Quantity Surveyors – 1999 edition, shall be deemed to form part of this contract documentation. Any amendments and/or additional information is listed under the supplementary preambles at the start of each trade in the bills of quantities
- viii) **Pricing of preliminaries – The relevant clause numbers of Section A and B of the preliminaries are listed at the end of the contract preliminaries section for pricing purposes.** If Alternative A as set out in clause 10 of the preliminaries hereinafter is to be used for the adjustment of the Preliminaries, each item priced is to be allocated to one or more of the three categories.
- ix) The **tenderer** shall allow opposite each of the items for whatever costs and charges he may consider necessary for the carrying out, complying with and due observance of the provisions, conditions and requirements set out therein.

- x) Only priced items will be considered in respect of any adjustments of this section. Any items left un-priced will be understood to be provided for in the rates given for other items and no claim for extras arising out of the tenderer's omission to price any item will be entertained.
- xi) Notwithstanding the period stated in the JBCC form of tender, tenderers shall hold good for a period of ninety (90) calendar days from the date of closing of the tenders and shall not be altered, amended or withdrawn or withdrawn during that period

2.2 **QUERIES FROM BIDDERS**

The pages of these bills of quantities are numbered consecutively as indexed on the first page.

The Bidder shall check the numbers of the pages and should any be missing or duplicated, or the reproduction be indistinct, or if any doubt exists as to the full intent or meaning of any description or these bills of quantities contain any obvious errors, the Bidder shall notify the Accounting Officer / Quantity Surveyor at once who shall promptly give a written directive. No liability whatsoever will be admitted in respect of errors in any BID due to the abovementioned causes.

On no account should these documents be used for placing orders for materials. Bidders do so at their own risk and shall not be reimbursed for additional costs so incurred.

2.3 **ACQUAINTANCE WITH BID DOCUMENTS**

By submission of a BID, the Bidder will be deemed to have acquainted himself fully with the BID documents, local authority requirements and by-laws and all aspects of the work envisaged in the documents prior to pricing and submission of his / her BID. The employer may appoint a Principal Agent to act on his / her behalf with full authority and obligations.

2.4 **FORMS TO BE COMPLETED**

The form of BID together with its appendices must be submitted with the BID.

2.5 **SCOPE OF THE WORKS**

The work entails the erection of accommodation block C (GBA ± 420m²) and renovations to the existing Hall

The buildings generally consist of:

The scope of work generally comprises of the following.

- Double story structure
- Concrete strip footings and bases.
- Concrete columns.
- Brick walls with face brick.
- Aluminum windows.
- Solid slabs.
- Mechanical installation.
- Electrical installation.
- Joinery fittings.
- Plumbing & drainage.

2.6 **Programming with direct contractors:**

Tenderers must take note that some work may be performed by independent / direct contractors that will not form part of this contract. Tenderers, however, must make provision for these installations in their programme and must provide all the necessary assistance to DEPARTMENT OF TRANSPORT in completion of the said contracts.

- Data installation.
- Access control installation.
- Security installation.
- Loose furniture and installations by specialists.

2.7 **SITE**

The site is at Limpopo Traffic Training College.

2.8 **CONTRACT DOCUMENTS**

The contract documents will be the "Principal Building Agreement (July 2007 Edition)" as issued by the Joints Building Committee.

Wherever reference is made to the terms "Client or Employer" in the documents, it shall be deemed to mean. The Department of Transport of the Limpopo Province or any person acting in such capacity as well as any officer to whom any power vested in terms of these conditions of contract have been delegated to.

2.9 **CONFIDENTIALITY OF BID DOCUMENTS**

All the recipients of BID documents shall, whether they submit a BID or not, treat the details of these documents as confidential and their general content shall not be disclosed or discussed with third parties without the prior approval of The Department of Transport.

2.10 **BID ALL INCLUSIVE**

The Bidder must allow in his /her BID for all labour, material, transport, handling, construction plant, temporary works, or method of construction where the method of payment allows for various methods of construction, value added tax and everything else necessary for the execution and completion of the works in accordance with the BID documents

2.11 **BILLS OF QUANTITIES**

This Bill of Quantities is provisional and subject to be remeasured. No added costs to be entertained in this regard.

The Contractor / Bidder is warned that should he / she use any quantities or specifications appearing in these Bills of Quantities for the purpose of ordering materials, he / she does so at his / her own risk and no liability whatsoever shall be admitted afterwards by the Employer / Department of Transport for the correctness of such quantities or specifications.

2.12 **STAMP DUTY**

If applicable, all stamp duties in connection with the contract shall be paid by the Bidder.

2.13 **SIGNING OF BIDDERS**

The BID must be signed by a representative of the Bidder being duly authorised to do so and Bidders are to attach a company resolution.

2.14 **LODGING AND SCRUTINY OF PRICED BILLS OF QUANTITIES**

The Bidder's / Contractor's attention is specifically directed to the provision that, before the contract is signed, he / she is to submit his / her priced Bills of Quantities with conditions of contract and cast neatly in black ink for checking. The Accounting Officer / Quantity Surveyor will duly check the priced Bills of Quantities and shall make such adjustment of individual prices and rectify discrepancies as he may consider necessary. No artificial prices shall be acceptable.

2.15 **ADDITIONAL INFORMATION REQUIRED**

The Employer / Department of Transport may ask any Bidder for a clarification/s of his / her BID. Nevertheless, no Bidder will be permitted to alter his / her BID sum after the BIDs have been opened and read to other bidders, although clarification which does not change the BID may be accepted

The Employer reserves the right to appoint a firm of public accountants to report on the financial capacity of any Bidder. The Bidder shall provide all reasonable help and information in such an investigation.

All written information submitted by the Bidder together with and in support of his / her BID shall be considered to form the basis on which the BID has been prepared and submitted

2.16 **ARITHMETICAL ERRORS**

The Accounting Officer / Quantity Surveyor reserves the right to correct arithmetical or other errors in the extension of rates and totals in the BID. The Bidder will be informed of the effect of any corrections prior to the signing of the contract. In no case will the BID sum be adjusted when correcting such errors

2.17 **IMBALANCE IN BIDDED RATES**

In the event of there being any rate or rates which are declared to be unacceptable by the Accounting Officer / Quantity Surveyor for reasons which the Accounting Officer / Quantity Surveyor will indicate, the Bidder will, in terms of Rule 14, be requested to:

- a) either justify and specify rate or rates, i.e. to give a financial breakdown on how such rate or rates were obtained or calculated, or
- b) consider amending and adjusting such rate or rates while retaining the BID sum derived under Sub rule 15.a unchanged and fixed

In the event that the Accounting Officer / Quantity Surveyor requests the Bidder to adjust any unacceptable rate or rates, the Accounting Officer / Quantity Surveyor may at his / her discretion limit any such adjustment to rates in specific sections of the bills of quantities. On no account will the Accounting Officer / Quantity Surveyor permit the Bidder to use such an opportunity to re-price extensive sections of the bills of quantities, even though the BID sum remains unchanged

2.18 **ALTERATIONS TO BID DOCUMENTS**

No unauthorised alteration or addition shall be made to the form of BID, to the bills of quantities or to any other portion of the BID documents. If any such alteration or additions is made and if the bills of quantities of not properly completed, the BID may be rejected and the Employer will not be bound to by such alterations.

2.19 **BID QUALIFICATIONS**

BIDs must be submitted strictly in accordance with the BID documents, i. e. without qualifications. Qualifications in the nature of statements of interpretation of contract documents must be avoided and any point of doubt or difficulty should be cleared with the Accounting Officer / Quantity Surveyor as early as possible during the BID period. Should any query be found to be of any influence to the BID, all other Bidders shall immediately be informed of the particulars by the Accounting Officer / Quantity Surveyor.

2.20 **COSTS INCURRED BY BIDDER**

The Employer will not be responsible to pay for expenses or losses, which may be incurred by any Bidder in the preparation of the BID or in visiting the site in connection herewith.

2.21 **BID ACCEPTANCE**

The Employer will not be bound to accept the lowest or any BID. No reason for the acceptance or rejection of any BID will be given.

2.22 **WITHDRAWAL OF BID AFTER CLOSING DATE**

The Bidder may not withdraw his BID after the time set for opening BIDs without any BID having been accepted.

Should a Bidder amend or withdraw his / her BID after the specified date and hour, but prior to his being notified of the acceptance thereof, or should a Bidder after having being notified that his / her BID has been accepted.

- (a) give notice of his / her inability to execute the contract in terms of his BID; or
- (b) fail to sign a contract or furnish the security within the period fixed in the BID conditions reflected on the form of BID or any extended period fixed by the Employer; or
- (c) fail to execute the contract;

fresh He shall pay all additional expended, damages and / or losses which the Employer may incur in calling for BIDs or by paying the difference between his / her BID and a less favourable BID accepted in terms of the provisions of the last paragraph of this term: Provided that the Employer may at its sole discretion exempt a Bidder from the provisions of this subrule if he is of the opinion that the circumstances justify the exemption.

When in circumstances mentioned in the second paragraph of this item, the Employer deems it not desirable to invite fresh BID; then the Employer may accept another BID from those already received. The provisions of Rule 2.21 above, shall again apply.

2.23 **METHOD OF MEASUREMENT**

These Bills of Quantities have been measured in accordance with the 6th Edition of the Standard System of Measuring Builders Work.

2.24 **AVAILABILITY AND SUBSTITUTIONS OF MATERIALS**

Bidders are urged to make themselves, during BID stage, thoroughly acquainted with the availability of all materials for this project as no claim for non-availability or late delivery of materials will afterwards be recognised.

If materials specified are not available or it seems that there will be a delay of materials, then the Bidder must notify the Principal Agent at once in writing who will, at his / her own discretion, attend to the matter. Once the BIDs are handed in it will be taken that all materials as specified in these Bills of Quantities are available and will be delivered on site for completion of the project within the prescribed contract period.

Substitution will be strictly subject to the Principal Agent's approval.

The Contractor must, as far as possible, purchase materials available in the Limpopo Province, provided the quality is acceptable. Materials of an inferior quality shall under no circumstances be accepted. If the contractor cannot comply with these conditions, he must substantiate this in writing with documentary proof from suppliers.

2.25 **PROPRIETARY TYPES AND TRADE NAMES**

Where reference is made in these Bills of Quantities to proprietary types or names, the products or materials, etc. referred to are to be exactly as described; the prior approval of the Principal Agent must be obtained for any substitution and may be the subject to a variation order.

2.26 **SABS SPECIFICATIONS**

All reference in these Bills of Quantities to Specifications of the Bureau of Standards shall be deemed to be reference to the latest issues of such specifications, and any subsequent amendments thereto. All articles, materials or items described as to conform to the SABS Specification must bear the SABS mark where possible.

2.27 **PERFORMANCE GUARANTEE**

Where the project is over R 2 000 000.00 then the Bidder must submit with this BID proof (by means of a letter of intent or otherwise) from his guarantor that his / her guarantor will issue the guarantee if the BID is accepted.

2.28 **BID**

While the Employer reserves the right to accept or not accept any BID, the intention is that a BID will be accepted. The successful Bidder will be appointed as the main contractor in terms of the JBCC Series 2000 Principal Building Agreement (July 2007 Edition). Any condition submitted by Bidders which is a variance with the provisions of the main contract will not be accepted and may render the BID liable to disqualification.

The BID shall be sealed in an envelope and endorsed as per BID form and be deposited in the BID box as per the BID advert.

On no account will BIDs received after the time and date for submission of BIDs be considered and Bidders are advised that postal delays will not constitute a claim for recognition of such BIDs.

Telegraphs or telefaxed BIDs will **NOT** be considered under any circumstances.

2.29 **INSPECTION OF SITE**

Compulsory site inspection will be as per advert. Tenderers are however, urged to thoroughly inspect the site, acquaint themselves with the nature and extent of the works, the site conditions pertaining to power and water supply, transport facilities, conditions of adjacent existing buildings and also access to the site, availability of working space, etc., before submitting their tenderers as **no extra arising out of their failure.**

2.30 **SITE OFFICE**

The contractor shall erect, maintain and take down on completion of the work a building for site meetings with a concrete floor, suitable roof, suitable walls, door and four windows, with tables and chairs (not benches), all suitable to accommodate 12 persons.

It is further a condition that all work or movement of vehicles in the vicinity of this office that create noise or nuisance during site meetings must be suspended for the duration of the site meetings.

2.31 **LOCAL LABOUR**

As soon as the site is handed to the Contractor, he / she will be expected to form a joint committee with the local community. This committee will ensure that all unskilled and available semi-skilled labour are employed from the community.

All labour shall apply through the committee for employment on the project and the selection of these labourers shall be made by the contractor from a list of applicants compiled by the community members on the committee.

On all labour intensive projects, at least 10% of the labourers must be employed from the local community where the project will be executed.

Labourers should be paid in accordance with the provision of the Labour Relations Act, Act 23 of 1956, and the amended Basic Conditions of Employment of 1983, or any latest available Acts.

In accordance with Government Gazette No. 16095 of 19 November 1994 wages differ for different areas.

2.32 **PROCEDURE OF THE WORK**

The Principal Agent reserves the right to direct the order in which the various parts of the contract will be executed should circumstances warrant such action.

2.33 **VARIATIONS**

Where prices are submitted by the Contractor or Nominated Sub-Contractors during the progress of the works in respect of variations or in regard to a claim under the terms of the contract and notwithstanding the fact that such prices may be used in an interim certificate, it is hereby agreed that there is to be no presumption of acceptance. Should the Principal Agent wish to accept any such prices prior to the issue of the final certificate, he will do so in writing.

2.34 **PROVISIONAL WORK**

Any increase or decrease of work measured provisionally will not be sufficient grounds for any adjustments in the Bidded rates.

2.35 **MONEY PROVISIONS**

Wherever an amount for work is allowed in these Bills of Quantities under the term "Money Provision" it shall be taken that such amount is for work to be carried out by Specialists, who will be ordinary domestic sub-contractors to the main contractor.

2.36 **BORROW PITS**

It is the responsibility of the Contractor to find the necessary borrows pits for imported filling and also to ascertain the suitability and acceptability of such filling, as no claims in this regard will be entertained afterwards.

2.37 **TESTS**

It is the responsibility of the contractor to carry out his / her own tests during the contract to check the strength of concrete, mortar, etc., density of filling, etc., and only those tests as requested for by the Principal Agent will be paid for by the Client.

These tests are compulsory.

2.38 **CONTRACT PERIOD**

The contract period shall be 24 months (exclusive of builder's holiday) from date of site handover.

2.39 **COMPLETION OF BID DOCUMENTS**

Bidders shall ensure that all documents requiring completion are duly completed in ink, signed and witnessed in the spaces provided.

2.40 **OCCUPATIONAL HEALTH AND SAFETY**

In terms of the Occupational Health and Safety Regulations promulgated on 18 July 2003, Bidders are advised that they are required to comply fully with such regulations pertaining to this project as no claims in this regard will be entertained.

2.41 **VALUE ADDED TAX**

Value added tax must be added to the contract amount in the Final Summary and all amounts, rates, etc. in the Bills of Quantities will therefore be exclusive of value added tax.

2.42 **PRICES ALL INCLUSIVE**

The Bidder must allow in his / her BID for all labour, material, transport, handling, construction plant, temporary works, or method of construction where the method of payment allows for various methods of construction, value added tax and everything else necessary for the execution and completion of the works in accordance with the BID documents.

2.43 PROOF OF PAYMENT OF VALUE ADDED TAX OR ANY APPLICABLE IMPORT DUTY

The Bidder is to provide proof that he and all his Sub-Contractors are registered at the Receiver of Revenue for VAT or any applicable import duty purposes and will submit all names of Sub-Contractors to the Employer. The Employer may submit all this information to the Receiver of Revenue.

2.44 WORKMEN'S COMPENSATION

The Contractor must supply monthly proof of payment of Workmen's Compensation

2.45 CONTRACT PRICE ADJUSTMENT

This BID will be subject to Escalation and the base month will be based on the date of tender closing.

2.46 GENERAL NOTES

Should the tender be awarded to the successful tenderer, the following is to be noted:

- No works shall commence until the Health & Safety Plan has been issued by the successful tenderer and has been approved by the Department of Transport representative.
- No work shall commence on site until all CAR and PL insurances are in place
- No Payment shall be made until such time as all guarantees are in place.
- **Workers employed by the contractor will not be allowed to be seen lingering around the complex.**
- **The contractor must not render any construction activities that will affect the client operation before informing the principal agent for approval thereof.**
- **The contractor's workers should be noticeable by wearing proper clothing with the company logo.**

2.47 PAYMENT PROCEDURE

Payment procedure in terms of this contract shall be as follows:

- Contractor to submit valuation by the 20th of the month.
- The payment shall be issued to the Department of Transport by the 7th of the following month, with payment being made by the 30th of that month.
- Every effort will be made to achieve payment earlier, but this cannot be guaranteed.
- Interest on late payment shall be charged at Prime rate.
- Payment for unfixed materials on site shall be allowed
- Payment for materials off site shall only be allowed subject to written approval by the Principal Agent, which will only be conditional upon the necessary cessions being in place and any other documentation which the Principal Agent requests.

2.48 WORKING HOURS

Works on a Sunday will ONLY be permitted, subject to approval by the Principal Agent in writing, on the proviso that works are stopped by 15H00.

2.49 **INFORMATION RELEVANT TO INSURANCES**

The contractor will be expected to take the following insurance with deductible to be determined by the contractor. In addition to the above-mentioned insurances the contractor should take any other insurances relevant to the proper execution of the works.

2.49.1 Contract works – Estimated Contract Amount plus 20%.

2.49.2 Public Liability – R 10 000 000.00.

PART A:
PROVISIONAL BILLS OF QUANTITIES



CUBIC
PROFESSIONAL CONSULTANTS

BILLS OF QUANTITIES
**CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
EXISTING HALL AT LIMPOPO TRAFFIC TRAINING COLLEGE**
LDPWRI-B/20047

Item No	Quantity	Rate	Amount
<u>SECTION NO. 1</u>			
<u>BILL NO. 1</u>			
<u>PRELIMINARIES</u>			
All prices/rates to be net, excluding Value Added Tax			
<u>General</u>			
i) The agreement is to be the JBCC Series 2000 Principal Building Agreement (Edition 5.0) prepared by the Joint Building Contracts Committee, July 2007			
ii) The preliminaries are to be the JBCC Series 2000 Preliminaries prepared by the Joint Building Contracts Committee, March 2005 edition 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")			
Carried to Collection			R
Section No. 1 Preliminaries Bill No. 1 Preliminaries			
DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE			

BILLS OF QUANTITIES
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vi) If Alternative A as set out in clause B10.3 hereinafter is to be used for the 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

SECTION A: PRINCIPAL BUILDING AGREEMENT

Definitions (A1)

1 Definitions and interpretation (clause 1)

Fixed

Item

Value Related

Item

Time Related

Item

Objective (A2)

2 Offer, acceptance and performance (clause 2)

Fixed

Item

Value Related

Item

Time Related

Item

Preparation (A3-A14)

3 Documents (clause 3)

Clause 3.1 shall be deemed to be omitted and replaced with the following:

No payment guarantee will be provided by the employer

Fixed

Item

Value Related

Item

Carried to Collection

R

Section No. 1
 Preliminaries
 Bill No. 1
 Preliminaries

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

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		Time Related	Item	
4	Design responsibility (clause 4)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
5	Employer's agents (clause 5)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
6	Contractor's site representative (clause 6)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
7	Compliance with regulations (clause 7)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
8	Works risk (clause 8)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
Carried to Collection				R
Section No. 1 Preliminaries Bill No. 1 Preliminaries DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE				

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9	Indemnities (clause 9)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
10	General insurances (clause 10)			
	All insurances are to be taken by the Contractor			
	The contractor will effect and maintain motor liability insurance as well as equipment insurance on all plant in terms of the COID act no 130 of 1993			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
11	Special insurances (clause 11)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
12	Effecting insurance (clause 12)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
13	Assignment (clause 13)			
		Fixed	Item	
		Value Related	Item	
	Carried to Collection			
				R
	Section No. 1 Preliminaries Bill No. 1 Preliminaries DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE			

BILLS OF QUANTITIES
**CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
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		Time Related	Item	
14	Security (clause 14)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
	<u>Execution (A15-A23)</u>			
15	Preparation for and execution of the works (clause 15)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
16	Site and Access (clause 16)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
17	Contract instructions (clause 17)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
Carried to Collection				R
Section No. 1 Preliminaries Bill No. 1 Preliminaries				
DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE				

BILLS OF QUANTITIES
**CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
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18 Setting out of the works (clause 18)

The contractor shall notify the principal agent if any encroachments of adjoining foundations, buildings, structures, pavements, boundaries, etc. exist in order that the necessary arrangements may be made for the rectification of any such encroachments

The contractor shall perform tolerance control checks regularly throughout the contract period and report on this at regular interval to the Principal Agent in the approved format. Should the contractor fail to comply with this requirement to the satisfaction of the the Principal Agent, progressively as the structure is being constructed, the Employer will commission a Registered Land Surveyor to do so on the Contractor's behalf and at the Contractor's Expense.

Fixed

Item

Value Related

Item

Time Related

Item

19 Temporary Works and Plant (clause 19)

Fixed

Item

Value Related

Item

Time Related

Item

20 Nominated sub-contractors (clause 20)

Fixed

Item

Value Related

Item

Time Related

Item

Carried to Collection

R

Section No. 1
Preliminaries
Bill No. 1
Preliminaries

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

BILLS OF QUANTITIES
CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
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21 Selected sub-contractors (clause 21)

Notwithstanding the content of this clause, the contractor's attention is drawn to the fact that all the work provided for by means of the inclusion of provisional amounts elsewhere in these bills of quantities, is to be executed and installed in the works during the construction period by selected sub-contractors

The selected sub-contractors shall be chosen, as far as possible, by the principal agent together with the contractor

Fixed

Item

Value Related

Item

Time Related

Item

22 Employer's direct contractors (clause 22)

The Contractor shall allow the direct contractors and employers agents access to the work, allocate reasonable space in the building for storage of their materials, tools and equipment, all to the satisfaction of the Principal Agent. The contractor shall also allow the direct contractors, etc. free of charge, use of their ablution facilities and water and power supply to the and shall in no way hinder or prevent the executiin of their works. Attendance may be priced against the relevant specified items in the bills of quantities.

Fixed

Item

Value Related

Item

Time Related

Item

23 Contractor's domestic sub-contractors (Clause 23)

Fixed

Item

Value Related

Item

Carried to Collection

R

Section No. 1
Preliminaries
Bill No. 1
Preliminaries

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

BILLS OF QUANTITIES
**CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
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29 Revision of date of practical completion (clause 29)

Clause 29.1.1 shall be deemed to be omitted and replaced by the following:

Inclement weather shall be defined as weather in excess of the average rainfall (volume and period) for each calender month over the past ten (10) years as recorded by the nearest commonly recognised weather bureau in the region of the project

It shall be deemed that the contractor has adequately allowed in his programme and tendered rates for expenses which might result from delays due to average or below rainfall as described above

Fixed

Item

Value Related

Item

Time Related

Item

30 Penalty for non-completion (clause 30)

The penalty per calender day shall be calculated at 0.05% of contract sum excluding contingency allowance and CPAP

Fixed

Item

Value Related

Item

Time Related

Item

Carried to Collection

R

Section No. 1
Preliminaries
Bill No. 1
Preliminaries

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

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	Payment (A31 - A35)			
31	Interim payment to the contractor (clause 31) <i>Notwithstanding this or any other clause, materials and goods stored off site shall not to be included in the amount authorized for payment</i> <i>Clause 31.6.5 shall be deemed to be deleted</i> <i>Clause 31.9:</i> <i>The wording "seven (7)" be replaced with "thirty (30)"</i> <i>Cause 31.11.1:</i> <i>The wording "one hundred and sixty per cent (160%)" be replaced with "one hundred and ten per cent (110%)"</i>	Fixed	Item	
		Value Related	Item	
		Time Related	Item	
32	Adjustment to the contract value (clause 32)	Fixed	Item	
		Value Related	Item	
		Time Related	Item	
33	Recovery of expense and loss (clause 33)	Fixed	Item	
		Value Related	Item	
		Time Related	Item	
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34	Final account and final payment (clause 34)			
	Fixed		Item	
	Value Related		Item	
	Time Related		Item	
35	Payment to other parties (clause 35)			
	Fixed		Item	
	Value Related		Item	
	Time Related		Item	
	<u>Termination (A36-A39)</u>			
36	Termination by employer - contractor's default (clause 36)			
	Fixed		Item	
	Value Related		Item	
	Time Related		Item	
37	Termination by employer - loss and damage (clause 37)			
	Fixed		Item	
	Value Related		Item	
	Time Related		Item	
38	Termination by contractor - employer's default (clause 38)			
	Fixed		Item	
	Value Related		Item	
	Time Related		Item	
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39	Termination - cessation of the works (clause 39)	Fixed	Item	
		Value Related	Item	
		Time Related	Item	

Dispute (A40)

40	Settlement of Disputes (clause 40)	Fixed	Item	
		Value Related	Item	
		Time Related	Item	

Contract Agreement (A41)

41	The schedule: Pre-tender information (clause 42)	Fixed	Item	
		Value Related	Item	
		Time Related	Item	

42.1 CONTRACTING AND OTHER PARTIES

See "Notes to Tenderers" for all the relevant physical and postal addresses, telephone and facsimile numbers

42.1.1 Employer:

Limpopo Province: Department of Public Works, Roads and Infrastructure

42.1.2 Principal Agent:

Cubic Professional Consultants

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42.1.3 Agent (1):

The Creative Axis

Agents service: *Architects*

42.1.4 Agent (2):

Cubic Professional Consultants

Agents service: *Quantity Surveyors*

42.1.5 Agent (3):

Muavha Ramollo Consulting

Agents service: *Structural and Civil Engineers*

42.1.6 Agent (4):

Pienaar & Erwee

Agents service: *Electrical Engineers*

42.1.6 Agent (5):

Not applicable

Agents service:

42.1.8 Agent (6):

Not Applicable

Agent service:

42.1.9 Agent (7):

Not applicable

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42.2 CONTRACT DETAILS

42.2.1 Works Description:

*The works shall be as described in the
"Notes to Tenderers"*

42.2.2 Site Description:

*The site shall be as described in the "Notes
to Tenderers"*

42.2.3 Work or installations by direct contractors:

*Refer to notes to tenders: Item 2 Scope of
contract*

42.2.4 Specific options that are applicable to a State
organ only:

- (1) Interest rate legislation: N/A
- (2) Lateral support insurance to be effected by
the contractor: N/A
- (3) Payment will be made for materials and
goods: N/A
- (4) Dispute resolution by litigation: N/A
- (5) Extended defects liability period applicable
to the following elements: N/A

42.2.5 Possession of the site is be given on:

To be determined

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42.2.6 Period for the commencement of the works after the contractor takes possession of the site:

Within one (1) working day

42.2.7 The date for practical completion and the penalty per calendar day for the works as a whole:

Date:
24 Months after the site handover excluding builder's holiday

Penalty:
0,05% of the tendered amount, inclusive of value added tax

42.2.8 The date for practical completion and the penalty per calendar day for the works in sections:

See Item 36 of Notes to Tenders

Section 1: Date: N/A Penalty: R
R..... Section 2: Date: N/A
Penalty: R Section 3: Date:
N/A Penalty: R Section 4: Date:
N/A Penalty: R Section 5: Date:
N/A Penalty: R Section 6: Date:
N/A Penalty: R

42.2.9 The law applicable to this agreement shall be that of:

Republic of south Africa

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42.3 INSURANCES

42.3.1 Contract works insurance:

To be effected by: **Contractor**
 For the sum of: **Tendered amount plus**
20%
 With a deductible of: **to be determined by**
the contractor

42.3.2 Supplementary insurance is required: **No**

42.3.3 Public liability insurance: **Yes**

To be effected by: **Contractor**
 For the sum of: **R 20 000 000-00**
 With a deductible of: **to be determined by**
the contractor

42.3.4 Support insurance to be effected by the employer: **No**

42.4 DOCUMENTS

41.4.1 Waivers of contractor's lien or right of continuing possession is required: **Yes**

42.4.2 Construction document copies to be supplied to the contractor free of charge:
Three (3) copies of each

42.4.3 Bills of quantities drawn up in accordance with:
Standard System of Measuring Building Work

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42.4.4 On acceptance of the tender the bills of quantities is to be submitted:

Within seven (7) working days

42.4.5 JBCC Engineering General Conditions are to be included in the documents: No

42.4.6 The contract value is to be adjusted using CPAP: Yes

Base month of indexes: *Will be based on date of tender closing*

42.4.7 Details of changes made to the provision of JBCC standard documentation:

- Clause 3 : page 2*
- Clause 10 : page 3*
- Clause 18 : page 5*
- Clause 21 : page 6*
- Clause 29 : page 8*
- Clause 31 : page 9*
- Clause 10 : page 4*
- Clause 18: page 6*

42.5 CONTRACT DETAILS

All post-tender information for this section will be determined once tender is awarded

42.6 DOCUMENTS

All post-tender information for this section will be determined once tender is awarded

42.7 DISPUTE RESOLUTION

All post-tender information for this section will be determined once tender is awarded

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42.8 SIGNATURES OF THE CONTRACTING PARTIES

All post-tender information for this section will be determined once tender is awarded

SECTION B: PRELIMINARIES

Definition and interpretation (B1)

42 Definition and interpretation (B1.1 - B1.6.5)

Fixed

Item

Value Related

Item

Time Related

Item

Documents (B2)

43 Checking of documents (B2.1)

These bills of quantities:

(1) contain pages and annexes as indexed, and;

(2) are in multiple procurement format, i.e. all trades are fully measured with minor budgetary allowances

Items in these bills of quantities are to be read and priced in conjunction with and the descriptions regarded as amplified by the Model Preambles for Trades, 1999 edition, as recommended and published by the Association of South African Quantity Surveyors and no claim arising from brevity of description of items fully described in the said Model Preambles for Trades will be entertained

Fixed

Item

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		Value Related	Item	
		Time Related	Item	
44	Provisional bills of quantities (B2.2)		Item	
		Value Related	Item	
		Time Related	Item	
45	Availability of construction documentation (B2.3)			
	<i>The minor budgetary allowances included in this document will be separately procured, based on multiple procurement of selected sub-contractors during the construction period</i>			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
46	Interests of agents (B2.4)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
47	Priced documents (B2.5)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
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48	Tender submission (B2.6)		
	<i>Notwithstanding anything contained in this clause tenders shall be valid for a period of ninety (90) days from the closing date of tenders</i>		
		Fixed	Item
		Value Related	Item
		Time Related	Item
	<u>The site (B3)</u>		
49	Defined works area (B3.1)		
		Fixed	Item
		Value Related	Item
		Time Related	Item
50	Geotechnical investigation (B3.2)		
		Fixed	Item
		Value Related	Item
		Time Related	Item
51	Inspection of the site (B3.3)		
	<i>No claims for extras arising from the contractor having failed to comply with this clause will be entertained</i>		
		Fixed	Item
		Value Related	Item
		Time Related	Item

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52	Existing premises occupied (B3.4)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
53	Previous work - dimensional accuracy (B3.5)			
	<i>Work executed under a previous contract and the extent thereof will be pointed out to the contractor by the principal agent on handing over of the site</i>			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
54	Previous work - defects (B3.6)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
55	Services - known (B3.7)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
56	Services - unknown (B3.8)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
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57	Protection of trees, etc (B3.9)			
	Fixed		Item	
	Value Related		Item	
	Time Related		Item	
58	Articles of value (B3.10)			
	Fixed		Item	
	Value Related		Item	
	Time Related		Item	
59	Inspection of adjoining properties, etc (B3.11)			
	Fixed		Item	
	Value Related		Item	
	Time Related		Item	
	<u>Management of contract (B4)</u>			
60	Management of the works (B4.1)			
	Fixed		Item	
	Value Related		Item	
	Time Related		Item	
61	Programming for the works (B4.2)			
	Clause B4.2 is hereby amended by the addition of the following:			
	Programme:			
	The contractor and the principal agent shall agree to a Contract Programme for the control of the Works.			
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The contractor shall submit a draft of the Contract Programme and method statement to the principal agent for approval together with the tender.

The contractor shall ensure that the contract programme:

1. Shall be prepared and drawn up to comply in all respects with the requirements of this Agreement.
2. shall be drawn up using logic developed during the tender period and complies with the planning requirements of The University;
3. shall be in accordance with the dates given herein for possession and practical completion; and
4. shall be in sufficient and approved detail to ensure effective control of the work, including all items necessary to enable calculations to be made for the distribution of finance during the cashflow analysis.
5. shall be accompanied by a full written method statement

The principal agent shall examine and comment on the contract programme and method statement within two weeks of its submission.

Following on these comments the contractor shall amend the contract programme and method statement as may be necessary and submit the final contract programme and method statement to the principal agent for approval within a further two weeks thereafter.

The contract programme shall be processed by computer and be presented to the principal agent in the form of logic charts and bar charts in such a way as to determine the critical path and the float on non-critical activities. All supporting printouts must be available to the principal agent on demand.

The acceptance by the principal agent of the contract programme, or any revision thereof, does not necessarily sanction the accuracy of validity of the network logic, the correctness of individual activities in terms of description or duration, the comprehensiveness

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changes.

A revision to the programme will not invalidate the contractual completion dates and applications for extensions of time will be processed by the principal agent in accordance with the conditions of contract.

Should the contractor fail to submit a request for revision to the construction programme , progress monitoring shall be based on the latest revised programme sanctioned by the principal agent.

The contractor shall make all his necessary revisions on the approved network sheets clearly marking, inter-alia, the logic changes and duration changes. These will then be processed by the necessary parties and then approved in the normal manner.

Progress Monitoring

The contractor shall provide regular progress reports showing actual and expected progress against the latest contract programme. Progress reports shall be submitted at each site progress meeting and shall outline the progress against key target dates and deviation which has occurred against the most recently updated control programme due to the progress reflected in the as-built construction programme.

The status of each activity must also be reported as follows:

Target - If the activity is not complete, the latest predicted completion date shall be supplied.

Start - If the activity has commenced, the actual date shall be supplied.

Finish - If the activity is complete, the actual completion date shall be supplied.

Problems which may occur during execution of the contract must be specifically identified in progress reports under a separate section of the contractor's report.

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Should problems occur during the execution of the contract or the scope of work be increased or decreased, the contractor may be requested to increase the extent or the detail of the programme.

The principal agent may recommend action to be taken by the contractor, including the revision of resource levels, but this information will not be binding on the contractor unless the recommendations are enforced in terms of the conditions of contract by the principal agent and will in no way relieve the contractor's responsibility to comply with the requirements of the Agreement.

Extension of time

Any extension of time which is granted by the principal agent will be annotated to affect selected activities in the programme and the associated activities will be incorporated by revisions to the programme by the contractor. Should the additional activities or the extension of time on existing activities fall on a non-critical area of the programme, extension will be limited to the activities affected by the said additional activities or extensions and the contract dates shall not be affected. If, however, the additional activities fall on the critical path, the principal agent shall take this into account when granting any extension of time in terms of the conditions of contract.

The contractor agrees that the contract completion date (i.e. the date for practical completion) has been stipulated in the contract for the benefit of the employer, so that, without derogating from the generality of the foregoing principle it is provide that:

1. The contractor shall not be entitled to deliver the site and the works to the employer prior to the contract completion date and
2. Should there for any reason be any float period indicated in the contract programme prior to the contractual completion date then this float period shall be utilized to absorb any delays or extensions of time without affecting the contract completion date.
3. The contractor shall, at all times, ensure that,

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notwithstanding the approval or sanctioning, reviewing or inspection of a programme or any revision of a programme by the principal agent in the foregoing terms, practical completion and completion of the works shall take place strictly in accordance with this Agreement.

A defective or faulty programme, even if so sanctioned, approved, reviewed or inspected by the principal agent, shall therefore not constitute a cause for granting an extension of time for completion of the works or for entitling the contractor to the payment by the employer in terms of the contract of any loss, compensation or damage whatsoever.

The contractor acknowledges that the principal agent's foregoing participation in the approval of development of, revisions to and updating of the Contract Programme shall take place in consultation with the principal agent. The contractor shall therefore provide the principal agent with such co-operation and/or information and/or access as they may reasonably require for such purposes.

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Progress meetings (B4.3)

Fixed

Item

Value Related

Item

Time Related

Item

Fixed

Item

Value Related

Item

Time Related

Item

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63	Technical meetings (B4.4)		
	Fixed	Item	
	Value Related	Item	
	Time Related	Item	
64	Labour and plant records (B4.5)		
	Fixed	Item	
	Value Related	Item	
	Time Related	Item	
	<u>Samples and shop drawings (B5)</u>		
65	Samples of materials (B5.1)		
	Fixed	Item	
	Value Related	Item	
	Time Related	Item	
66	Workmanship samples (B5.2)		
	Fixed	Item	
	Value Related	Item	
	Time Related	Item	
67	Shop drawings (B5.3)		
	Fixed	Item	
	Value Related	Item	
	Time Related	Item	
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68	Compliance with manufacturer's instructions (B5.4)	Fixed	Item
		Value Related	Item
		Time Related	Item
<u>Temporary works and plant (B6)</u>			
69	Deposits and fees (B6.1)	Fixed	Item
		Value Related	Item
		Time Related	Item
70	Enclosure of the works (B6.2)	Fixed	Item
		Value Related	Item
		Time Related	Item
71	Advertising (B6.3)	Fixed	Item
		Value Related	Item
		Time Related	Item
72	Plant, equipment, sheds and offices (B6.4)	Fixed	Item
		Value Related	Item
		Time Related	Item

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73	Main notice board (B6.5)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
74	Subcontractors notice board (B6.6)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
	<u>Temporary services (B7)</u>			
75	Location (B7.1)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
76	Water (B7.2)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
77	Electricity (B7.3)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
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78	Telecommunication equipment (B7.4)	Fixed	Item
		Value Related	Item
		Time Related	Item
79	Ablution facilities (B7.5)	Fixed	Item
		Value Related	Item
		Time Related	Item
<u>Prime cost amounts (B8)</u>			
80	Responsibility for prime cost amounts (B8.1)	Fixed	Item
		Value Related	Item
		Time Related	Item
<u>Attendance on nominated and selected subcontractors (B9)</u>			
81	General attendance (B9.1)	Fixed	Item
		Value Related	Item
		Time Related	Item
82	Special attendance (B9.2)	Fixed	Item
		Value Related	Item

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		Time Related	Item	
83	Commissioning - Fuel, water and power (B9.3)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
	<u>Financial aspects (B10)</u>			
84	Statutory taxes, duties and levies (B10.1)			
	<i>Provision is made in the summary of these bills of quantities for the inclusion of Value Added Tax (VAT)</i>			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
85	Payment of preliminaries (B10.2)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
86	Adjustment of preliminaries (B10.3)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
87	Payment certificate cash flow (B10.4)			
		Fixed	Item	
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		Value Related	Item	
		Time Related	Item	
	General (B11)			
88	Protection of works (B11.1)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
89	Protection/isolation of existing/sectionally occupied work (B11.2)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
90	Site security (B11.3)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
91	Notice before covering work (B11.4)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
92	Disturbance (B11.5)			
		Fixed	Item	
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		Value Related	Item	
		Time Related	Item	
93	Enviromental disturbance (B11.6)			
		Fixed	Item	
		Time Related	Item	
94	Works cleaning and clearing (B11.7)			
		Value Related	Item	
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
95	Vermin (B11.8)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
96	Overhand work (B11.9)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
97	Instruction manuals and guarantees (B11.10)			
		Fixed	Item	
		Value Related	Item	
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		Time Related	Item	
98	As built information (B11.11)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
99	Tenant installations (B11.12)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
	<u>Schedule of variables (B12)</u>			
100	Pre-tender information (B12.1)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
	12.1.1 Provisional bills of quantities (B2.2)			
	The quantities are provisional:	Yes		
	12.1.2 Availability of construction documentation (B2.3)			
	Construction documentation is not complete:	No		
	12.1.3 Interest of agents (B2.4)			
		No		
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12.1.4 Defined works area (B3.1)

The area of the works to be occupied by the contractor, any restriction on the area and the limit of access or exit will be pointed out to the contractor by the principal agent on handing over of the site

12.1.5 Geotechnical investigation (B3.2)

Yes

12.1.6 Existing premises occupied (B3.4)

No

12.1.7 Previous work - Dimensional accuracy (B3.5)

No

12.1.8 Previous work - Defects (B3.6)

No

12.1.9 Services - known (B3.7)

Existing services and points of connection are shown on the site plan and/or will be pointed out on site by the principal agent

12.1.10 Protection of trees (B3.9)

N/A

12.1.11 Inspection of adjoining properties (B3.11)

Yes

12.1.12 Enclosure of the works (B6.2) (See notes to tenders)

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101 12.1.13 Offices (B6.4.3)

The contractor shall provide, maintain and remove on completion of the works an office for the exclusive use for meetings to be held on site. The minimum size of the office shall be 8 x 4 x 2,40m high internally with concrete floor, insulated ceiling and roof. The office shall be suitably ventilated, equiped with electric lighting and fitted with table, twelve (12) chairs, one (1) pining board 2,40 x 1,20m high, one (1) writing board 2,40 x 1,20m high and a set of ten (10) aluminium "Ozafile" drawing hangers complete with stand. The office shall be kept clean and fit for use at all times

Fixed

Item

Value Related

Item

Time Related

Item

102 12.1.14 Main notice board (B6.5)

The contractor shall provide, erect where directed, maintain and remove on completion of the works a notice board size 3 x 3m high. The exact extent of the details, clour scheme and wording will be provided by the principal agent on the day of the site handover. The board shall be securely fixed to and including a suitable supporting structure of timber or tubular posts and braces

Fixed

Item

Value Related

Item

Time Related

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- 12.1.15 Sub-contractors notice board (B6.6)
A notice board is required: **No**

- 12.1.16 Water (B7.2) Alternative selected: **A**

- 12.1.17 Electricity (B7.3) Alternative selected: **A**

- 12.1.18 Telecommunications (B7.4) Alternative selected: **A**

- 12.1.19 Ablution facilities (B7.5) Alternative selected: **A**

- 12.1.20 Protection of existing/sectionally occupied works
(B11.2) **No**

- 12.1.22 Protection of the works **No**

- 12.1.23 Disturbance (B11.5) **No**

- 12.1.24 Enviromental disturbance (B11.6) **No**

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106	<p>Clause C3 - As-built drawings</p> <p>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 principal agent and the structural engineer for their records</p>			
	Fixed		Item	
	Value Related		Item	
	Time Related		Item	
107	<p>Clause C4 - Site instructions</p> <p>All site instructions issued on site shall be recorded in writing within seven (7) calendar days in site instruction book (A4 size and triplicate carbon format), which is to be provided and maintained by the contractor. The said site instruction book shall be kept on site at all times for the exclusive use of recording site instructions only</p> <p>Site instructions may be issued by the architect or any of the consultants only. Copies of the site instructions are to be submitted to the architect and quantity surveyor within seven (7) calendar days of such recording in the site instruction book</p>			
	Fixed		Item	
	Value Related		Item	
	Time Related		Item	
108	<p>Clause C5 - Labour record</p> <p>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 subcontractors on the works each day</p>			
	Fixed		Item	
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		Value Related	Item	
		Time Related	Item	
109	<p>Clause C6 - Plant record</p> <p>At the end of each calendar 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</p>			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
110	<p>Clause C7 - Non-cession of monies</p> <p>The contractor shall not cede nor assign his rights or claims to any monies due or to become due to him under this contract</p>			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
111	<p>Clause C8 - Occupational Health and Safety Act</p> <p>In terms of the Occupational Health and Safety Regulations promulgated on 18 July 2003, it will be expected from the contractor to comply fully with and adhere to all such regulations pertaining to this project as no claims in this regard will be entertained</p>			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
	Carried to Collection			R
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PART A-OHS ACT COMPLIANCE-IMPLEMENTATION OF THE HEALTH AND SAFETY - Construction health & safety documentation				
112	Clause C8.1.1 - Prepare and compile H&S plan as per site specification Health and safety specifications (Section C3, Scope of Work), OHS Act & Regulations	Fixed	Item	
		Value Related	Item	
		Time Related	Item	
113	Clause C8.1.2 - Allow for the preparation and compilation of the site specific health and safety file, and a health and safety working file	Fixed	Item	
		Value Related	Item	
		Time Related	Item	
114	Clause C8.1.3 - Appointment of a Registered Construction health and safety officer for the duration of the Contract as per Section 8(5) of the Construction Regulations 2014	Fixed	Item	
		Value Related	Item	
		Time Related	Item	
PART B-OHS ACT COMPLIANCE-IMPLEMENTATION OF THE HEALTH AND SAFETY - Personal Protective Clothing & Equipment				
115	Clause C8.2.1 - Foot protection (steel toe cap, gum boots, etc)	Fixed	Item	
Carried to Collection				R
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	Value Related	Item	
	Time Related	Item	
116	Clause C8.2.2 - Clothing (Overalls Depicting Contractors Company name/identification)		
	Fixed	Item	
	Value Related	Item	
	Time Related	Item	
117	Clause C8.2.3 - Glove (leather, PVC, Acid Resistant, etc) Item		
	Fixed	Item	
	Value Related	Item	
	Time Related	Item	
118	Clause C8.2.4 - Head Protection: Hardhats with air vents Colour Coded - Supervisory (Red) Labour (Green)		
	Fixed	Item	
	Value Related	Item	
	Time Related	Item	
119	Clause C8.2.5 - Ear protection (earmuffs with 30% protective value) Item		
	Fixed	Item	
	Value Related	Item	
	Time Related	Item	
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120	Clause C8.2.6 - Eye Protection (Face Shield, Goggles, Spectacles, etc)			
	Fixed		Item	
	Value Related		Item	
	Time Related		Item	
121	Clause C8.2.7 - Visibility (luminous high visibility safety vests/ jackets/ bibs/ etc)			
	Fixed		Item	
	Value Related		Item	
	Time Related		Item	
122	Clause C8.2.8 - Harness(double stranded safety harness with pylon hooks)			
	Fixed		Item	
	Value Related		Item	
	Time Related		Item	
123	Clause C8.2.9 - Portable ladders A-frame, extendable, length, material, etc.			
	Fixed		Item	
	Value Related		Item	
	Time Related		Item	
124	Clause C8.2.9 - Portable ladders A-frame, extendible, length, material, etc.			
	Fixed		Item	
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	Value Related	Item	
	Time Related	Item	
125	Clause C8.2.10 - Barricading/ Demarcation (Supply, Install & Removal) Demarcation perimeter (fence, shade netting, corrugated iron, shutter board, hard Barricade etc)		
	Fixed	Item	
	Value Related	Item	
	Time Related	Item	
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PART C-OHS ACT COMPLIANCE-IMPLEMENTATION
OF THE HEALTH AND SAFETY - Occupational
medical surveillance

126	Clause C8.3.1 - Entry Medical Examinations by a SASOHN registered Occupational Health Nurse or a SASOM registered Occupational Medical Practitioner	Fixed	Item
		Value Related	Item
		Time Related	Item
127	Clause C8.3.2 - Exit Medical Examination	Fixed	Item
		Value Related	Item
		Time Related	Item
128	Clause C8.3.3 -Provision of a first aid kit	Fixed	Item
		Value Related	Item
		Time Related	Item
129	Clause C8.3.4 - Provision of a fire-fighting measures	Fixed	Item
		Value Related	Item
		Time Related	Item

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PART D-OHS ACT COMPLIANCE-IMPLEMENTATION OF THE HEALTH AND SAFETY Education, training, signage		
130	Clause C8.4.1 - Health and safety induction site access cards	
	Fixed	Item
	Value Related	Item
	Time Related	Item
131	Clause C8.4.2 - Basic First Aid training level one	
	Fixed	Item
	Value Related	Item
	Time Related	Item
132	Clause C8.4.3 - Health and Safety representative	
	Fixed	Item
	Value Related	Item
	Time Related	Item
133	Clause C8.4.4 - Construction (firefighting, General information, prohibitory, mandatory, warning, hazchem, photo luminescent, etc)	
	Fixed	Item
	Value Related	Item

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		Time Related	Item	
134	Clause C8.4.5 - Health and Safety information display board in site office (emergency evacuation flow diagram, emergency contact numbers, electrical, general, etc)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
135	Clause C8.4.6 -Health and safety charts (OHS Act, Basic Conditions of Employment Act)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
	PART E - OHS AC COMPLIANCE - IMPLEMENTATION OF THE HEALTH AND SAFETY Covid-19 Compliance management			
136	Clause C8.5.1 - Covid - 19 related signage and posters			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
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137	Clause C8.5.2- 2 x 3ply cloth masks			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
138	Clause C8.5.2- hand sanitizers with 70% alcohol content			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
139	Clause C8.5.3 Decontamination agent / surface sanitizers			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
140	Clause C8.5.4 Surgical Gloves (for security and cleaning team)			
		Fixed	Item	
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		Value Related	Item	
		Time Related	Item	
141	Clause C8.5.5 Non-contact thermometers			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
142	Clause C8.5.6 Physical barriers to ensure social distancing (Compliance to Section 22 of the Covid-19 OHS Directive)			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
143	Clause C9 - Viewing of the construction areas The site is situated in Limpopo Traffic Training College and the tenderer must arrange with the responsible hospital staff to obtain permission to enter the site for tendering purposes			
		Fixed	Item	
		Value Related	Item	
		Time Related	Item	
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144 **Clause C10 - Commencement of Works in College Areas**

As the **works** falls within a college area the **contractor** must give the responsible staff member notice 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

Fixed

Item

Value Related

Item

Time Related

Item

145 **Clause C11 - Entrance Permits to Construction Areas**

As the **works** falls within a college 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 the control of the Principal, or chief security officer

Fixed

Item

Value Related

Item

Time Related

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146 **Clause C12 - 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**

Fixed

Item

Value Related

Item

Time Related

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147 **Clause C13 - HIV/Aids Awareness**

It is required of the **contractor** to thoroughly study the HIV/AIDS Specification (PW 1544) of the Department that must be read together with and is deemed to be incorporated under this Section of the **bills of quantities**. Provision for pricing of HIV/AIDS awareness is made under items C10.1 to C10.5 hereafter and it is explicitly pointed out that all requirements of the aforementioned specification are deemed to be priced hereunder, as the said items represent the only method of measurement and no additional items or extras to the contract in this regard shall be entertained

The **contractor** must take note that compliance with the HIV/AIDS Specification is compulsory. In the event of partial or total non-compliance, the **principal agent**, notwithstanding the provisions of Clause A 31.0 of Section A or any other clause to the contrary, reserves the right to delay issuing any progress **payment certificate** until the **contractor** provides satisfactory proof of compliance. The **contractor** shall not be entitled to any compensation of whatsoever nature, including interest, due to such delay of payment

Fixed

Item

Value Related

Item

Time Related

Item

148 **Clause C13.1 - Awareness Champion**

Selection, appointment, briefing and making available of an Awareness Champion including provision of all relevant services, all in accordance with the HIV/AIDS Specification

Fixed

Item

Value Related

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152 **Clause C13.5- Monitoring**

Monitoring HIV/AIDS awareness of workers, providing the **principal agent** with access to information including making available all reports, thoroughly completed and reflecting the correct information, for the duration of the **construction period** and close out, all in accordance with the HIV/AIDS Specification

Fixed

Item

Value Related

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Time Related

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	<u>SECTION 2</u>			
	<u>BUILDING WORK</u>			
	<u>BILL NO 1</u>			
	<u>ALTERATIONS</u>			
	For preambles see "Model Preambles for Trades (2008 Edition)" and Supplementary preambles as specified in the Trades as well as Engineering Specifications attached to these documents.			

	<u>SUPPLEMENTARY PREAMBLES</u>			
	Note:			
	All usable material from the demolitions should be kept safety and handed over to the Principal Agent who shall sign for all material received.			
	<u>REMOVAL OF EXISTING WORK</u>			
	<u>Breaking down and removing brickwork etc</u>			
1	One brick walls	m2	21	
	<u>Taking down and removing roofs, floors, panelling, ceilings, partitions, etc</u>			
2	Corrugated roof sheeting and trusses	m2	885	
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<u>Taking out and removing doors, windows, etc, including thresholds, sills, etc (building up openings and making good finishes elsewhere)</u>				
3	Timber single door and frame 813 x 2032m high overall from one brick wall	No	2	
4	Steel double door and frame 1550 x 2032m high overall from one brick wall	No	1	
<u>PREPARATORY WORK TO EXISTING SURFACES</u>				
5	Making good defects in existing screeded floors	m2	10	
<u>SERVICING OF DOORS AND WINDOWS</u>				
6	Replace existing damaged or missing brass window stay	No	10	
<u>MAKING GOOD OF FINISHES ETC</u>				
<u>Making good screed</u>				
7	Floors in patches	m2	2	
<u>Making good to internal cement plaster</u>				
8	Walls in patches	m2	1	
<u>OPENINGS THROUGH EXISTING WALLS ETC</u>				
9	Opening for window size 5000 x 510mm high, 685 x 1535mm high, 685 x 1535mm high (W03) overall through one brick wall	No	5	
10	Opening for double door size 1990 x 2495mm high overall with aluminium, windows 3360 x 540mm high, 685mm x 1960mm high and 685mm x 1960mm high (D05) through one brick wall	No	3	
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11	Opening for double door size 1990 x 2495mm high overall with aluminium windows 5000 x 540mm high, 685 x 1535mm high and 685mm 1535mm high(D04) through one brick wall	No	2	
<u>BUILDING UP OPENINGS</u>				
<u>Brickwork in NFP bricks in class II mortar in building up openings, including bonding new to existing and making good cement plaster on one (both?) side(s) (making good paintwork elsewhere)</u>				
12	Opening 1550mm x 2032mmmm high overall in 230mm brick wall	No	1	
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Amount

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BILL NO 2

FOUNDATIONS

For preambles see "Model Preambles for Trades (2008 Edition)" and Supplementary preambles as specified in the Trades as well as Engineering Specifications attached to these documents.

SUPPLEMENTARY PREAMBLES

In the event of any discrepancy with the 'Model Preambles for Trades', the 'Concrete, Formwork and Reinforcement Specification' shall take precedence.

Nature of ground

Descriptions of excavations shall be deemed to include all ground conditions classifiable as "earth" described in 'The Model Preambles for Trades 2008' and where conditions of a more difficult character are indicated these are separately measured.

Excavations

No allowance is made for bulking in the given quantities for excavated material.

Prices of excavations are to include for putting aside excavated material to be used as filling, as well as forming excavated surfaces to falls, slopes, counters, trimming sides and stepping, levelling and ramming bottoms.

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DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

BILLS OF QUANTITIES
**CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
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Carting away of excavated material

Descriptions of carting away of excavated material shall be deemed to include loading excavated material onto trucks directly from the excavations or, alternatively, from stockpiles situated on the building site.

SITE CLEARANCE, ETC.

Site clearance

1	Digging up and removing rubbish, debris, vegetation, hedges, shrubs and trees not exceeding 200mm girth, bush, etc	m2	312
2	Rip and scarify ground level to a depth of 200mm and consolidate to 93% mod. AASHTO density	m2	312

EXCAVATION, FILLING, ETC

Excavate in earth not exceeding 2m deep below natural, excavated or reduced ground level and depositing excavated material in stock piles on site

3	Trenches	m3	98
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Extra over trench and hole excavation in earth for excavation in

4	Soft rock	m3	10
5	Hard rock	m3	5

Extra over all excavations for carting away

6	Surplus material from excavations and/or stockpiles on site to a dumping site to be located by the contractor.	m3	49
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<u>Risk of collapse of excavations</u>			
7	Sides of trench and hole excavations not exceeding 1 500mm deep	m2	245
<u>Keeping excavations free of water</u>			
8	Keeping excavations free of all water other than subterranean water		Item
<u>Earth filling obtained from the excavations and/or prescribed stock piles on site compacted to 93% Mod AASHTO density</u>			
9	Over site	m3	21
10	Under floors, steps, paving, etc	m3	43
11	Backfilling to trenches, holes, etc	m3	49
<u>Compaction of surfaces</u>			
12	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 93% Mod AASHTO density	m2	142
<u>Prescribed density tests on filling</u>			
13	"Mod. AASHTO Density" test	No	10
<u>SOIL POISONING</u>			
<u>Soil insecticide to be executed with SABS compliance by a firm of Specialists under a 5 year guarantee</u>			
14	Under floors etc including forming and poisoning shallow furrows against foundation walls etc, filling in furrows and ramming	m2	142
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15	To bottoms and sides of trenches etc	m2	343
<u>CONCRETE</u>			
<u>REINFORCED CONCRETE CAST AGAINST EXCAVATED SURFACES</u>			
<u>15MPa/20mm concrete</u>			
16	Surface blinding under footings and bases	m3	5
<u>25MPa/19mm concrete</u>			
17	Strip footings	m3	29
<u>TEST BLOCK</u>			
18	Making and testing a set of four 150 x 150 150mm concrete strength test cubes per concrete pour, one crushed at 7 days and 3 at 26 days	No	10
<u>MOVEMENT JOINTS ETC</u>			
<u>Two layers of 375 micron "Consol Plastic Brickgrip DPC" in slip joints between horizontal concrete and brick surfaces, including cement mortar bed</u>			
19	6mm Joints not exceeding 300mm high	m	95
<u>Fabric reinforcement</u>			
20	Type 193 fabric reinforcement in concrete surface beds, slabs etc.	m2	142

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Foundations

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

MASONRY

BRICKWORK IN FOUNDATIONS
(PROVISIONAL)

**Brickwork of NFX bricks (14 MPa nominal
 compressive strength) in class II mortar**

21	One brick walls	m2	86	
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BRICKWORK SUNDRIES

Brickwork reinforcement

22	150mm wide reinforcement built in horizontally in foundations.	m	471	
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DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

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Item No		Quantity	Rate	Amount
	<p><u>SECTION NO 2</u></p> <p><u>BUILDING WORK</u></p> <p><u>BILL NO 3</u></p> <p><u>CONCRETE, FORMWORK AND REINFORCEMENT</u></p> <p><u>SUPPLEMENTARY PREAMBLES</u></p> <p><u>Cost of tests</u></p> <p>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 architect. The testing shall be undertaken by an independent firm or institution nominated by the contractor and to the approval of the architect. (Test cubes are measured separately)</p> <p><u>Breeze concrete</u></p> <p>Breeze concrete shall consist of twelve parts clean dry furnace ash, free from coal or other foreign matter, to one part cement (12:1), the ash graded up to particles which will pass a 16,5mm ring from a minimum which fails to pass a 4,75mm mesh. The finer materials from the screening are to be first mixed with the cement into a mortar and the ash added afterwards and thoroughly incorporated</p>			
	Carried to Collection			R
	<p>Section No. 2 Alterations (Hall) Bill No. 3 Concrete, Formwork and Reinforcement</p>			
	DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE			

Formwork

Description 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

Formworks to soffits of solid slabs etc shall be deemed to be slabs not exceeding 250mm thick unless otherwise described

Formwork to soffits of slabs, beams, etc shall be deemed to be propped up exceeding 1,5m and not exceeding 3,5m high 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"

REINFORCED CONCRETE

25MPa/19mm concrete

1	Surface beds cast in panels on waterproofing	m3	13	
2	Ramps on waterproofing	m3	1	

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Bill No. 3
Concrete, Formwork and Reinforcement

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

TEST CUBES

3	Making and testing 150 x 150 x 150mm concrete strength test cube (Provisional)	No	10	
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CONCRETE SUNDRIES

Finishing top surfaces of concrete smooth with a wood float/steel trowel

4	Surface beds, slabs, ramps etc	m2	150	
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Fabric reinforcement

5	Type 193 fabric reinforcement in concrete surface beds, slabs etc.	m2	150	
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BILLS OF QUANTITIES
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Item No		Quantity	Rate	Amount
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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

Samples of all masonry building units, except those for walls described as "load bearing", shall consist of a minimum of 6 units. Samples of building units to be used in walls described as "load bearing" shall consist of 30 units from every 30 000 units delivered to site.

Samples

Samples of all masonry building units, shall consist of a minimum of 6 units

BRICKWORK IN SUPER STRUCTURE

Brickwork of NFP bricks in class II mortar

1	Half brick walls	m2	81
2	Half brick walls in beamfilling.	m2	10
3	One brick walls.	m2	263

BRICKWORK SUNDRIES

Galvanised hoop iron cramps, ties, etc.

4	30 x 1,2mm Hoop iron 800mm long short fixed to timber purlins and other end built into brickwork	No	40
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Turning pieces

5	230mm Wide turning piece to lintels etc	m	48
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Bill No. 4
Mansory

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

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6	110mm Wide turning piece to lintels etc	m	8	
<u>Prestressed fabricated lintels</u>				
7	100 x 70mm lintels in lengths not exceeding 1200mm.	m	16	
8	100 x 70mm lintels in lengths exceeding 1200mm not exceeding 1500mm.	m	7	
9	100 x 70mm lintels in lengths exceeding 1500mm not exceeding 1800mm.	m	4	
<u>Brickwork reinforcement</u>				
10	75mm Wide reinforcement built in horizontally	m	334	
11	150mm wide reinforcement built in horizontally.	m	965	

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Mansory

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Item No		Quantity	Rate	Amount
	<u>SECTION NO 2</u>			
	<u>BUILDING WORK</u>			
	<u>BILL NO 5</u>			
	<u>WATERPROOFING</u>			
	For preambles see "Model Preambles for Trades (2008 Edition)" and Supplementary preambles as specified in the Trades as well as Engineering Specifications attached to these documents.			
	<u>Waterproofing</u>			
	Waterproofing of roofs, basements, etc shall be laid under a ten year guarantee by an approved applicator. Waterproofing to roofs shall be laid to even falls to outlets etc with necessary ridges, hips and valleys. Descriptions of sheet or membrane waterproofing shall be deemed to include additional labour to turn-ups and turn-downs			
	<u>DAMP-PROOFING OF WALLS AND FLOORS</u>			
	<u>One layer of 375 micron "Consol Plastics Brickgrip DPC or Similar Approved" embossed damp proof course</u>			
1	In walls	m2	28	
	<u>One layer of 250 micron "Consol Plastic USB Green or Similar Approved" waterproof sheeting sealed at laps with "Gunplas Pressure Sensitive Tape"</u>			
2	Under surface beds	m2	142	
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Item
No

Quantity

Rate

Amount

SECTION NO 2

BUILDING WORK

BILL NO 6

ROOF COVERINGS, ETC

For preambles see "Model Preambles for Trades (2008 Edition)" and Supplementary preambles as specified in the Trades as well as Engineering Specifications attached to these documents.

SUPPLEMENTARY PREAMBLES

All items are measured net unless otherwise described

Flashings, trimming plates, etc.

Prices to include for all cutting and waste and relevant fixing material, unless otherwise described

All rates for flashings, trimmings, etc., to include for forming drips and closed ends to troughs of sheet steel roof covering where applicable

All items are unless otherwise described measured net

Carried to Collection

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Section No. 2
Alterations (Hall)
Bill No. 6
Roof Covering, etc

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

PROFILED METAL SHEETING AND ACCESSORIES

0.55mm thick 700mm cover Saflok 700® Rain Forest COLORPLUS® interlocking roof covering, fixed to steel purlins at 2200mm centres and end-span purlins at 2000mm centres using SL 700® Clip 35 clips secured to purlins with Fixtite® or Safintra approved wafer head self-tapping fasteners with roof insulation complete under a five year guarantee by an approved firm of specialists, all in accordance with the materials supplied and methods employed by the manufacturer

1	Roof coverings with pitches not exceeding 25 degrees	m2	970	
2	Ridge capping (Code FK3) to be Brownbuilt Klip-Lok 406 550mm girth, three times bent along girth and notched on site to suit roof profile	m	47	

SHEET METAL FLASHINGS, LININGS, COPINGS, ETC

0.8mm Galvanised sheet iron with "Rain Forest COLORPLUS" finish on one side

3	Side wall flashing 550mm girth	m	92	
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ROOF INSULATION

4	D&D Roof 135mm thick Starlite® 12kg/m ³ density aluminium foil faced roof insulation complying with SANS 428:2012, laid over-purlin directly below the roof sheet on and including 1.6 gauge galvanized or white pvc coated steel straining wire at 300mm centres with all longitudinal flap joints securely stapled, all in accordance with the manufacturer's recommendations.	m2	970	
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	<p><u>SECTION NO 2</u></p> <p><u>BUILDING WORK</u></p> <p><u>BILL NO 7</u></p> <p><u>CARPENTRY AND JOINERY</u></p> <p>For preambles see "Model Preambles for Trades (2008 Edition)" and Supplementary preambles as specified in the Trades as well as Engineering Specifications attached to these documents.</p> <p><u>SUPPLEMENTARY PREAMBLES</u></p> <p><u>Particle board:</u></p> <p><u>Particle board shall comply with the following specifications:</u></p> <p>a) SABS 1300 Particle board: exterior and flooring type b) SABS 1301 Particle board: interior type</p> <p><u>PREFABRICATED ROOF TRUSSES</u></p> <p><u>Pre-fabricated metal connected timber roof trusses</u></p> <p>All trusses shall be fabricated by an approved truss manufacturer who holds a current Certificate of Competence awarded by the Institute for Timber Construction</p> <p><u>Timber</u></p> <p>Timber for trusses to be South African softwood and shall be in accordance with the grades as defined in SABS Specification No 563 or as defined in SABS Specification No 1460</p> <p style="text-align: center;">Carried to Collection</p> <p>Section No. 2 Alterations (Hall) Bill No. 7 Carpentry and Joinery</p> <p>DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE</p>			R

Bolts

Bolts shall be in accordance with BS 4190 or SABS 135

Shear plates, tooth connectors and split rings

Shear plates, tooth connectors and split rings shall be in accordance with BSS 1759 : 1960 and installed in accordance with the CSIR Publication HOUT 468, "The Design, Manufacturing and Erection of Timber Trusses"

Washers

Square or round washers of the following dimensions shall be used with all bolts:

- 1 Bolts up to 8mm diameter:
Washers shall be minimum 25mm wide of minimum 2,50mm thickness
- 2 Bolts up to 12mm diameter:
Washers shall be minimum 36mm wide of minimum 4,00mm thickness
- 3 Bolts up to 20mm diameter:
Washers shall be minimum 60mm wide of minimum 5,00mm thickness

Metal connector plates

Metal connector plates shall be fabricated out of not less than 1mm thick drawn quality galvanised steel

The steel shall have a minimum yield strength of 228MPa and a minimum ultimate tensile strength of 330MPa. The corrosion resisting coating shall be not less than 275g/m² commercial class hot dipped galvanising as per SABS 934 before stamping

All connector plates shall have been tested by the CSIR and be of a size capable of transmitting the forces between members of a truss without exceeding the design values published in the CSIR report

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Truss construction

Trusses shall be constructed in jigs specially designed to ensure the correct profile, overhangs and cambers

Where metal connector plates are used all joints are to be close fitted butt joints made by precision pressing of the metal connector plates into each side of the joint

Truss design

All trusses shall be designed by a registered Professional Engineer in accordance with SABS 0163 ("Design of Timber Structures") and Code 0160 ("Loadings")

Truss spacing

The truss centres shall be less than or equal to that as described in this bill for each respective truss

Truss pitch

The truss pitch shall be as described in this bill for each respective truss type

Truss loading

Trusses shall be designed for a live load of 0,50kN/m² and dead load as specified under the sub-heading "Specific load specifications for roof trusses"

Shop drawings, design and erection guarantee certificates

It will be expected from the Contractor to timeously prepare, submit and obtain the necessary approvals from the Representative/Agent in respect of the required shop drawings, design and erection guarantee certificates as specified

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Dimensions

All dimensions given in the descriptions of the trusses are nominal and actual measurements are to be obtained by actual measurements taken on the site before design or fabrication commences

Erection

All trusses are to be hoisted and erected strictly in accordance with the procedures and recommendations of the manual "The Erection and Bracing of Timber roof Trusses" as published by the Institute for Timber Construction and the CSIR, or the SABS Code of Practice "The Design, Manufacture and Erection of Timber Roof Trusses", or as designed and detailed by the designer

Design system

The design system as documented in this bill is based on the "MiTek" system and all references given in the descriptions are related to specific type of trusses based on this design system

However, Contractors are to note that any design system of similar quality may be used subject to the prior written approval of the Representative/Agent

Specific specifications for roof trusses

Unless otherwise described, the following specifications will apply:

- 1 All trusses to be with a 10° pitch
- 2 The dead load consists of corrugated roof sheeting and purlins at approximately 1200mm centres

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BILLS OF QUANTITIES
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ROOFS

1	Complete supply and erection of 82m2 double pitched timber roof including wall plates, trusses, jack rafters, permanent bracing and 50 x 76mm purlins, etc. all as per the drawings attached to these bills of quantities	No	1	
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2	Complete supply and erection of 140m2 double pitched timber roof including wall plates, trusses, jack rafters, permanent bracing and 50 x 76mm purlins, etc. all as per the drawings attached to these bills of quantities	No	1	
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Allow for the preparation and submission of the following documents in respect of all buildings

3	Detailed shop drawings indicating truss sizes, truss positions, bracings, details, etc. to be submitted for approval prior the commencement of any fabrication			Item
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4	Design certificate indicating the licensed programme used, SABS specifications adhered to, general procedures and loadings adopted, sizes and grading of timber components, details, etc.			Item
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5	Erection guarantee certificate after the whole completed roof truss structure have been inspected, all defective work have been taken out and made good, etc. to the full satisfaction of the Representative/Agent			Item
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EAVES, VERGES, ETC

"Everite FC77 Similar and approved" pressed fibre-cement

6	15 x 250mm Fascias and barge boards including galvanised steel H-profile jointing strips	m	137	
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DOORS ETC

40mm Solid core flush panel doors with two
concealed edges, 3mm masonite board on both
sides prepared for painting fixed on the steel door
frame. (painting measured some where else)

7	Door 762 x 2032mm high(D2)	No	10
8	Door 813 x 2032mm high (D3)	No	1
9	Door 914 x 2032mm high (D6)	No	1

SUNDRIES

10	Cut 150mm from the bottom of 40mm solid door	No	10
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SKIRTINGS

Meranti skirting, plugged

11	Van Acht hardwood VMS7 skirting, size 18 x125mm plugged and screwed to wall surface including 19mm quadrant bead	m	142
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Carpentry and Joinery

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

Item No		Quantity	Rate	Amount
	<p><u>SECTION NO 2</u></p> <p><u>BUILDING WORK</u></p> <p><u>BILL NO 8</u></p> <p><u>CEILINGS, PARTITIONS AND ACCESS FLOORING.</u></p> <p>For preambles see "Model Preambles for Trades (2008 Edition)" and Supplementary preambles as specified in the Trades as well as Engineering Specifications attached to these documents.</p> <p><u>SUPPLEMENTARY PREAMBLES</u></p> <p><u>Descriptions</u></p> <p>Items described as "nailed" shall be deemed to be fixed with hardened steel nails or pins or shot pinned to brickwork or concrete</p> <p>Items described as "plugged" shall be deemed to include screwing to fibre, plastic or metal plugs at not exceeding 600mm centres, and where described as "bolted", the bolts are measured elsewhere</p>			
	Carried to Collection			R
	<p>Section No. 2 Alterations (Hall) Bill No. 8 Ceiling, Partitions and Access Flooring</p>			
	DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE			

SUSPENDED CEILINGS

Gypsum ceiling panels face-covered with Fissured embossed vinyl, size 1200 x 600 x 12.5mm thick, laid on fire rated S3 exposed demountable Butt-cut T24 suspension system, comprising galvanised main tees and cross tees with main tees suspended by means of galvanised hangers at centres not exceeding 1200mm with ceiling perimeter finished with Shadowline W-trim, plugged and screwed at 200mm centres

1	Horizontal ceilings suspended not exceeding 1m below concrete slab	m2	659
2	Extra over ceilings for opening for 150mm diameter downlighter (Provisional)	No	25

CORNICES

"Donn or Similar and approved" cornices to suspended ceilings

3	"SM25" pre-painted cornices, nailed	m	240
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PARTITIONS ETC

Aluglass Bautech Variflex® VX110 mobile acoustic (o 17000 x 3,000mm high to suit structural opening size comprising 110mm thick tongued and grooved acous panels with Grey Weaverworld Vulcan fabric finish, top and bottom seals and vertical seals formed of alu seals and magnetic strips, panels suspended at two track with ball bearing and/or thrust rollers with track in turn bolted to steel support structure and 500mm to specified 50dB class of the panels fitted to and ab Panels are to park U-parking with panels stacking to

4	Mobile acoustic partition	No	1
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 Bill No. 8
 Ceiling, Partitions and Access Flooring

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	<u>SECTION NO 2</u>			
	<u>BILL NO 9</u>			
	<u>FLOOR COVERINGS, PLASTIC LININGS, ETC</u>			
	For preambles see " Specification of materials and methods to be used - PW 371"			
	<u>FLOOR COVERINGS</u>			
	<u>FloorworX noraplan or similar approved @ Stone rubber sheeting colour 6601 (Colour code: 6601), size 1,22m wide x 2.0mm thick, manufactured in accordance with EN 14041, laid in FloorworX No. 71 contact adhesive spread with a brush or paint roller on suitably prepared sub-floor in accordance with SANS 10070, using FloorworX Self Leveller when required, with joints welded with a fully flexible coloured 'FloorworX Welding Rod' to provide a smooth, hygienic sealed finish rolled with 68kg three section metal roller.</u>			
1	On floors	m2	595	
	<u>POLISH, SEALERS, ETC</u>			
	<u>Two coats wax polish</u>			
2	On vinyl flooring	m2	595	
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	<u>SECTION NO 2</u>			
	<u>BUILDING WORK</u>			
	<u>BILL NO 10</u>			
	<u>IRONMONGERY</u>			
	<u>SUPPLEMENTARY PREAMBLES</u>			
	<u>Descriptions</u>			
	Items described as "plugged" shall be deemed to include screwing to fibre, plastic or metal plugs			
	<u>IRONMONGERY</u>			
	<u>HINGES, BOLTS, ETC</u>			
	<u>"Dorma" or similar and approved</u>			
1	Butt Hinge code EN1935GRD13 SS	No	12	
2	Female fixing screws(4 per pack)	No	12	
3	DWC-006 Indicator bolt with turknob for physically impaired	No	11	
	<u>LOCKS</u>			
	<u>"Dormakaba" or similar and approved</u>			
4	DMWC-SS-008 Bathroom deadlock case dimensions 38mm x 76mm. forend dimensions 78 x 22W. backset 57mm	No	11	
5	DPL1000 GMK 50mm Satin Nickel padlock (Grand master keyed)	No	1	
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HANDLES

"Dormakaba" or similar and approved

6	DPH301B 325 x 25mm straight tubular pull handle flange fixing	No	12
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Sundries

7	Door stop satin 87001SS	No	30
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8	Hat & coat hook with buffer DHC-SS-031B	No	12
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DOOR CLOSERS

"Dormakaba" or similar and approved

9	TS92B Silver slide channel door closure	No	1
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10	BTS75v Double action floor spring for aluminium door fixed with two speed control valves	No	6
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PUSH PLATES AND KICKING PLATES

"Union" or similar and approved

11	800mm wide x 300mm high x 1.2mm thick Grade 304 SS kick plate with 10 counter sunk hole for screw fixing at ablutions	No	2
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12	900mm wide x 800mm high x 1.2mm thick Grade 304 SS kick plate with 10 counter sunk hole for screw fixing at Paraplegic room	No	2
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BATHROOM FITTINGS

"Buchel" or similar and approved

13	19mm Diameter chromium plated towel rail 600mm long including end brackets	No	11
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"Kimberly-Clark" or similar and approved

14	Kimberly-Clark® Professional MR2 Satin finish Stainless Steel toilet tissue dispenser (code: SA426130), overall size 130 x 135 x 256mm high, installed by a Kimberly Clark® installation team.	No	11
15	Kimberly-Clark® Professional Reflex® Hand towel disposer colour White (code: 6959000), overall size 236 x 430 x 241mm high, installed by a Kimberly Clark® installation team.	No	3
16	Kimberly-Clark® Professional Reflex® Disposer waste bin colour White (code: 6993000) installed by a Kimberly Clark® installation team.	No	3

"Franke" or similar and approved

17	Franke HF2400HD 1,2/1,5mm thick satin finished stainless steel automatic hands free hand dryer (Code: 359961), size 280 x 207 x 245mm high with 2 vandal proof lock screws and key wrench, plugged and screwed to the wall with stainless steel screws, 200 W motor connected to 230/240 volt power supply. With 5 year warranty.	No	3
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LETTERS, NAMEPLATES, ETC

"Union" or similar and approved

18	3mm thick x 32mm wide clear perspex numeral plate reverse engraved and enamelled in two numerals and/or letters, twice countersunk holed for and screwed to door with chromium plated dome headed screws	No	3
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"Sundries"

19	150 x 150mm Stainless steel plate engraved with "female" sign (St/Steel)	No	1
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20	150 x 150mm Stainless steel plate engraved with "male" sign (St/Steel)	No	1	
21	150 x 150mm Stainless steel plate engraved with "Disable" sign (St/Steel)	No	1	
22	150 x 150mm Stainless steel plate engraved with "running man RH" sign (St/Steel)	No	8	
23	150 x 150mm Stainless steel plate engraved with a "Fire Hose Reel" sign (St/Steel)	No	1	
24	150 x 150mm Stainless steel plate engraved with "Fire Extinguisher" sign (St/Steel)	No	8	
<u>"Glo Products" or similar and approved</u>				
25	Glo-products photoluminescent escape route signage code E1 size 150mm x 150mm in SABS 1186 certified ABS plastic, with natural anodized aluminium frame, drilled, plugged and fixed with non-corrosive screws	No	1	
26	Glo-products photoluminescent fire signage code F2 size 150mm x 150mm in SABS 1186 certified ABS plastic, with natural anodized aluminum frame, drilled, plugged and fixed with non-corrosive screws	No	1	
<u>"VAAL PARAGON OR SIMILAR AND APPROVED" GRAB RAILS</u>				
27	32mm Chairman Industries type SR1 back grab rail 800mm long plugged.	No	1	
28	32mm Chairman Industries type DL3 side grab rail 900mm long plugged.	No	1	
<u>PELMETS AND CURTAIN TRACKS</u>				
<u>Money Provision: Installation of Blinds</u>				
29	Provide a sum of R50 000,00 (Fifty thousand rand) for supply and installations of blinds		Item	50,000,00
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All welding will be subject to random testing and x-rays to the discretion and satisfaction of the Engineer

The Contractor will be required to provide a mock-up sample of a handrail and/or ballustrade

WELDED SCREENS, GATES, ETC

Gates to external doors

1	Gate and frame 813 x 2134mm high complete	No	1	
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Steel gate frame

2	50mm x 25mm x 1.6mm Mild steel rectangular tube gate frame mitred 45 degrees at corner before welded and secured in opening with brackets welded to gate and bolted to wall	No	1	
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PRESSED STEEL DOOR FRAMES

"Durowin or Similar and approved" 1,6mm Double rebated frames suitable for half brick walls

3	Frame for door 762 x 2032mm high	No	10	
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4	Frame for door 914 x 2032mm high	No	1	
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"Durowin or Similar and approved" 1,6mm Double rebated frames suitable for one brick walls

5	Frame for door 813 x 2032mm high	No	1	
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ALUMINIUM WINDOWS, DOORS, ETC

AAAMSA guide

All windows, doors, etc shall comply with and meet the minimum recommended performance requirements as set out in the General Specification for Architectural Aluminium and Glass Products (Third Edition) as published by the Association of Architectural Aluminium Manufacturers of South Africa (AAAMSA)

Finish

The windows, doors, etc shall be natural anodised to a thickness of 25 micron and shall comply with SABS 999 and 1407

Glass

Glazing to be with patent rubber gaskets with glazing beads and comply with BS 952. Thickness of glass shall be in accordance with table 1 (Part N : Glazing). Safety glass shall comply with SABS 1263. The National Building Regulations shall be observed with regard to the specification of safety glass

Design indemnity

The contractor is to submit with his tender the "Form of Indemnity", annexed to this document, fully completed and signed

Drawings

Tenderers are referred to architect's drawings annexed to these bills of quantities for full details of windows, doors, etc

Pricing.

All window prices should include alluminium louvres as shown

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General

Workshop drawings to be approved by the architect before manufacture

Ironmongery

Prices for windows shall allow for two standard stainless steel side/top hung friction hinges and one bronze anodised aluminium handle per opening sash. Prices for doors shall allow for two pairs of standard flush bolts to double doors and one-and-a-half pairs of standard hinges per door leaf.

Charcoal anodised purpose made aluminium frame with 20 x 50mm aluminium vertical slats

6	Louvre unit for 1700 x 750mm high (W04)	No	5	
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Charcoal anodised purpose made aluminium windows formed 5mm thick glazed with GSA SmartGlass™ Intruderprufe® Clear laminated safety glass, complying with SANS 1263 Part 1, 2 or 3 with name of the manufacturer permanently marked on each sheet visible after glazing, glazed in accordance with NBR N schedule 1 and SABS 0137 and plugged to brickwork or concreteGlass Properties :• Shading Coefficient = 0,71 to 1• Light Transmission Level = 61 to 95

7	Window size 600 x 600mm high (W01)	No	11	
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8	Window size 1200 x 600mm high (W02)	No	5	
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9	Window size 5000 x 510mm high, 685 x 1535mm high, 685 x 1535mm high (W03)	No	5	
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Charcoal anodised series 340 aluminium windows, doors, etc including sub-frames, fixing, silicone sealant all round, ironmongery and glazed with 6,4mm GSA SmartGlass™ ArmourLam™ Clear toughened laminated safety glass, complying with SANS 1263 Part 1, 2 or 3 with name of the manufacturer permanently marked on each sheet visible after glazing, glazed in accordance with NBR N schedule 1 and SABS 0137 and signed off by a competent structures or glazing specialist. Glass Properties :• Shading Coefficient = 0,47 to 0,70• Light Transmission Level = 61 to 95

10	Charcoal anodised aluminium double door size 1620 x 2100mm high overall fixed on aluminium frame (D01)	No	4
11	Charcoal anodised aluminium double door size 1990 x 2495mm high overall fixed on aluminium frame with aluminium windows 5000 x 540mm high, 685 x 1535mm high and 685mm 1535mm high(D04)	No	2
12	Charcoal anodised aluminium double door size 1990 x 2495mm high overall fixed on aluminium frame with aluminium, windows 3360 x 540mm high, 685mm x 1960mm high and 685mm x 1960mm high (D05)	No	3

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	<u>SECTION NO 2</u>			
	<u>BUILDING WORK</u>			
	<u>BILL NO 12</u>			
	<u>PLASTERING</u>			
	<u>SCREEDS</u>			
	<u>Screeds on concrete</u>			
1	50mm Thick on floors and landings	m2	596	
	<u>GRANOLITHIC</u>			
2	38mm Thick on floors and landings including 50mm grano skirting	m2	89	
	<u>INTERNAL PLASTER</u>			
	<u>Steel troweled cement plaster on brickwork</u>			
3	On walls	m2	506	
	<u>EXTERNAL PLASTER</u>			
	<u>Steel troweled cement plaster on brickwork</u>			
4	On walls	m2	209	
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	<u>SECTION NO 2</u>			
	<u>BUILDING WORK</u>			
	<u>BILL NO 13</u>			
	<u>TILING</u>			
	<u>WALL TILING</u>			
	<u>300 x 600 x 7mm Porcelain wall tiles (PC R250.00/m2 VAT excl.) fixed with adhesive to external cement plaster wall (plaster elsewhere) and flush pointed with tinted waterproof jointing compound</u>			
1	On walls	m2	93	
2	On narrow widths, etc.	m2	3	
3	Fair cutting and fitting around pipe not exceeding 100mm diameter (Provisional)	No	11	
	<u>FLOOR TILING</u>			
	<u>600 x 600 x 7mm Porcelain floor tiles (PC R350.00/m2 VAT excl.) fixed with adhesive to cement screed (screed elsewhere) and flush pointed with tinted waterproof jointing compound</u>			
4	On floors and landings	m2	89	
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Item No		Quantity	Rate	Amount
	<p><u>SECTION NO 2</u></p> <p><u>BUILDING WORK</u></p> <p><u>BILL NO 14</u></p> <p><u>PLUMBING AND DRAINAGE</u></p> <p>For preambles see "Model Preambles for Trades (2008 Edition)" and Supplementary preambles as specified in the Trades</p> <p>-----</p> <p><u>SUPPLEMENTARY PREAMBLES</u></p> <p>Fusion welded bends and tees shall include jointing to pipes with PVC rubber ring double Z joint couplers. Branch tees shall include flanged and bolted joints to "Polycop" branch pipes in addition and for brass compression male iron to copper straight couplers.</p> <p>Reducers shall include jointing to pipes with PVC rubber ring double Z joint couplers and reducers shall be of sufficient overall length to accommodate same. All pipes shall be jointed and fixed strictly in accordance with the manufacturer's instructions. All pipe diameters are nominal external.</p> <p>uPVC pipes and fittings</p> <p>Sewer and drainage pipes and fittings shall be jointed and sealed with butyl rubber rings.</p> <p>Soil, waste and vent pipes and fittings shall be solvent weld jointed or sealed with butyl rubber rings.</p> <p style="text-align: center;">Carried to Collection</p> <p>Section No. 2 Alterations (Hall) Bill No. 14 Plumbing and Drainage</p> <p>DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE</p>			
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uPVC pressure pipes and fittings

Pipes for water supply shall be of the class stated.

Pipes of 40mm diameter and smaller shall be plain ended with solvent welded uPVC loose sockets and fittings.

Pipes of 50mm diameter and greater shall have sockets and spigots with push-in type integral rubber ring joints. Bends shall be uPVC and all other fittings shall be cast iron, all with similar push-in type joints.

Gratings, covers, etc

Gratings, covers, etc shall be manufactured by "Besaans du Plessis Foundries", unless otherwise described

Sealing of edges

Outer edges of sinks, basins, urinals, etc are to be sealed against adjacent surfaces with "Bayer 400F" silicone

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Copper pipes

Pipes shall be hard drawn and half-hard pipes of the class stated. Class 0 (thin walled hard drawn) pipes shall not be bent. Class 1 (thin walled half-hard), class 2 (half-hard) and class 3 (heavy walled half-hard) pipes shall only be bent with benders with inner and outer formers. Fittings to copper waste, vent and anti-syphon pipes, capillary solder fittings and compression fittings shall be "Cobra Watertech" type. Capillary solder fittings shall comply with ISO 2016. Only compression fittings shall be used in walls or in ground.

Copper pipes are to be installed in accordance with the latest revision of the code of Practice for Copper Plumbing soldering techniques. Flux, solder, etc to be strictly in accordance with the manufacturer's requirements with special attention to copperflux composition

Lead pipes and traps

All soldered joints shall be wiped and brass unions shall be used for jointing lead to steel.

Reducing fittings

Where fittings have reducing ends or branches they are described as "reducing". In the case of pipes with diameters not exceeding 60mm only the largest end or branch size is given. Should the contractor wish to use other fittings and bushes or reducers he may do so on the understanding that no claim in this regard will be entertained. In the case of pipes with diameters exceeding 60mm all sizes are given and no claim for extra bushes, reducers, etc will be entertained.

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Excavations

No claim for rock excavation will be entertained unless the contractor has timeously notified the quantity surveyor thereof prior to backfilling.

"Soft rock" and "hard rock" shall be as defined in "Earthworks".

Fixing of pipes

Unless specifically otherwise stated, descriptions of pipes shall be deemed to include fixing to walls, etc, casting in, building or suspending not exceeding 1m below suspension level

Laying, backfilling, bedding, etc of pipes

Pipes shall be laid and bedded and trenches shall be carefully backfilled in accordance with manufacturers' instructions.

Where no manufacturer's instructions exist pipes shall be laid in accordance with clauses 5.1 and 5.2 of each of the following:

- SABS 1200L : Medium-pressure pipelines
- SABS 1200LD : Sewers
- SABS 1200LE : Stormwater drainage

Pipe trenches etc shall be backfilled in accordance with clauses 3, 5.5, 5.6, 5.7 and 7 of SABS 1200DB : Earthworks (Pipe trenches)

Pipes shall be bedded in accordance with clauses 3.1 to 3.4.1, 5.1 to 5.3 and 7 of SABS 1200LB: Bedding (Pipes)

Unless otherwise described bedding of rigid pipes shall be class B bedding

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Where no manufacturers' instructions exist pipes shall be laid in accordance with clauses 5.1 and 5.2 of each of the following: SABS 1200. L : Medium-pressure pipelines LD : Sewers LE : Stormwater drainage Pipe trenches etc. shall be backfilled in accordance with clauses 3, 5.5, 5.6, 5.7 and 7 of SABS 1200.DB : Earthworks(Pipe trenches)Pipes shall be bedded in accordance with clauses 3.1 to 3.4.1, 5.1 to 5.3 and 7 of SABS 1200.LB : Bedding (Pipes).Unless otherwise described bedding of rigid pipes shall be class B bedding.

General

Descriptions of pipes laid in and including trenches and of inspection chambers, catchpits, etc shall be deemed to include excavation, bedding, backfilling, compaction to a minimum of 93% Modified AASHTO density and disposal of surplus material on site

Descriptions of copper service pipes and flexible connecting pipes shall be deemed to include connections to taps, cisterns, etc and to steel pipes

Descriptions of wc pans, slop hoppers, etc shall be deemed to include joints to soil pipes (pan connectors separately measured)

Flush pans

Flush pans shall have straight or side outlets and "P" or "S" traps as necessary.

Stainless steel basins, sinks, wash troughs, urinals, etc.

Units shall have standard aprons on all exposed edges and tiling keys against walls where applicable.

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Waste unions

Descriptions of waste unions shall be deemed to include rubber or vulcanite plugs and chains fixed to fittings.

Test shall include for the provision of all necessary water, etc. for and testing the whole of the plumbing services as described and in stages as deemed necessary, including chlorination, complete to the satisfaction of the principal agent and the local authority, replace defective work free of charge, including necessary re-testing and leave in perfect condition upon completion

As-built drawings

Where required, the contractor shall at all times keep an updated set of "as-built" drawings. At completion of the contract the contractor shall hand these drawings to the architect for reproducing onto the originals for handing over to the employer (Provision for allowance of as-built drawings elsewhere)

SANITARY FITTINGS

White Vitreous China

1.	Vaal Sanitaryware 635 x 485mm Hibiscus White vitreous china vanity basin with universal half pedistal (code 715222) including two semi punched taphole and integrated overflow and chainstay hole, bolted to wall with two 10mm bolts	No	10	
2.	Vaal Sanitaryware White vitreous china low level washdown suite comprising 90° outlet pan with enlarged pedestal and matching 9 litre cistern complete with lid, flushpipe and fitments	No	8	

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3	Vaal Sanitaryware Protea Paraplegic white vitreous china floor mounted paraplegic washdown suite (product code 7300SC) comprising 90° outlet pan and matching 9 litre cistern, including DPE heavy duty thermoplastic A1 deluxe double flap seat, lid, fitments and purpose-made chromium plated side flush lever.	No	1
4	Cobra Watertech exposed urinal chrome plated Junior Flushmaster flushvalve (code: FJ6-000) with non-hold open feature, wall flange and 20mm "Ball-o-Stop" control inlet.	No	4
<u>WASTE UNIONS ETC</u>			
<u>"Cobra Watertech or Similar and approved"</u>			
5	38mm "Cobra 301" basin chrome platted unslotted waste and plug with chain	No	8
6	38mm "Cobra 316" unslotted waste and plug with chain	No	8
<u>TRAPS, ETC</u>			
<u>"Cobra Watertech or Similar and approved"</u>			
7	40mm Chrome plated deep seal Bottle trap with outlet of 50mm PVC pipe (Code 340)	No	8
8	Cobra Watertech exposed urinal chrome plated Junior Flushmaster flushvalve (code: FJ6-000) with non-hold open feature, wall flange and 20mm "Ball-o-Stop" control inlet.	No	4
<u>"Marley or Similar and approved"</u>			
9	40mm Deep seal "P" or "S" trap	No	8
<u>TAPS, VALVES, ETC</u>			
<u>"Cobra Watertech or Similar and approved"</u>			
10	"Cobra Ref. 231/350" Angle regulating valve	No	26

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11	Cobra Ref 1111-15 CP "Stella" pillar tap	No	7
12	15mm "515/055-21" elbow action wall mounted mixer with "Sawn neck"swivel spout outlet, ceramic disc head parts, inlet connections and wall flanges	No	1
	<u>Brass</u>		
13	22mm Stopcock	No	1
14	22mm Fullway gate valve	No	1
15	22mm Non-return valve	No	1
16	15mm 1050RB in-line strainer	No	1
17	PA3.132 "Masterflo 1" pressure control valve with vacuum breaker	No	1
	<u>WATER SUPPLIES</u>		
	<u>Class 0 copper pipes</u>		
18	15mm Pipes	m	85
19	22mm Pipes	m	62
20	28mm Pipes	m	45
	<u>Extra over class 0 copper pipes for capillary fittings</u>		
21	15mm Fittings	No	15
22	22mm Fittings	No	20
23	28mm Fittings	No	13

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<u>PVC gulley</u>			
24	110mm Gulley trap with O, P, Q or S outlet, plain gulley head and grating, jointed to 110mm PVC pipe, including excavated for, bedding on and encasing in concrete 15 MPa / 19mm, not exceeding 0.75m deep to invert	No	1
<u>Sundries</u>			
25	300 x 300 x 50mm Precast concrete inspection eye marker slab set in ground	No	1
26	100mm Cast iron "ABC" cleaning eye	No	1
27	Type 3B cast iron valve box	No	1
<u>TESTING</u>			
28	Testing water pipe system		Item
<u>ELECTRIC WATER HEATERS</u>			
<u>"Kwikot or Similar and approved"</u>			
29	"Kwikot Megaflo" 100 Litre Slimline 600 Dual electric water heater (Code : ESG-100) complying with SABS 151-2002, overall size 990 x 480mm high, operating at 400kPa with temperature and pressure safety relief valve including 20mm female draincock with inlet compression. Geyser to be installed horizontally in roof space with 1160 x 560mm wide polyethylene drip tray with union and back nut connected to 20mm PVC overflow pipe taken out at eaves (Code : GSTP-1200) and 15mm pipe work including two 15mm vacuum breakers (Code : KHN4.150CX) installed on hot and cold water supply. Installation to include a 15mm 400kPa Kwikot Mono control and expansion relief valve (Code : KHN3.104), all in accordance with SANS 10254, connected to single phase electrical power supply with isolator 1m away from connection on geyser.	No	1
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BILLS OF QUANTITIES
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SOIL DRAINAGE

**"Geberit or Similar and approved" Underground
drain pipes including couplings in the running
lengths**

30	110mm Pipes laid in and including trenches not exceeding 1m deep	m	225
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Extra over Geberit pipes for fittings

31	110mm Bend	No	25
32	110mm Junction	No	11
33	110mm Access junction	No	11

**Precast concrete circular inspection chambers
including precast concrete cover slabs (covers
elsewhere) and channels in benching**

34	Inspection chamber 1000mm diameter exceeding 1000mm and not exceeding 1500mm deep internally	No	1
35	Inspection chamber 1000mm diameter exceeding 1000mm and not exceeding 2000mm deep internally	No	1

Covers, etc

36	600 x 650mm x 74kg Type 8A cast iron double seal manhole cover and frame	No	2
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SANITARY PLUMBING

**Extra heavy duty structured wall Geberit sewer
pipes to SANS 1601**

37	50mm Pipes	m	45
38	110mm Pipes	m	22

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**Extra over extra heavy duty structured wall Geberit
 sewer pipes to SANS 1601 for fittings**

39	50mm Access bend	No	16
40	110mm Access bend	No	22
41	110mm Bend	No	11
42	110mm Pan connector	No	11
43	50mm BSP adaptor	No	8
44	50mm Bend	No	32
45	50mm Junction	No	8
46	110mm Reducing junction	No	11
47	110mm Access bend	No	11
48	110mm Double junction	No	11
49	110mm Acess junction	No	11
50	110mm "GI Two-way" vent valve	No	11

TESTING

51	Testing waste pipe system		Item
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FIRE APPLIANCES ETC

'Chubb'

52	9kg Dry chemical powder fire extinguisher, including standard hard wood backing plugged and backing finished with one coat dark stain and two coats clear suede polyurethane varnish	No	7
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	<u>SECTION NO 2</u>			
	<u>BUILDING WORK</u>			
	<u>BILL NO. 15</u>			
	<u>GLAZING</u>			
	For preambles see "Model Preambles for Trades (2008 Edition)" and Supplementary preambles as specified in the Trades			
	<u>GLAZING TO ALUMINIUM WITH SCREWED ON BEADS</u>			
	<u>MIRRORS, ETC</u>			
	<u>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</u>			
1	Mirror 300 x 450mm high with four brass screws	No	8	
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	DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE			

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BILLS OF QUANTITIES
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EXISTING HALL AT LIMPOPO TRAFFIC TRAINING COLLEGE**

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Item No		Quantity	Rate	Amount
	<p><u>SECTION NO 2</u></p> <p><u>BUILDING WORK</u></p> <p><u>BILL NO 16</u></p> <p><u>PAINTWORK</u></p> <p>For preambles see "Model Preambles for Trades (2008 Edition)" and Supplementary preambles as specified in the Trades as well as Engineering Specifications attached to these documents.</p> <p><u>SUPPLEMENTARY PREAMBLES</u></p> <p><u>DESCRIPTIONS</u></p> <p>Descriptions of paintwork shall be deemed to include for all cutting in</p> <p><u>PREPARATORY WORK TO EXISTING WORK</u></p> <p><u>Previously painted plastered surfaces</u></p> <p>Surfaces shall be thoroughly washed down and allowed to dry completely before any paint is applied. Blistered or peeling paint shall be completely removed and cracks shall be opened, filled with a suitable filler and finished smooth</p> <p><u>Previously painted metal surfaces</u></p> <p>Surfaces shall be thoroughly rubbed and cleaned down. Blistered or peeling paint shall be completely removed down to bare metal</p> <p style="text-align: center;">Carried to Collection</p> <p>Section No. 2 Alterations (Hall) Bill No. 16 Paintwork</p> <p>DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE</p>			
			R	

ON PLASTER BOARD

Plascon Sure Coat Gloss Enamel to exterior new fibre cement (NW 174).Surface to be dry, sound and clean, with a moisture content, measured with a Doser Hygrometer (or equivalent), of BD 2 scale - 8% or less. Prime with one coat of Plascon Plaster Primer (UC 56) with an overcoating time of 16 hours and finish with two coats of Sure Coat Gloss Enamel (SGE) with 16 hours drying time between coats, for a maintenance cycle of 2 years in a C1 - inland environment.

3	On fascias and barge boards	m2	34
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ON METAL

One coat alkyd based universal undercoat and one coat superior quality universal enamel paint

4	On door frames etc	m2	17
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ON TIMBER

Stop, fill, sand down and prepare wood surfaces. Apply one coat Plascon Wood Primer, one coat Plascon Universal Undercoat and two coats Plascon Super Universal Enamel paint

5	On doors	m2	42
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Prepare and apply three coats polyurethane suede varnish, lightly sanded between applications

6	On skirtings, rails, cornices etc not exceeding 300 mm girth	m	142
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PAINTWORK ETC TO PREVIOUSLY PAINTED WORK

Old paint should be completely removed by scraping and sanding the surface

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Section No. 2
 Alterations (Hall)
 Bill No. 16
 Paintwork

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Previously painted wood surfaces

Surfaces shall be thoroughly cleaned down. Blistered or peeling paint shall be completely removed and cracks and crevices shall be primed, filled with suitable filler and finished smooth

PAINT SPECIFICATIONS

All painting shall be done in accordance with "Plascon-Evans" specifications

PAINTWORK, ETC TO NEW WORK ON

ON FLOATED PLASTER

Apply one coat plaster primer and with two coats of a top-quality exterior water-based paint.

1	On internal walls	m2	372
	<u>Prime with one coat Professional Plaster Primer (PP700) with an overcoating time of 16 hours and finish with two coats Professional Marroca (PTX 1200) with 2 hours drying time between coats, for a maintenance cycle of 10 years in a C1</u>		
2	On external walls	m2	172

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ON FLOATED PLASTER

Apply one coat plaster primer and two coats Double velvet

7	On internal walls	m2	409	
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Apply one coat plaster primer and two coats Plascon Double velvet

8	On external walls	m2	364	
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ON METAL

Apply one coat Duraphos, one coat Duragrip and two coats Silthane Silk Enamel paint

9	On door frames etc	m2	9	
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DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

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BILLS OF QUANTITIES
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No

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SECTION NO 3

BUILDING WORK

BILL NO 1

FOUNDATIONS

For preambles see "Model Preambles for Trades (2008 Edition)" and Supplementary preambles as specified in the Trades as well as Engineering Specifications attached to these documents.

SUPPLEMENTARY PREAMBLES

In the event of any discrepancy with the 'Model Preambles for Trades', the 'Concrete, Formwork and Reinforcement Specification' shall take precedence.

Nature of ground

Descriptions of excavations shall be deemed to include all ground conditions classifiable as "earth" described in 'The Model Preambles for Trades 2008' and where conditions of a more difficult character are indicated these are separately measured.

Excavations

No allowance is made for bulking in the given quantities for excavated material.

Prices of excavations are to include for putting aside excavated material to be used as filling, as well as forming excavated surfaces to falls, slopes, counters, trimming sides and stepping, levelling and ramming bottoms.

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Building Work
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Foundations

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

BILLS OF QUANTITIES
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Carting away of excavated material

Descriptions of carting away of excavated material shall be deemed to include loading excavated material onto trucks directly from the excavations or, alternatively, from stockpiles situated on the building site.

SITE CLEARANCE, ETC.

Site clearance

1	Digging up and removing rubbish, debris, vegetation, hedges, shrubs and trees not exceeding 200mm girth, bush, etc	m2	568
2	Rip and scarify ground level to a depth of 200mm and consolidate to 93% mod. AASHTO density	m2	568

EXCAVATION, FILLING, ETC

Excavate on earth not exceeding 2m deep

3	Reduced levels under floors	m3	467
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Excavate in earth not exceeding 2m deep below natural, excavated or reduced ground level and depositing excavated material in stock piles on site

4	Holes	m3	35
5	Trenches	m3	494

Extra over trench and hole excavation in earth for excavation in

6	Soft rock	m3	28
7	Hard rock	m3	52

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<u>Extra over all excavations for carting away</u>		
8	Surplus material from excavations and/or stockpiles on site to a dumping site to be located by the contractor.	m3 157
<u>Risk of collapse of excavations</u>		
9	Sides of trench and hole excavations not exceeding 1 500mm deep	m2 1,849
<u>Keeping excavations free of water</u>		
10	Keeping excavations free of all water other than subterranean water	Item
<u>Earth filling obtained from the excavations and/or prescribed stock piles on site compacted to 93% Mod AASHTO density</u>		
11	Over site	m3 236
12	Under floors, steps, paving, etc	m3 215
13	Backfilling to trenches, holes, etc	m3 182
<u>Earth filling (G5 material in accordance with SANAS approved 1200 DM) supplied by the contractor compacted to 95% Mod AASHTO density in layers not exceeding 150mm thick</u>		
14	Under floors, steps, pavings, etc	m3 73
<u>Earth filling (C4 material in accordance with SANAS approved 1200 DM) supplied by the contractor including 3% 32,50 BV cement and compacted to 97% mod. AASHTO density in layers not exceeding 150mm thick</u>		
15	Backfilling to trenches, holes, etc	m3 300

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<u>Compaction of surfaces</u>		
16	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 93% Mod AASHTO density	m2 501
<u>Prescribed density tests on filling</u>		
17	"Mod. AASHTO Density" test	No 25
<u>SOIL POISONING</u>		
<u>Soil insecticide to be executed with SABS compliance by a firm of Specialists under a 5 year guarantee</u>		
18	Under floors etc including forming and poisoning shallow furrows against foundation walls etc, filling in furrows and ramming	m2 501
19	To bottoms and sides of trenches etc	m2 1,380
<u>CONCRETE</u>		
<u>REINFORCED CONCRETE CAST AGAINST EXCAVATED SURFACES</u>		
<u>15MPa/20mm concrete</u>		
20	Surface blinding under footings and bases	m3 17
<u>25MPa/19mm concrete</u>		
21	Strip footings	m3 102
22	Column Bases	m3 2

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TEST BLOCK

23	Making and testing a set of four 150 x 150 150mm concrete strength test cubes per concrete pour, one crushed at 7 days and 3 at 26 days	No	30
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MOVEMENT JOINTS ETC

Two layers of 375 micron "Consol Plastic Brickgrip DPC" in slip joints between horizontal concrete and brick surfaces, including cement mortar bed

24	6mm Joints not exceeding 300mm high	m	319
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SMOOTH FORMWORK (DEGREE OF ACCURACY I)

Smooth formwork to sides

25	230mm Diameter column 5325mm high	No	28
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REINFORCEMENT

Mild steel reinforcement to structural concrete work

26	8mm Diameter bars	t	8.00
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High tensile steel reinforcement to structural concrete work

27	12mm Diameter bars	t	16.56
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28	16mm Diameter bars	t	3.00
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<u>BILL NO 2</u>			
<u>CONCRETE, FORMWORK AND REINFORCEMENT</u>			
<u>SUPPLEMENTARY PREAMBLES</u>			
<u>Cost of tests</u>			
<p>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 architect. The testing shall be undertaken by an independent firm or institution nominated by the contractor and to the approval of the architect. (Test cubes are measured separately)</p>			
<u>Breeze concrete</u>			
<p>Breeze concrete shall consist of twelve parts clean dry furnace ash, free from coal or other foreign matter, to one part cement (12:1), the ash graded up to particles which will pass a 16,5mm ring from a minimum which fails to pass a 4,75mm mesh. The finer materials from the screening are to be first mixed with the cement into a mortar and the ash added afterwards and thoroughly incorporated</p>			
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DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE			

Formwork

Description 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

Formworks to soffits of solid slabs etc shall be deemed to be slabs not exceeding 250mm thick unless otherwise described

Formwork to soffits of slabs, beams, etc shall be deemed to be propped up exceeding 1,5m and not exceeding 3,5m high 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"

LIGHTWEIGHT CONCRETE

Breeze concrete

1	Grading to slabs	m3	13
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Bill No. 2
Concrete, Formwork and Reinforcement

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

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BILLS OF QUANTITIES
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REINFORCED CONCRETE

25MPa/19mm concrete

2	Surface beds cast in panels on waterproofing	m3	73
3	Ramps on waterproofing	m3	3

REINFORCED CONCRETE

25MPa/19mm concrete

4	Columns	m3	17
5	Stairs including landings, beams and inverted beams	m3	8

TEST CUBES

6	Making and testing 150 x 150 x 150mm concrete strength test cube (Provisional)	No	10
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CONCRETE SUNDRIES

Finishing top surfaces of concrete smooth with a wood float/steel trowel

7	Surface beds, slabs, etc	m2	969
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Finishing top surfaces of concrete to an evenly ribbed non slip surface

8	Surface beds, slabs, ramps etc to falls	m2	15
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SMOOTH FORMWORK (DEGREE OF ACCURACY I)

Smooth formwork to soffits

9	Stairs with sloping soffits	m2	5
10	Landings	m2	6

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Concrete, Formwork and Reinforcement

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BILLS OF QUANTITIES
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**SMOOTH FORMWORK (DEGREE OF
ACCURACY II)**

Rough formwork to sides

11	Edges, risers, ends and reveals not exceeding 300mm high or wide	m	306
12	Sloping and stepped outer edges of stairs not exceeding 300mm high extreme	m	120

MOVEMENT JOINTS ETC

Expansion joints with bitumen impregnated softboard between concrete and brickwork

13	10mm Joints not exceeding 300mm high along edges of surface beds	m	64
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Saw cut joints

14	3 x 50mm Deep formed groove with Thioflex sealant	m	54
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REINFORCEMENT (PROVISIONAL)

Mild steel reinforcement to structural concrete work

15	8mm Diameter bars	t	4.00
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High tensile steel reinforcement to structural concrete work

16	10mm Diameter bars	t	5.00
17	12mm Diameter bars	t	6.00
18	16mm Diameter bars	t	3.00
19	20mm Diameter bars	t	4.00
20	25mm Diameter bars	t	7.00

Carried to Collection

Section No. 3
Building Work
Bill No. 2
Concrete, Formwork and Reinforcement

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

R

0256

BILLS OF QUANTITIES
CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
EXISTING HALL AT LIMPOPO TRAFFIC TRAINING COLLEGE

LDPWRI-B/20047

Fabric reinforcement

21	Type 193 fabric reinforcement in concrete surface beds, slabs etc.	m2	467	
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Carried to Collection

R

Section No. 3
 Building Work
 Bill No. 2
 Concrete, Formwork and Reinforcement

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

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BILLS OF QUANTITIES
 CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
 EXISTING HALL AT LIMPOPO TRAFFIC TRAINING COLLEGE
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Item No		Quantity	Rate	Amount
	<u>SECTION NO 3</u>			
	<u>BUILDING WORK</u>			
	<u>PRECAST CONCRETE</u>			
	<u>BILL NO 3</u>			
	For preambles see "Model Preambles for Trades (2008 Edition)" and Supplementary preambles as specified in the Trades			
	<u>PRECAST CONCRETE SLABS</u>			
	<u>"Coreslab" or similar approved Prestress hollow core slabs erected onto brickwork 3,0m above ground level including grouting of longitudinal joints. All in accordance with manufacturers specifications.</u>			
1	150mm deep x 1 200mm wide Prestress hollow core slab not exceeding 7,6m to be designed for a S.I.L. of 4,0kN/m ² .	m2	377	
2	250mm deep x 1 200mm wide Prestress hollow core slab not exceeding 7,6m to be designed for a S.I.L. of 4,0kN/m ² .	m2	71	
	<u>"Coreslab" or similar approved Prestress hollow core slabs erected onto brickwork not exceeding 6,0m above ground level including grouting of longitudinal joints. All in accordance with manufacturers specifications.</u>			
3	150mm deep x 1 200mm wide Prestress hollow core slab not exceeding 7,6m to be designed for a S.I.L. of 4,0kN/m ² .	m2	36	
	Carried to Collection			R
	Section No. 3 Building Work Bill No. 3 Precast Concrete			
	DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE			

0259

BILLS OF QUANTITIES
**CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
EXISTING HALL AT LIMPOPO TRAFFIC TRAINING COLLEGE**

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4	250mm deep x 1 200mm wide Prestress hollow core slab not exceeding 7,6m to be designed for a S.I.L. of 4,0kN/m2.	m2	70
	<u>"Coreslab" or similar approved Prestress hollow core slabs erected onto brickwork not exceeding 9,0m above ground level including grouting of longitudinal joints. All in accordance with manufacturers specifications.</u>		
5	250mm deep x 1 200mm wide Prestress hollow core slab not exceeding 7,6m to be designed for a S.I.L. of 4,0kN/m2.	m2	44
	<u>Precast light grey brushed terrazzo including bedding, jointing and pointing</u>		
6	340 x 220mm High beam finished on both sides and soffit (reinforcement elsewhere)	m	22
7	425 x 220mm High beam finished on both sides and soffit (reinforcement elsewhere)	m	7
8	510 x 220mm High beam finished on both sides and soffit (reinforcement elsewhere)	m	15
	<u>HOLES ETC</u>		
	<u>Core drilling of hole for pipe not exceeding 50mm diameter</u>		
9	250mm Precast concrete slab, beam, wall, etc	No	36
	<u>Core drilling of hole for pipe exceeding 50mm and not exceeding 100mm diameter</u>		
10	250mm Precast concrete slab, beam, wall, etc	No	10
	<u>Core drilling of hole for pipe exceeding 100mm and not exceeding 200mm diameter</u>		
11	250mm Precast concrete slab, beam, wall, etc	No	5

Carried to Collection

Section No. 3
Building Work
Bill No. 3
Precast Concrete

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

R

0260

BILLS OF QUANTITIES
CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
EXISTING HALL AT LIMPOPO TRAFFIC TRAINING COLLEGE

LDPWRI-B/20047

NET SUM

12 Allow net sum of R 85,000-00 for the supply and installation of precast stair case by the specialist

Item

85,000.00

Carried to Collection

R

Section No. 3
 Building Work
 Bill No. 3
 Precast Concrete

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

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BILLS OF QUANTITIES
**CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
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No

Quantity

Rate

Amount

SECTION NO 3

BUILDING WORK

BILL NO 4

MASONRY

For preambles see "Model Preambles for Trades (2008 Edition)" and Supplementary preambles as specified in the Trades as well as Engineering Specifications attached to these documents.

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 wall ties and leaving every fifth perpend of the bottom course of the external skin open as a weep hole

Wall ties shall be vertical twist type wall ties galvanised 750g/m² zinc in accordance to SABS - 1986, and shall be at every 4th brick course at 500mm centres staggered in diamond formation

Carried to Collection

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Section No. 3
Building Work
Bill No. 4
Masonry

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

BILLS OF QUANTITIES
CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
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LDPWRI-B/20047

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

Samples of all masonry building units, except those for walls described as "load bearing", shall consist of a minimum of 6 units. Samples of building units to be used in walls described as "load bearing" shall consist of 30 units from every 30 000 units delivered to site.

Samples

Samples of all masonry building units, shall consist of a minimum of 6 units

BRICKWORK IN SUPER STRUCTURE

Brickwork of NFP bricks in class II mortar

1	Half brick walls	m2	595
2	Half brick walls in beamfilling.	m2	232
3	One brick walls.	m2	1,475

BRICKWORK SUNDRIES

Galvanised hoop iron cramps, ties, etc.

4	30 x 1,2mm Hoop iron 800mm long short fixed to timber purlins and other end built into brickwork	No	350
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Turning pieces

5	230mm Wide turning piece to lintels etc	m	233
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Carried to Collection

Section No. 3
 Building Work
 Bill No. 4
 Masonry

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

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BILLS OF QUANTITIES
CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
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6	110mm Wide turning piece to lintels etc	m	39
<u>Prestressed fabricated lintels</u>			
7	100 x 70mm lintels in lengths not exceeding 1200mm.	m	57
8	100 x 70mm lintels in lengths exceeding 1800mm not exceeding 2100mm.	m	10
<u>Brickwork reinforcement</u>			
9	75mm Wide reinforcement built in horizontally	m	2,686
10	150mm wide reinforcement built in horizontally.	m	5,126
<u>FACE BRICKWORK</u>			
<u>Face bricks Type A (PC sum of R 6000.00 / 1000 VAT excl. supply and delivered to site) pointed with recessed horizontal and vertical joints</u>			
11	Extra over brickwork for face brickwork	m ²	1,017
12	Fair raking cutting	m	62
<u>Brick-on-edge header course copings, sills, etc of "Type B (PC sum of R 6000.00 / 1000" face bricks pointed with recessed joints on all exposed faces</u>			
13	Cut face brick-on-edge external window cill, 180mm wide, set sloping and slightly projecting in cement mortar and pointed on top, front edge and projecting soffit including all necessary fair raking cutting to facings under and fair and fitted ends	m	110
14	Cut face brick-on-edge flat lintel course in cement mortar 230mm wide on soffit and to correspond in height with adjoining facebrick courses including pointing on 110mm wide projecting soffit and one side	m	115

Carried to Collection

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Section No. 3
 Building Work
 Bill No. 4
 Masonry

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

BILLS OF QUANTITIES
**CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
 EXISTING HALL AT LIMPOPO TRAFFIC TRAINING COLLEGE**

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BILLS OF QUANTITIES
**CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
EXISTING HALL AT LIMPOPO TRAFFIC TRAINING COLLEGE**
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Item No		Quantity	Rate	Amount
	<u>SECTION NO 3</u>			
	<u>BUILDING WORK</u>			
	<u>BILL NO 5</u>			
	<u>WATERPROOFING</u>			
	For preambles see "Model Preambles for Trades (2008 Edition)" and Supplementary preambles as specified in the Trades as well as Engineering Specifications attached to these documents.			
	<u>Waterproofing</u>			
	Waterproofing of roofs, basements, etc shall be laid under a ten year guarantee by an approved applicator. Waterproofing to roofs shall be laid to even falls to outlets etc with necessary ridges, hips and valleys. Descriptions of sheet or membrane waterproofing shall be deemed to include additional labour to turn-ups and turn-downs			
	<u>WATERPROOFING TO ROOFS, BASEMENTS, ETC</u>			
	<u>"Derbigum" Special polyster 4mm thick roofing or other approved waterproofing system comprising preparation of surface primer and one layer of 4mm membrane laid on slabs to falls in accordance with the manufacturer's instructions by an approved firm of specialists under a ten year written guarantee, including all cutting and waste, laps, turn-ups and turn-downs, etc. (measured nett)</u>			
1	On flat floors	m2	119	
2	On tops and sides of inverted beams	m2	11	
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	Section No. 3 Building Work Bill No. 5 Waterproofing			
	DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE			

BILLS OF QUANTITIES
 CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
 EXISTING HALL AT LIMPOPO TRAFFIC TRAINING COLLEGE

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3	Additional membrane at 100mm diameter outlet	No	6
<u>PROTECTIVE ROOF PAINT</u>			
<u>Two coats "Silvakote or Similarv Approved" bituminous aluminium paint</u>			
4	On waterproofing to roofs	m2	138
5	On walls	m2	69
<u>DAMP-PROOFING OF WALLS AND FLOORS</u>			
<u>One layer of 375 micron "Consol Plastics Brickgrip DPC or Similar Approved" embossed damp proof course</u>			
6	In walls	m2	77
<u>One layer of 250 micron "Consol Plastic USB Green or Similar Approved" waterproof sheeting sealed at laps with "Gunplas Pressure Sensitive Tape"</u>			
7	Under surface beds	m2	501
<u>JOINT SEALANTS ETC</u>			
<u>Two-part grey polysulphide sealing compound including backing cord, bond breaker, primer, etc</u>			
8	3 x 10mm In vertical expansion joints including raking out expansion joint filler as necessary	m	151
<u>Silicone sealing compound including backing cord, bond breaker, primer, etc</u>			
9	6 x 10mm In expansion joints including raking out of expansion joint filler as necessary	m	47

Carried to Collection

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Section No. 3
 Building Work
 Bill No. 5
 Waterproofing

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

BILLS OF QUANTITIES
**CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
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Building Work

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Waterproofing

COLLECTION

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Building Work

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Waterproofing

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BILLS OF QUANTITIES
**CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
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Item
No

Quantity

Rate

Amount

SECTION NO 3

BUILDING WORK

BILL NO 6

ROOF COVERINGS, ETC

For preambles see "Model Preambles for Trades (2008 Edition)" and Supplementary preambles as specified in the Trades as well as Engineering Specifications attached to these documents.

SUPPLEMENTARY PREAMBLES

All items are measured net unless otherwise described

Flashings, trimming plates, etc.

Prices to include for all cutting and waste and relevant fixing material, unless otherwise described

All rates for flashings, trimmings, etc., to include for forming drips and closed ends to troughs of sheet steel roof covering where applicable

All items are unless otherwise described measured net

Carried to Collection

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Section No. 3
Building Work
Bill No. 6
Roof Coverings, etc

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

PROFILED METAL SHEETING AND ACCESSORIES

0,58mm "Brownbuilt Klip-Lok 700" heavy industrial spelter troughed sheet steel with "Globalcoat" finish one side, fixed to timber purlins complete under a five year guarantee by an approved firm of specialists, all in accordance with the materials supplied and methods employed by the manufacturer

1	Roof coverings with pitches not exceeding 25 degrees	m2	608
2	Aluminium side claddings	m2	123

SHEET METAL FLASHINGS, LININGS, COPINGS, ETC

0,8mm Galvanised sheet iron with "colomet" finish on one side

3	Side wall flashing 550mm girth	m	80
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ROOF INSULATION

4	D&D Roof 135mm thick Starlite® 12kg/m³ density aluminium foil faced roof insulation complying with SANS 428:2012, laid over-purlin directly below the roof sheet on and including 1.6 gauge galvanized or white pvc coated steel straining wire at 300mm centres with all longitudinal flap joints securely stapled, all in accordance with the manufacturer's recommendations.	m2	608
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Carried to Collection

Section No. 3
 Building Work
 Bill No. 6
 Roof Coverings, etc

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

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BILLS OF QUANTITIES
**CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
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BILLS OF QUANTITIES
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Quantity

Rate

Amount

SECTION NO 3

BUILDING WORK

BILL NO 7

CARPENTRY AND JOINERY

For preambles see "Model Preambles for Trades (2008 Edition)" and Supplementary preambles as specified in the Trades as well as Engineering Specifications attached to these documents.

SUPPLEMENTARY PREAMBLES

Particle board:

Particle board shall comply with the following specifications:

- a) SABS 1300 Particle board: exterior and flooring type
- b) SABS 1301 Particle board: interior type

PREFABRICATED ROOF TRUSSES

Pre-fabricated metal connected timber roof trusses

All trusses shall be fabricated by an approved truss manufacturer who holds a current Certificate of Competence awarded by the Institute for Timber Construction

Timber

Timber for trusses to be South African softwood and shall be in accordance with the grades as defined in SABS Specification No 563 or as defined in SABS Specification No 1460

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Section No. 3
 Building Work
 Bill No. 7
 Capentry and Joinery

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

Bolts

Bolts shall be in accordance with BS 4190 or SABS 135

Shear plates, tooth connectors and split rings

Shear plates, tooth connectors and split rings shall be in accordance with BSS 1759 : 1960 and installed in accordance with the CSIR Publication HOUT 468, "The Design, Manufacturing and Erection of Timber Trusses"

Washers

Square or round washers of the following dimensions shall be used with all bolts:

- 1 Bolts up to 8mm diameter:
Washers shall be minimum 25mm wide of minimum 2,50mm thickness
- 2 Bolts up to 12mm diameter:
Washers shall be minimum 36mm wide of minimum 4,00mm thickness
- 3 Bolts up to 20mm diameter:
Washers shall be minimum 60mm wide of minimum 5,00mm thickness

Metal connector plates

Metal connector plates shall be fabricated out of not less than 1mm thick drawn quality galvanised steel

The steel shall have a minimum yield strength of 228MPa and a minimum ultimate tensile strength of 330MPa. The corrosion resisting coating shall be not less than 275g/m² commercial class hot dipped galvanising as per SABS 934 before stamping

All connector plates shall have been tested by the CSIR and be of a size capable of transmitting the forces between members of a truss without exceeding the design values published in the CSIR report

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DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

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Truss construction

Trusses shall be constructed in jigs specially designed to ensure the correct profile, overhangs and cambers

Where metal connector plates are used all joints are to be close fitted butt joints made by precision pressing of the metal connector plates into each side of the joint

Truss design

All trusses shall be designed by a registered Professional Engineer in accordance with SABS 0163 ("Design of Timber Structures") and Code 0160 ("Loadings")

Truss spacing

The truss centres shall be less than or equal to that as described in this bill for each respective truss

Truss pitch

The truss pitch shall be as described in this bill for each respective truss type

Truss loading

Trusses shall be designed for a live load of 0,50kN/m² and dead load as specified under the sub-heading "Specific load specifications for roof trusses"

Shop drawings, design and erection guarantee certificates

It will be expected from the Contractor to timeously prepare, submit and obtain the necessary approvals from the Representative/Agent in respect of the required shop drawings, design and erection guarantee certificates as specified

Carried to Collection

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Building Work
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Carpentry and Joinery

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

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Dimensions

All dimensions given in the descriptions of the trusses are nominal and actual measurements are to be obtained by actual measurements taken on the site before design or fabrication commences

Erection

All trusses are to be hoisted and erected strictly in accordance with the procedures and recommendations of the manual "The Erection and Bracing of Timber roof Trusses" as published by the Institute for Timber Construction and the CSIR, or the SABS Code of Practice "The Design, Manufacture and Erection of Timber Roof Trusses", or as designed and detailed by the designer

Design system

The design system as documented in this bill is based on the "MiTek" system and all references given in the descriptions are related to specific type of trusses based on this design system

However, Contractors are to note that any design system of similar quality may be used subject to the prior written approval of the Representative/Agent

Specific specifications for roof trusses

Unless otherwise described, the following specifications will apply:

- 1 All trusses to be with a 10° pitch
- 2 The dead load consists of corrugated roof sheeting and purlins at approximately 1200mm centres

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Section No. 3
Building Work
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Capentry and Joinery

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

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ROOFS

1 Roof construction to mono pitched roof over L-shaped building with one hipped end and one gable end, the one leg with hipped end over building 9830 long x 36638mm wide extreme, the other leg with gable end over building 33098mm long x 9139mm wide extreme, trusses 730mm high, hoisted approximately 6m high, including 38 x 114mm wall plates, trusses,hip/valley trusses, half trusses, hip trusses, jack trusses, permanent bracing, 50 x 76mm purlins (76 x 76 eaves purlin) and 25 x 152mm gangbaording, 200 x 100mm gasset plate fixed to brick wall including 76 x 76mm steel roof support fixed to gasset plate.(refer to roof plan attached to these bills of quantities)

No 1

Allow for the preparation and submission of the following documents in respect of all buildings

2 Detailed shop drawings indicating truss sizes, truss positions, bracings, details, etc. to be submitted for approval prior the commencement of any fabrication

Item

3 Design certificate indicating the licensed programme used, SABS specifications adhered to, general procedures and loadings adopted, sizes and grading of timber components, details, etc.

Item

4 Erection guarantee certificate after the whole completed roof truss structure have been inspected, all defective work have been taken out and made good, etc. to the full satisfaction of the Representative/Agent

Item

EAVES, VERGES, ETC

"Everite FC77 Similar and approved" pressed fibre-cement

5 15 x 250mm Fascias and barge boards including galvanised steel H-profile jointing strips

m 70

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DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

BILLS OF QUANTITIES
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DOORS ETC

**40mm Solid core flush panel doors with two
concealed edges, 3mm masonite board on both
sides prepared for painting fixed on the steel door
frame. (painting measured some where else)**

6	Door 762 x 2032mm high(3A)	No	22
7	Door 813 x 2032mm high (1A)	No	46
8	Door 914 x 2032mm high (4A)	No	6

Wrought meranti doors hung to steel frames

9	40mm Framed and ledged batten door 813 x 2032mm high of 44 x 100mm top rail and stiles, 22 x 100mm middle and bottom rails, covered on both sides with 6mm plywood with veneer (D3)	No	1
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Wrought meranti doors hung to aluminium frames

10	40mm Framed and ledged batten door 1511 x 2032mm high of 44 x 100mm top rail and stiles, 22 x 100mm middle and bottom rails, covered on both sides with 6mm plywood with veneer (6A)	No	1
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"Bitcon Industries or Similar and approved" fire doors with masonite veneer

11	"Rubidor class B" fire door 813 x 2032mm high including pressed steel frame for one brick wall and preparing frame for lock and door closer	No	4
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SKIRTINGS

Meranti skirting, plugged

12	76 x 22mm Meranti skirting with bullnose edge with and including 19mm quadrant bead	m	351
13	76 x 22mm Skirtings stepped over treads and risers, nailed	m	51

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WINDOW CILLS

Meranti nailed

14	135 x 19mm Meranti timber window cill	m	112	
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SUNDRIES

15	Cut 150mm at the bottom of the 40mm solid core doors	No	8	
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DUCTS COVERS

Closing of drainage pipes alcove's with 38 x 38 SA Pine brandering (painted matt black) on either side of the alcove and 10mm fascia boards screwed to the brandering at 450 centres ensuring the finished face of the fascia board is flush with the face brickwork

16	Closure to 400mm wide x 4850mm high pipe alcove	No	4	
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FITTINGS

Bedroom cupboard of "Novowhite" particle board with six "Salice" hinges, two "Solid No 567" handles, one "Solid No 678" cupboard lock and one 100mm "Solid No 789" brass bolt for double doors

17	Built in Cupboard 1200mm wide x 2100mm high x 616mm deep consisting of shelf section 600mm wide with four shelves, two drawer cabinet on rollers and hanging section 900mm wide with top, sides, bottom, division, shelves, edge strips, etc	No	40	
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 Capentry and Joinery

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

THE FOLLOWING GRANITE TOPS

30mm Thick "Rustenberg Granite" chamfered on all exposed edges and polished on all exposed surfaces and edges, fixed in position with and including all fixing brackets, screws, jointing, pointing, silicone sealing around edges, etc.

18	Vanity top, 600mm wide provided in single lengths to form required shape with and including cut outs to sizes to fit wash hand basin and in positions as indicated on the drawings,	m	32
19	100mm High Splash back fixed to brick wall	m	8
20	225mm x 22mm Thick Saligna trimming fixed to a steel bracket with and including varnish to all exposed surfaces and sealing all around	m	8
21	Mild steel brackets 548mm long x 225mm high overall, comprising of horizontal member 40x40x3mm angle iron 548mm long, two vertical members 40x40x3mm angle iron 225mm long and 100mm long respectively and with diagonal member formed of 40 x 3mm steel flat plate 547mm long, with and including all mitred edges, welding, etc. and vertical member twice holed for and including 8mm diameter expansion anchor bolts bolted to brick wall in position	No	16

KITCHEN CUPBOARDS

Carried to Collection

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Building Work
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Carpentry and Joinery

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

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General notes on kitchen cupboards

Interior carcasses, shelves, bottoms, etc to be 16mm thick interior grade particle board with white "Melamine" decorative laminate to all exposed surfaces. All exposed edges to be fitted with 3.2mm thick white "Masonite" edge strips. Carcasses to be fitted at back with 6mm thick white "Masonite" backing.

All exposed carcasses, sides, etc to be 16mm thick interior grade particle board with "Vancouver Maple Melamine" decorative laminate to all exposed surfaces. All exposed edges to be fitted with 3.2mm thick "Vancouver Maple Masonite" edge strips.

Kickplates to be 16mm thick interior grade particle board with "Supawood Renolite" decorative laminate to all exposed surfaces.

Doors to be 16mm thick interior grade particle board with two long postformed vertical edges with "Supawood or Melamine Renolite" decorative laminate on all surfaces.

Floor units to be supplied and installed complete with tops and kickplates

Tops of floor units to be 32mm thick particle board with one long postformed leading edge and laminated with 1mm "Vancouver Maple Formica" high pressure decorative laminate. Tops for floor units have been measured seperately

All butt edges and edges against walls to be sealed with silicone sealant. Hinges to be "Hettich" type and drawer runners to be of 500mm long metal type "FR602" with nylon runners and minimum 100 000 cycle test guarantee quality and load capacity of of 30kg. All units to supplied and installed complete with approved handles, hinges and other ironmongery.

Carried to Collection

Section No. 3
 Building Work
 Bill No. 7
 Capentry and Joinery

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

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BILLS OF QUANTITIES
**CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
EXISTING HALL AT LIMPOPO TRAFFIC TRAINING COLLEGE**
LDPWRI-B/20047

The following cupboard fittings have been measured as complete units i.e. the components of the units have not been separately measured. The descriptions, therefore, of such units shall be deemed to include all components, assembling, housing, notching, glueing, blocking, planting on and screwing with countersunk screws, edge strips, decorative plastic finish, glass, ironmongery, metalwork, paint or varnish finishes, etc

"Cupboard Connections" or similar approved

22	Sink unit cupboard size 1240 x 600 x 900mm high with sides, bottom, shelf, back and two hinged door	No	4
23	Floor drawer cupboard size 600 x 600 x 900mm high with sides, bottom, back, dividing framework and five drawers	No	4
24	Floor cupboard size 1200 x 600 x 900mm high with sides, bottom, shelf, back, dividing framework, and two hinged doors etc	No	4
25	Wall unit cupboard size 1200 x 300 x 600mm high with sides, bottom, shelf, back, dividing framework, and two hinged doors etc	No	4
26	Wall unit cupboard size 600 x 300 x 600mm high with sides, bottom, shelf, back, dividing framework, and two hinged doors etc	No	4

BOOKSHELF CUPBOARDS

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General notes on cupboards

Interior carcasses, shelves, bottoms, etc to be 16mm thick interior grade particle board with white "Melamine" decorative laminate to all exposed surfaces. All exposed edges to be fitted with 3.2mm thick white "Masonite" edge strips. Carcasses to be fitted at back with 6mm thick white "Masonite" backing.

All exposed carcasses, sides, etc to be 16mm thick interior grade particle board with "Vancouver Maple Melamine" decorative laminate to all exposed surfaces. All exposed edges to be fitted with 3.2mm thick "Vancouver Maple Masonite" edge strips.

Kickplates to be 16mm thick interior grade particle board with "Supawood Renolite" decorative laminate to all exposed surfaces.

Doors to be 16mm thick interior grade particle board with two long postformed vertical edges with "Supawood or Melamine Renolite" decorative laminate on all surfaces.

Floor units to be supplied and installed complete with tops and kickplates

Tops of floor units to be 32mm thick particle board with one long postformed leading edge and laminated with 1mm "Vancouver Maple Formica" high pressure decorative laminate. Tops for floor units have been measured seperately

All butt edges and edges against walls to be sealed with silicone sealant. Hinges to be "Hettich" type and drawer runners to be of 500mm long metal type "FR602" with nylon runners and minimum 100 000 cycle test guarantee quality and load capacity of of 30kg. All units to supplied and installed complete with approved handles, hinges and other ironmongery.

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The following cupboard fittings have been measured as complete units i.e. the components of the units have not been separately measured. The descriptions, therefore, of such units shall be deemed to include all components, assembling, housing, notching, glueing, blocking, planting on and screwing with countersunk screws, edge strips, decorative plastic finish, glass, ironmongery, metalwork, paint or varnish finishes, etc

"Cupboard Connections" or similar approved

27	Bookshelf unit size 1490 x 300 x 2580mm high with four shelves sides, bottom, shelf, back, dividing framework, and two hinged doors, etc with and including fixing brackets	No	20	
28	Wall unit cupboard size 1851 x 300 x 800mm high with sides, bottom, shelf, back, dividing framework, and four hinged doors etc	No	40	
	<u>32mm Thick laminated formica chamfered on all exposed edges and fixed in position with and including all fixing brackets, screws, jointing, pointing, silicone sealing around edges, etc.</u>			
29	Study desk top, 600mm wide provided in single lengths to form required shape with and including fixing in positions as indicated on the drawings,	m	80	

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Item No		Quantity	Rate	Amount
	<u>SECTION NO 3</u>			
	<u>BUILDING WORK</u>			
	<u>BILL NO 8</u>			
	<u>CEILINGS, PARTITIONS AND ACCESS FLOORING.</u>			
	For preambles see "Model Preambles for Trades (2008 Edition)" and Supplementary preambles as specified in the Trades as well as Engineering Specifications attached to these documents.			
	<u>SUPPLEMENTARY PREAMBLES</u>			
	<u>Descriptions</u>			
	Items described as "nailed" shall be deemed to be fixed with hardened steel nails or pins or shot pinned to brickwork or concrete			
	Items described as "plugged" shall be deemed to include screwing to fibre, plastic or metal plugs at not exceeding 600mm centres, and where described as "bolted", the bolts are measured elsewhere			
	<u>CEILING CONSTRUCTION, CORNICES, ETC.</u>			
	<u>Insulation</u>			
1	50mm glass fibre insulation blanket to manufacturer's specification, laid on ceiling.	m2	632	
	<u>Sawn softwood</u>			
2	38 x 114mm Ceiling joists (Provisional)	m	618	
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	Section No. 3 Building Work Bill No. 8 Ceilings, Partitions and Access Flooring			
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BILLS OF QUANTITIES
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	<u>"Rhino or Similar and approved" gypsum plasterboard cornices</u>			
3	75mm Coved cornices	m	874	
	<u>NAILED UP AND SCREWED UP CEILINGS</u>			
	<u>6mm "Everite Nutec or Similar and approved" fibre-cement boards with H-profile primed steel jointing cover strips over joints</u>			
4	Ceilings including 38 x 50mm bandering at 90deg to trusses at maximum centres of 600mm by 32 x 2.5mm long serrated ceiling nails.	m2	488	
5	Extra over ceiling for opening for 610 x 610mm trap door of 50 x 76mm wrought softwood rebated framing with one 38 x 38mm sawn softwood cross brander covered with ceiling board and fitted flush in opening	No	4	
	<u>SUSPENDED CEILINGS</u>			
	<u>BPB Gypsum DonnCeil Soundlite® Coral Fiberglass ceiling tiles size 1200 x 600mm x 15mm thick laid on and including lay in exposed tee suspension ceiling system including Donn® SQ/T38 galvanised main tees, cross tees, hold-down clips, wedges, etc., all suspended with galvanised hangers at centres not exceeding 1200mm.</u>			
6	Horizontal ceilings suspended not exceeding 1m below concrete slab	m2	67	
7	Extra over ceilings for opening for 150mm diameter downlighter (Provisional)	No	15	
8	Extra over ceilings for opening for 600 x 600mm light fitting (Provisional)	No	15	
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	<u>Ceiling boards, installed into ceiling grid consisting of wall angles fixed to perimeter wall using screws and plugs at maximum 400mm centres. main tees t38 cross t-white hangers at 1200mm centres and suspended using 25 x 1mm galvanised strapping, to be fixed underside of the concrete slab using angle cleats 25 x 25 x 25mm long. fix the everite nutec board to the tees using 4mm diameter suspension rod and hook combined with suspension spring clip and t-suspension plate</u>		
9	Horizontal ceilings suspended not exceeding 1m below concrete slab	m2	399
	<u>Cement plastered ceiling board laid on and including lay in exposed tee suspension ceiling system including Donn® SQ/T38 galvanised main tees, cross tees, hold-down clips, wedges, etc., all suspended with galvanised hangers at centres not exceeding 1200mm fixe to concrete.</u>		
10	Horizontal ceilings suspended not exceeding 1m below concrete slab	m2	399
	<u>CORNICES</u>		
	<u>"Donn or Similar and approved" cornices to suspended ceilings</u>		
11	"SM25" pre-painted cornices, nailed	m	262

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	<u>SECTION NO 3</u>			
	<u>BUILDING WORK</u>			
	<u>BILL NO 9</u>			
	<u>IRONMONGERY</u>			
	<u>SUPPLEMENTARY PREAMBLES</u>			
	<u>Descriptions</u>			
	Items described as "plugged" shall be deemed to include screwing to fibre, plastic or metal plugs			
	<u>IRONMONGERY</u>			
	<u>HINGES, BOLTS, ETC</u>			
	<u>"Dorma" or similar and approved</u>			
1	Butt Hinge code EN1935GRD13 SS	No	52	
2	Female fixing screws(4 per pack)	No	53	
3	L+Z Bracket 1200 for EMC1200 ALH	No	2	
4	DWC-006 Indicator bolt with turknob for physically impaired	No	1	
	<u>LOCKS</u>			
	<u>"Dormakaba" or similar and approved</u>			
5	DMWC-SS-008 Bathroom deadlock case dimensions 38mm x 76mm. forend dimensions 78 x 22W. backset 57mm	No	8	
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6	D032D SS-008 Bathroom deadlock case dimensions 102mm x 78mm. forend dimensions 155 x 22W. backset 57mm	No	1
7	D036S SS Cylinder sash lock. case dimension 116.5 x 78mm. forend dimensions 168 x 22W. backset 57mm centre 61mm	No	60
8	DPL1000 GMK 50mm Satin Nickel padlock (Grand master keyed)	No	1
9	EMC 1200-2 ALH Double electromagnetic lock with 1200 IBF (Code:5338N) holding force per magnet, surfaced-mounted, with lock status sensor including red/green LED light indicator(Cod:19860503)	No	2
10	EMC 600 ALH Single electromagnetic lock with 600 IBF (Code:2669N) holding force per magnet, surfaced-mounted, with lock status sensor including red/green LED light indicator(Cod:19860501)	No	4
<u>HANDLES</u>			
<u>"Dormakaba" or similar and approved</u>			
11	DPH301B 325 x 25mm straight tubular pull handle flange fixing	No	2
12	DPH301C BT 149 x 19mm straight tubular pull handle BT	No	8
13	DPH215 BTB 382 x 32mm ss "D" offset tubular pull handle BTB including BTB fixing set	No	4
14	DPH-430-BL Pull handle BT fixed on a 170 x 170 x 1.2mm thick grade 4320 SS plate with no cylinder	No	12
15	DPH301A BTB 325 x 325mm straight tubular pull handle including BTB fixing set	No	4
16	SH875Cyl SS Lever handle on plate with cylinder cutout	No	41

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<u>Sundries</u>				
17	Door stop satin 87001SS	No	52	
18	Hat & coat hook with buffer DHC-SS-031B	No	40	
<u>JOINT COVER ETC</u>				
19	Aluminium structural joint cover with 48mm width fixed to brick wall	m	13	
20	76mm wide aluminium structural floor joint cover with no flange fixed with screws to floors	m	24	
<u>DOOR CLOSERS</u>				
<u>"Dormakaba" or similar and approved</u>				
21	TS92B Silver slide channel door closure	No	16	
22	ITS962-4 NHO En 2-4 Concealed in the door closure-non hold open	No	4	
23	TS73V PA DC/NE 2-4 Silver parallel arm delayed action door closure	No	1	
<u>PUSH PLATES AND KICKING PLATES</u>				
<u>"Union" or similar and approved</u>				
24	900mm wide x 800mm high x 1.2mm thick Grade 304 SS kick plate with 10 counter sunk hole for screw fixing at Paraplegic room	No	3	
25	800mm wide x 300mm high x 1.2mm thick Grade 304 SS kick plate with 10 counter sunk hole for screw fixing at ablutions	No	2	
26	900mm wide x 800mm high x 1.2mm thick Grade 304 SS kick plate with 10 counter sunk hole for screw fixing at Paraplegic room	No	2	
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27	DPP-430-BL 75mm wide x 170mm high x 1.2mm thick Grade 430 SS plate with 4 counter sunk hole for screw fixing	No	8
28	DPP-430-BL 170mm wide x 170mm high x 1.2mm thick Grade 430 SS with 4 counter sunk hole for screw fixing	No	12
<u>BATHROOM FITTINGS</u>			
<u>"Buchel" or similar and approved</u>			
29	19mm Diameter chromium plated towel rail 600mm long including end brackets	No	8
<u>"Kimberly-Clark" or similar and approved</u>			
30	Kimberly-Clark® Professional MR2 Satin finish Stainless Steel toilet tissue dispenser (code: SA426130), overall size 130 x 135 x 256mm high, installed by a Kimberly Clark® installation team.	No	9
31	Kimberly-Clark® Professional Reflex® Hand towel disposer colour White (code: 6959000), overall size 236 x 430 x 241mm high, installed by a Kimberly Clark® installation team.	No	8
32	Kimberly-Clark® Professional Reflex® Disposer waste bin colour White (code: 6993000) installed by a Kimberly Clark® installation team.	No	7

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	<u>"Franke" or similar and approved</u>			
33	Franke HF2400HD 1,2/1,5mm thick satin finished stainless steel automatic hands free hand dryer (Code: 359961), size 280 x 207 x 245mm high with 2 vandal proof lock screws and key wrench, plugged and screwed to the wall with stainless steel screws, 200 W motor connected to 230/240 volt power supply. With 5 year warranty.	No	5	
	<u>LETTERS, NAMEPLATES, ETC</u>			
	<u>"Union" or similar and approved</u>			
34	3mm thick x 32mm wide clear perspex numeral plate reverse engraved and enamelled in two numerals and/or letters, twice countersunk holed for and screwed to door with chromium plated dome headed screws	No	40	
	<u>"Sundries"</u>			
35	150 x 150mm Stainless steel plate engraved with "female" sign (St/Steel)	No	2	
36	150 x 150mm Stainless steel plate engraved with "male" sign (St/Steel)	No	2	
37	150 x 150mm Stainless steel plate engraved with electrical symbol (St/Steel)	No	2	
38	150 x 150mm Stainless steel plate engraved with "running man RH" sign (St/Steel)	No	4	
39	150 x 150mm Stainless steel plate engraved with a "Fire Hose Reel" sign (St/Steel)	No	4	
40	150 x 150mm Stainless steel plate engraved with "Fire Extinguisher" sign (St/Steel)	No	8	
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<u>"Glo Products"</u>		
41	Glo-products photoluminescent escape route signage code E1 size 150mm x 150mm in SABS 1186 certified ABS plastic, with natural anodized aluminium frame, drilled, plugged and fixed with non-corrosive screws	No 6
42	Glo-products photoluminescent fire signage code F2 size 150mm x 150mm in SABS 1186 certified ABS plastic, with natural anodized aluminum frame, drilled, plugged and fixed with non-corrosive screws	No 6
<u>"VAAL PARAGON OR SIMILAR AND APPROVED" GRAB RAILS</u>		
43	32mm Chairman Industries type SR1 back grab rail 800mm long plugged.	No 1
44	32mm Chairman Industries type DL3 side grab rail 900mm long plugged.	No 1
<u>PELMETS AND CURTAIN TRACKS</u>		
<u>"Kirsch" or similar and approved</u>		
45	White regular duty double curtain track fixed to wall including 14 rollers per metre, brackets, stopped ends, etc. all as per manufacturer's specifications	m 112
<u>Windovert or similar and approved roller blind system with aluminium head rail with blackout material</u>		
46	Window blind size 900 x 900mm high	No 2
47	Window blind size 600 x 900mm high	No 16
48	Window blind size 900 x 1500mm high	No 10
49	Window blind size 3938 x 1100mm high	No 4
50	Window blind size 5440 x 1100mm high	No 4

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51	Window blind size 5444 x 1000mm high	No	7
52	Window blind size 3567 x 1000mm high	No	1
<u>STEEL LOCKERS ETC</u>			
<u>Cold rolled steel multi door locker with epoxy powder coated finish</u>			
53	305 x 1752 x 457mm Deep four-door locker with bottom and middle shelf, door handles and latch for padlock, plugged	No	4
<u>PINNING BOARDS, WRITING BOARDS, PROJECTION SCREENS, ETC</u>			
<u>"Vitrex" or similar approved</u>			
54	Vitrex "Code 2309" Pinning board 1200 x 2400mm high plugged	No	4

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<p><u>SECTION NO 3</u></p> <p><u>BUILDING WORK</u></p> <p><u>BILL NO 10</u></p> <p><u>METALWORK</u></p> <p>For preambles see "Model Preambles for Trades (2008 Edition)" and Supplementary preambles as specified in the Trades as well as Engineering Specifications attached to these documents.</p> <p>-----</p> <p><u>SUPPLEMENTARY PREAMBLES</u></p> <p><u>Descriptions</u></p> <p>All dimensions are to be checked on site prior to manufacture</p> <p>Any discrepancies are to be reported to the Architect before manufacture</p> <p>All work to be done in strict accordance with the Engineers specifications</p> <p>Shop drawings are to be submitted to Architects for approval prior to manufacture</p> <p>Contractor can adjust the unit lenghts to suit his manufacturing and transport requirements but must submit to the Architect for approval</p> <p>All welding to be done in strict accordance with SABS codes and done by a qualified and registered welder and to the satisfaction of the Engineer</p> <p style="text-align: right;">Carried to Collection</p> <p>Section No. 3 Building Work Bill No. 10 Metalwork</p> <p>DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE</p>			
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All welding will be subject to random testing and x-rays to the discretion and satisfaction of the Engineer

The Contractor will be required to provide a mock-up sample of a handrail and/or ballustrade

WASHING LINES, DRIERS, ETC

1	50 X 50 X4mm Angle section brackets 1200mm long three times holed	No	8
2	4mm Diameter galvanised steel wire in long lengths tightly	m	48
3	M4 eyebolt fixed to steel bracket.	No	24

STAINLESS STEEL HANDRAILS, BALUSTRADES, ETC

Welded and bolted stainless steel balustrading to stairs

4	50mm External diameter x 2,0mm hollow section rails	m	52
5	50mm Hollow section post fixed to base plate	m	38
6	12mm External diameter x 2,0mm rods	m	60
7	25mm Diameter Thick CHS rails	m	308
8	38mm Diameter brackets with flange core drilled and secured with polyester non-shrink grout into wall at 1200 centres	m	30
9	Extra over for rounded closed end	No	21
10	Extra for rounded bend to 90 degrees over flat edge	No	14

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11	50 x 70 x 5mm Thick plate section fixing plate welded to vertical supports	No	40
12	M6 expansion anchor with bolt	No	160
<u>WELDED SCREENS, GATES, ETC</u>			
<u>Gates to external doors</u>			
13	Gate and frame 1700 x 2980mm high complete	No	1
<u>PRESSED STEEL DOOR FRAMES</u>			
<u>"Durowin or Similar and approved" 1,6mm Double rebated frames suitable for half brick walls</u>			
14	Frame for door 762 x 2032mm high	No	8
15	Frame for door 813 x 2032mm high	No	33
16	Frame for door 914 x 2032mm high	No	2
<u>"Durowin or Similar and approved" 1,6mm Double rebated frames suitable for one brick walls</u>			
17	Frame for door 762 x 2032mm high	No	14
18	Frame for door 813 x 2032mm high	No	13
19	Frame for door 914 x 2032mm high	No	4

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Metalwork

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

**PRESSED STEEL TRANSFORMER ROOM
 DOORS AND FRAMES**

**GALVANIZED PRESSED STEEL
 TRANSFORMER ROOM DOORS AND FRAMES**

20	Double door 1525mm x 2135mm high with louvred ventilation panel on each leaf and double rebated frame suitable for 230mm wall	No	1
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STEEL CANOPIES, ETC.

Canopies formed of 15mm diameter x 2mm thick circular hollow section frame, fixed to wall with and including 80 x 80 x 5mm thick fixing plate bent and chamfered fixed with 4 x M6 bolts, the frame with 45 x 5mm thick flat bar sub-frames in between, and 6mm thick flat bar 100mm wide tapered to 50mm to front to both ends, each 6mm thick flat bar with decorative holes of varying diameters (70mm, 50mm, 30mm, 20mm), the canopy filled in with Type LA Wispeco Louvres and tied to wall with 6mm cable, all as detailed in the Architectural Drawings No 300

21	Canopy size 3078mm x 700mm wide	No	1
22	Canopy size 2351mm x 700mm wide	No	1

ALUMINIUM WINDOWS, DOORS, ETC

AAAMSA guide

All windows, doors, etc shall comply with and meet the minimum recommended performance requirements as set out in the General Specification for Architectural Aluminium and Glass Products (Third Edition) as published by the Association of Architectural Aluminium Manufacturers of South Africa (AAAMSA)

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Finish

The windows, doors, etc shall be natural anodised to a thickness of 25 micron and shall comply with SABS 999 and 1407

Glass

Glazing to be with patent rubber gaskets with glazing beads and comply with BS 952. Thickness of glass shall be in accordance with table 1 (Part N : Glazing). Safety glass shall comply with SABS 1263. The National Building Regulations shall be observed with regard to the specification of safety glass

Design indemnity

The contractor is to submit with his tender the "Form of Indemnity", annexed to this document, fully completed and signed

Drawings

Tenderers are referred to architect's drawings annexed to these bills of quantities for full details of windows, doors, etc

Pricing.

All window prices should include alluminium louvres as shown

General

Workshop drawings to be approved by the architect before manufacture

Carried to Collection

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Ironmongery

Prices for windows shall allow for two standard stainless steel side/top hung friction hinges and one bronze anodised aluminium handle per opening sash. Prices for doors shall allow for two pairs of standard flush bolts to double doors and one-and-a-half pairs of standard hinges per door leaf.

BRONZE ANODISED ALUMINIUM LOUVRE UNITS

23	Louvre unit for 900 x 1200mm high (W08)	No	1
24	Louvre unit for 2400 x 1200mm high (W07)	No	1

Bronze anodised purpose made aluminium windows formed 2.5mm thick shopfront sections and 50mm minimum for aluminium door frames glazed with GSA SmartGlass™ Intruderprufe® Clear laminated safety glass, complying with SANS 1263 Part 1, 2 or 3 with name of the manufacturer permanently marked on each sheet visible after glazing, glazed in accordance with NBR N schedule 1 and SABS 0137 and plugged to brickwork or concrete
Glass Properties :• Shading Coefficient = 0,71 to 1• Light Transmission Level = 61 to 95

25	Window size 600 x 600mm high (W03)	No	14
26	Window size 1200 x 600mm high (W05)	No	8
27	Window size 600 x 900mm high (W06)	No	4
28	Window size 900 x 900mm high (W04)	No	4
29	Window size 1800 x 900mm high (W02)	No	1
30	Window size 900 x 1200mm high (W01)	No	41

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<u>Bronze annodised series 340 aluminium windows, doors, etc including sub-frames, fixing, silicone sealant all round, ironmongery and glazed with 6,4mm GSA SmartGlass™ ArmourLam™ Clear toughened laminated safety glass, complying with SANS 1263 Part 1, 2 or 3 with name of the manufacturer permanently marked on each sheet visible after glazing, glazed in accordance with NBR N schedule 1 and SABS 0137 and signed off by a competent structures or glazing specialist. Glass Properties :• Shading Coefficient = 0,47 to 0,70• Light Transmission Level = 61 to 95</u>		
31	Purpose made aluminium shopfront size 2332 x 1785mm high overall fixed on first floor on top of (SF-1)	No 1
32	Purpose made aluminium shopfront size 2400 x 1785mm high overall fixed on first floor on top of (SF-2)	No 1
33	Purpose made aluminium shopfront size 1120 x 2635mm high overall (SF5)	No 2
34	Purpose made aluminium shopfront size 554 x 5015mm high overall (SF3)	No 1
35	Purpose made aluminium shopfront size 1500 x 5015mm high overall (SF4)	No 1
<u>Bronze annodised series 340 aluminium windows, doors, etc including sub-frames, fixing, silicone sealant all round, ironmongery and glazed with GSA SmartGlass™ Solarshield® S10 Aquamarine laminated reflective coated safety glass, complying with SANS 1263 Part 1, 2 or 3 with name of the manufacturer permanently marked on each sheet visible after glazing, glazed in accordance with NBR N schedule 1 and SABS 0137. Glass Properties :• Shading Coefficient = 0,14 to 0,46• Light Transmission Level = 0 to 30</u>		
36	Purpose made aluminium shopfront and double door, size 2400 x 2400mm high overall and double door size 1500 x 2400mm high (SF-2)	No 1
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37	Purpose made aluminium shopfront and double door, size 2332 x 2635mm high overall with double door 1500 x 2400mm high (SF-1)	No	1	
	<p><u>SHOWER CUBICLE DOORS</u></p> <p><u>"Shower Concepts Elite" or similar approved 6 mm obscured toughened safety glass frameless door with sidelight and return panel shower enclosure 2000mm high, with pair of back to back pull handles code (H 01) and all necessary hinges, clamps and PVC seals and wipes, all set up complete to walls.</u></p>			
38	Pivot door 750 x 2064mm high	No	8	
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Quantity Rate Amount

SECTION NO 3

BILL NO. 11

STRUCTURAL STEELWORK

SUPPLEMENTARY PREAMBLES

Descriptions

Descriptions of bolts shall be deemed to include nuts and washers

Descriptions of L-shaped and U-shaped anchor bolts shall be deemed to include bending, threading, nuts and washers and embedding in concrete

Descriptions of expansion anchors and bolts and chemical anchors and bolts shall be deemed to include nuts, washers and mortices in brickwork or concrete

Descriptions of L-shaped and U-shaped anchor bolts shall be deemed to include bending, threading, nuts and washers and embedding in concrete. Where anchor bolts are described as embedded in sides or soffits of concrete it shall be deemed to include holes through formwork.

Descriptions of expansion anchors and bolts and chemical anchors and bolts shall be deemed to include nuts, washers and mortices in brickwork or concrete.

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 Structural Steel

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Finishing-off painting is to be included into this trade

STEEL COLUMNS AND BEAMS

Welded columns and beams in single lengths with flat section base, top and end plates, bolted to concrete

1	254 x 146mm x 31kg/m I-section columns	t	0.50
2	203 x 203mm x 54kg/m H-section columns	t	0.60

Bolts to columns, beams, etc

3	20mm Diameter holding down bolt approximately 400mm long with 70 x 70x 12mm thick plate at bottom and embedded in concrete.	No	20
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PURLINS, GIRTS, BRACING, ETC

Purlins and girts bolted to steel

4	Lipped channel section purlins	t	0.03
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Welded bracing etc with flat section connection plates bolted to steel

5	Angle section bracing	t	0.04
6	Angle section sag rails	t	0.01

Anchor bolts etc

7	"Hilti" HEA/HAS M16/190 chemical anchor	No	10
8	"Hilti" HEA/HAS M20/190 chemical anchor	No	12

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	<u>BILL NO 12</u>			
	<u>PLASTERING</u>			
	<u>SCREEDS</u>			
	<u>Screeds on concrete</u>			
1	50mm Thick on floors and landings	m2	955	
2	Ditto, but to treads and risers of stairs	m2	53	
	<u>3:1 Cement plaster screeds wood floated on concrete</u>			
3	Average 50mm thick on balconies and roof slabs to falls	m2	152	
4	Average 50mm thick on floors to falls	m2	7	
	<u>GRANOLITHIC</u>			
5	38mm Thick on floors and landings including 50mm grano skirting	m2	34	
	<u>INTERNAL PLASTER</u>			
	<u>Steel troweled cement plaster on brickwork</u>			
6	On walls	m2	2,905	
	<u>Steel troweled cement plaster on concrete</u>			
7	On raking soffits of stairs	m2	51	
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8	On ceilings	m2	598	
	<u>Gypsum skim plaster on concrete</u>			
9	On concrete surface	m2	598	
	<u>Gypsum skim plaster on ceiling</u>			
10	On ceiling	m2	402	
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Plastering

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Building Work

Bill No. 12

Plastering

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Item No		Quantity	Rate	Amount
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	<u>BUILDING WORK</u>			
	<u>BILL NO 13</u>			
	<u>TILING</u>			
	<u>WALL TILING</u>			
	<u>200 x 200 x 10mm Glazed ceramic tiles flush pointed with tinted jointing fixed to cement plaster with plastic nosing at corners (PC R180.00/m2 Vat excl. delivered to site)</u>			
1	On walls	m2	54	
	<u>300 x 600 x 7mm Porcelain wall tiles (PC R250.00/m2 VAT excl.) fixed with adhesive to external cement plaster wall (plaster elsewhere) and flush pointed with tinted waterproof jointing compound</u>			
2	On walls	m2	495	
3	On narrow widths, etc.	m2	7	
4	Fair cutting and fitting around pipe not exceeding 100mm diameter (Provisional)	No	28	
5	Fair cutting and fitting around pipe exceeding 100mm and not exceeding 200mm diameter	No	8	
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FLOOR TILING

600 x 600 x 7mm Porcelain floor tiles (PC R350.00/m2 VAT excl.) fixed with adhesive to cement screed (screed elsewhere) and flush pointed with tinted waterproof jointing compound

6	On floors and landings	m2	955
7	On treads 300mm wide	m	48
8	On risers 180mm high	m	48

60 x 60 x 10mm Thick "Union or similar approved mosaic tiles fixed with adhesive to and including 30mm plaster bedding to falls on concrete and flush pointed with tinted waterproof jointing compound

9	On floors to falls	m2	7
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Sundries

10	Aluminium square edge tile-in stair nosing 8mm high code QEA, with Natural mill colour finish fitted on treads - By Sure Strip Marketing	m	153
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TOILET PAPER HOLDERS ETC

"Vaal or Similar and approved" white glazed ceramic

11	175 x 175mm Semi-recessed toilet paper holder (Code 654010)	No	9
12	170 x 170mm Semi-recessed white soap dish (Code 653110)	No	9

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	<p><u>SECTION NO 3</u></p> <p><u>BUILDING WORK</u></p> <p><u>BILL NO 14</u></p> <p><u>PLUMBING AND DRAINAGE</u></p> <p>For preambles see "Model Preambles for Trades (2008 Edition)" and Supplementary preambles as specified in the Trades</p> <p>-----</p> <p><u>SUPPLEMENTARY PREAMBLES</u></p> <p>Fusion welded bends and tees shall include jointing to pipes with PVC rubber ring double Z joint couplers. Branch tees shall include flanged and bolted joints to "Polycop" branch pipes in addition and for brass compression male iron to copper straight couplers.</p> <p>Reducers shall include jointing to pipes with PVC rubber ring double Z joint couplers and reducers shall be of sufficient overall length to accommodate same. All pipes shall be jointed and fixed strictly in accordance with the manufacturer's instructions. All pipe diameters are nominal external.</p> <p>uPVC pipes and fittings</p> <p>Sewer and drainage pipes and fittings shall be jointed and sealed with butyl rubber rings.</p> <p>Soil, waste and vent pipes and fittings shall be solvent weld jointed or sealed with butyl rubber rings.</p> <p style="text-align: center;">Carried to Collection</p> <p>Section No. 3 Building Work Bill No. 14 Plumbing and Drainage</p> <p>DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE</p>			
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uPVC pressure pipes and fittings

Pipes for water supply shall be of the class stated.

Pipes of 40mm diameter and smaller shall be plain ended with solvent welded uPVC loose sockets and fittings.

Pipes of 50mm diameter and greater shall have sockets and spigots with push-in type integral rubber ring joints. Bends shall be uPVC and all other fittings shall be cast iron, all with similar push-in type joints.

Gratings, covers, etc

Gratings, covers, etc shall be manufactured by "Besaans du Plessis Foundries", unless otherwise described

Sealing of edges

Outer edges of sinks, basins, urinals, etc are to be sealed against adjacent surfaces with "Bayer 400F" silicone

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Copper pipes

Pipes shall be hard drawn and half-hard pipes of the class stated. Class 0 (thin walled hard drawn) pipes shall not be bent. Class 1 (thin walled half-hard), class 2 (half-hard) and class 3 (heavy walled half-hard) pipes shall only be bent with benders with inner and outer formers. Fittings to copper waste, vent and anti-syphon pipes, capillary solder fittings and compression fittings shall be "Cobra Watertech" type. Capillary solder fittings shall comply with ISO 2016. Only compression fittings shall be used in walls or in ground.

Copper pipes are to be installed in accordance with the latest revision of the code of Practice for Copper Plumbing soldering techniques. Flux, solder, etc to be strictly in accordance with the manufacturer's requirements with special attention to copperflux composition

Lead pipes and traps

All soldered joints shall be wiped and brass unions shall be used for jointing lead to steel.

Reducing fittings

Where fittings have reducing ends or branches they are described as "reducing". In the case of pipes with diameters not exceeding 60mm only the largest end or branch size is given. Should the contractor wish to use other fittings and bushes or reducers he may do so on the understanding that no claim in this regard will be entertained. In the case of pipes with diameters exceeding 60mm all sizes are given and no claim for extra bushes, reducers, etc will be entertained.

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Excavations

No claim for rock excavation will be entertained unless the contractor has timeously notified the quantity surveyor thereof prior to backfilling.

"Soft rock" and "hard rock" shall be as defined in "Earthworks".

Fixing of pipes

Unless specifically otherwise stated, descriptions of pipes shall be deemed to include fixing to walls, etc, casting in, building or suspending not exceeding 1m below suspension level

Laying, backfilling, bedding, etc of pipes

Pipes shall be laid and bedded and trenches shall be carefully backfilled in accordance with manufacturers' instructions.

Where no manufacturer's instructions exist pipes shall be laid in accordance with clauses 5.1 and 5.2 of each of the following:

- SABS 1200L : Medium-pressure pipelines
- SABS 1200LD : Sewers
- SABS 1200LE : Stormwater drainage

Pipe trenches etc shall be backfilled in accordance with clauses 3, 5.5, 5.6, 5.7 and 7 of SABS 1200DB : Earthworks (Pipe trenches)

Pipes shall be bedded in accordance with clauses 3.1 to 3.4.1, 5.1 to 5.3 and 7 of SABS 1200LB: Bedding (Pipes)

Unless otherwise described bedding of rigid pipes shall be class B bedding

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Where no manufacturers' instructions exist pipes shall be laid in accordance with clauses 5.1 and 5.2 of each of the following: SABS 1200. L : Medium-pressure pipelines LD : Sewers LE : Stormwater drainage Pipe trenches etc. shall be backfilled in accordance with clauses 3, 5.5, 5.6, 5.7 and 7 of SABS 1200.DB : Earthworks(Pipe trenches)Pipes shall be bedded in accordance with clauses 3.1 to 3.4.1, 5.1 to 5.3 and 7 of SABS 1200.LB : Bedding (Pipes).Unless otherwise described bedding of rigid pipes shall be class B bedding.

General

Descriptions of pipes laid in and including trenches and of inspection chambers, catchpits, etc shall be deemed to include excavation, bedding, backfilling, compaction to a minimum of 93% Modified AASHTO density and disposal of surplus material on site

Descriptions of copper service pipes and flexible connecting pipes shall be deemed to include connections to taps, cisterns, etc and to steel pipes

Descriptions of wc pans, slop hoppers, etc shall be deemed to include joints to soil pipes (pan connectors separately measured)

Flush pans

Flush pans shall have straight or side outlets and "P" or "S" traps as necessary.

Stainless steel basins, sinks, wash troughs, urinals, etc.

Units shall have standard aprons on all exposed edges and tiling keys against walls where applicable.

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Waste unions

Descriptions of waste unions shall be deemed to include rubber or vulcanite plugs and chains fixed to fittings.

Test shall include for the provision of all necessary water, etc. for and testing the whole of the plumbing services as described and in stages as deemed necessary, including chlorination, complete to the satisfaction of the principal agent and the local authority, replace defective work free of charge, including necessary re-testing and leave in perfect condition upon completion

As-built drawings

Where required, the contractor shall at all times keep an updated set of "as-built" drawings. At completion of the contract the contractor shall hand these drawings to the architect for reproducing onto the originals for handing over to the employer (Provision for allowance of as-built drawings elsewhere)

RAINWATER DISPOSAL

0.8mm Galvanised sheet iron with "Chromadek" finish on one side

1	200 x 150mm Box gutter	m	70
2	Extra over 200 x 150mm Deep Box gutter for stopped end	No	4
3	Extra over 200 x 150mm box gutter for outlet for 160mm diameter pipe	No	4
4	110mm Diameter rainwater pipes	m	72
5	Extra over 110 rainwater pipe for shoe	No	4

Cast iron pipes

6	80mm Diameter rainwater pipes	m	48
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<u>Extra over cast iron pipes for fittings</u>				
7	80mm Elbow	No	12	
8	80mm Bend	No	12	
9	80mm Tee	No	6	
10	80mm Junction	No	6	
<u>"Fulbore or Similar and approved" cast iron outlets</u>				
11	Saint Gobain Pipelines South Africa 100mm 90° centre bolt side roof outlet with dome grate code 03585.	No	6	
<u>SANITARY FITTINGS</u>				
<u>White Vitreous China</u>				
12	Vaal Sanitaryware 580 x 510mm concorde vanity ceramic fireclay drop-in-vanity basin colour white with two taphole including integrated overflow and chainstay hole, fitted into opening in vanity top. Sealed silicone sealant where basin rim meets vanity top.	No	16	
13	Vaal Sanitaryware 635 x 485mm Hibiscus White vitreous china vanity basin with universal half pedestal (code 715222) including two semi punched taphole and integrated overflow and chainstay hole, bolted to wall with two 10mm bolts	No	1	
14	Vaal Sanitaryware White vitreous china low level washdown suite comprising 90° outlet pan with enlarged pedestal and matching 9 litre cistern complete with lid, flushpipe and fitments	No	8	
15	Vaal Sanitaryware Protea Paraplegic white vitreous china floor mounted paraplegic washdown suite (product code 7300SC) comprising 90° outlet pan and matching 9 litre cistern, including DPE heavy duty thermoplastic A1 deluxe double flap seat, lid, fitments and purpose-made chromium plated side flush lever.	No	1	
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16	Cobra Watertech exposed urinal chrome plated Junior Flushmaster flushvalve (code: FJ6-000) with non-hold open feature, wall flange and 20mm "Ball-o-Stop" control inlet.	No	8
<u>"Citimetal or Similar and approved" stainless steel</u>			
17	Franke Nouveau Model Nvn611 Grade 304 18/10 polished stainless steel single end bowl inset sink, size 800 x 460mm wide with one 340 x 370 x 149mm deep bowl, fitted onto cupboard (elsewhere specified) including 90mm waste fitting (Code: 300651) and PVC traps (traps elsewhere specified). Sink guaranteed for 25 years against corrosion and supplied with protective plastic coating for transport and handling and to be removed once sink is made operational.	No	4
<u>"VANSTONE" or similar approved</u>			
18	Reinforced concrete double compartment wash trough with outlets and three pedestals size 1400 x 530 x 340mm deep.	No	2
<u>WASTE UNIONS ETC</u>			
<u>"Cobra Watertech or Similar and approved"</u>			
19	38mm "Cobra 301" basin chrome plated unslotted waste and plug with chain	No	16
20	38mm "Cobra 316" unslotted waste and plug with chain	No	4
<u>TRAPS, ETC</u>			
<u>"Cobra Watertech or Similar and approved"</u>			
21	40mm Chrome plated deep seal Bottle trap with outlet of 50mm PVC pipe (Code 340)	No	16
22	40mm Shower trap including stainless steel grating	No	4

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23	Cobra Watertech exposed urinal chrome plated Junior Flushmaster flushvalve (code: FJ6-000) with non-hold open feature, wall flange and 20mm "Ball-o-Stop" control inlet.	No	8
	<u>"Marley or Similar and approved"</u>		
24	40mm Deep seal "P" or "S" trap	No	4
	<u>TAPS, VALVES, ETC</u>		
	<u>"Cobra Watertech or Similar and approved"</u>		
25	"Cobra Ref. 231/350" Angle regulating valve	No	16
26	Cobra Ref 1111-15 CP "Stella" pillar tap	No	16
27	Cobra Watertech Ref. 266/041/10 sink mixer with aerated swivel spout and concealed connection	No	4
28	15mm 181/020/070CP shower mixer	No	8
29	15mm 078CP shower rose	No	8
30	15mm 027CP overhead shower arm	No	8
31	"Cobra watertech" shower column (Cod002/4) with diverter, handshower connection and wall flange	No	1
32	"Cobra watertech" 15mm chrome plated pillar tap(Code: NM-502-21R) with red indice and elbow action lever	No	1
33	"Cobra watertech" 15mm chrome plated pillar tap(Code: NM-502-21B) with blue indice and elbow action lever	No	1
	<u>Brass</u>		
34	22mm Stopcock	No	4
35	22mm Fullway gate valve	No	4

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36	22mm Non-return valve	No	4
37	15mm 1050RB in-line strainer	No	2
38	PA3.132 "Masterflo 1" pressure control valve with vacuum breaker	No	4

WATER SUPPLIES

Class 0 copper pipes

39	15mm Pipes	m	284
40	22mm Pipes	m	192
41	28mm Pipes	m	96

Extra over class 0 copper pipes for capillary fittings

42	15mm Fittings	No	250
43	22mm Fittings	No	201
44	28mm Fittings	No	65

PVC gully

45	110mm Gully trap with O, P, Q or S outlet, plain gully head and grating, jointed to 110mm PVC pipe, including excavated for, bedding on and encasing in concrete 15 MPa / 19mm, not exceeding 0.75m deep to invert	No	2
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Sundries

46	300 x 300 x 50mm Precast concrete inspection eye marker slab set in ground	No	2
47	100mm Cast iron "ABC" cleaning eye	No	2
48	Type 3B cast iron valve box	No	2

Carried to Collection

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DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

TESTING

49 Testing water pipe system

Item

ELECTRIC WATER HEATERS

"Kwikot or Similar and approved"

50 10 Litre "Kwikot 2000" under-basin electric water heater fitted to manufacturer's instructions and specifications

No

4

51 "Kwikot Megaflor" 100 Litre Slimline 600 Dual electric water heater (Code : ESG-100) complying with SABS 151-2002, overall size 990 x 480mm high, operating at 400kPa with temperature and pressure safety relief valve including 20mm female draincock with inlet compression. Geyser to be installed horizontally in roof space with 1160 x 560mm wide polyethylene drip tray with union and back nut connected to 20mm PVC overflow pipe taken out at eaves (Code : GSTP-1200) and 15mm pipe work including two 15mm vacuum breakers (Code : KHN4.150CX) installed on hot and cold water supply. Installation to include a 15mm 400kPa Kwikot Mono control and expansion relief valve (Code : KHN3.104), all in accordance with SANS 10254, connected to single phase electrical power supply with isolator 1m away from connection on geyser.

No

1

SOIL DRAINAGE

"Geberit or Similar and approved" Underground drain pipes including couplings in the running lengths

52 110mm Pipes laid in and including trenches not exceeding 1m deep

m

110

53 160mm Pipes laid in and including trenches not exceeding 1m deep

m

450

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EXISTING HALL AT LIMPOPO TRAFFIC TRAINING COLLEGE

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<u>Extra over Geberit pipes for fittings</u>			
54	110mm Bend	No	11
55	160mm Bend	No	15
56	110mm Junction	No	2
57	160mm Junction	No	12
58	110mm Access junction	No	2
59	160mm Access junction	No	16
<u>Precast concrete circular inspection chambers including precast concrete cover slabs (covers elsewhere) and channels in benching</u>			
60	Inspection chamber 1000mm diameter exceeding 1000mm and not exceeding 1500mm deep internally	No	3
61	Inspection chamber 1000mm diameter exceeding 1000mm and not exceeding 2000mm deep internally	No	3
62	Double bowl precast water trough fixed to brick wall	No	2
<u>Covers, etc</u>			
63	600 x 650mm x 74kg Type 8A cast iron double seal manhole cover and frame	No	6
<u>SANITARY PLUMBING</u>			
<u>Extra heavy duty structured wall Geberit sewer pipes to SANS 1601</u>			
64	50mm Pipes	m	20
65	110mm Pipes	m	61
Carried to Collection			
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BILLS OF QUANTITIES
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**Extra over extra heavy duty structured wall Geberit
sewer pipes to SANS 1601 for fittings**

66	50mm Access bend	No	7
67	110mm Access bend	No	6
68	110mm Bend	No	8
69	110mm Pan connector	No	9
70	50mm BSP adaptor	No	16
71	50mm Bend	No	16
72	50mm Junction	No	16
73	110mm Reducing junction	No	6
74	110mm Access bend	No	8
75	110mm Double junction	No	16
76	110mm Access junction	No	9
77	110mm "GI Two-way" vent valve	No	9

TESTING

78	Testing waste pipe system		Item
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FIRE APPLIANCES ETC

'Chubb'

79	9kg Dry chemical powder fire extinguisher, including standard hard wood backing plugged and backing finished with one coat dark stain and two coats clear suede polyurethane varnish	No	8
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BILLS OF QUANTITIES
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80	"Everyway" hose reel complete with 30m plastic hose, chromium plated stopcock, shut-off nozzle and wall bracket	No	2	
	<u>Fire hydrant pedestals</u>			
81	Unreinforced concrete hydrant pedestal 900mm high cast around vertical pipe with bottom 300mm below ground, 300 x 300mm square at base and tapering to octagonal shaped top 200 x 200mm overall including necessary excavation, formwork and two coats of paint to exposed surfaces	No	2	
	<u>WATER SUPPLIES TO FIRE APPLIANCES</u>			
82	63mm Pipes laid in and including trenches not exceeding 1m deep	m	250	
83	100mm Pipes laid in and including trenches not exceeding 1m deep	m	210	
	<u>Extra over class 12 uPVC pressure pipes for fittings with solvent welded joints</u>			
84	110mm Junction	No	4	
85	63mm Bend	No	10	
86	110mm Bend	No	4	
	<u>Galvanised steel pipes</u>			
87	80mm Pipes	m	12	
	<u>Extra over galvanised steel pipes for steel fittings</u>			
88	110mm Bush	No	2	

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VALVES, ETC.

"Cobra Watertech or Similar approved"

89	Cobra Watertech 100mm BSP parallel threaded F x F Cobra cast brass light duty fullway gate valve with non-blowout, non rising spindle, non-asbestos gland packing, guided wedge and red pressed steel hand wheel (Code: 1002-125-100mm).	No	2
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HYDRANTS

90	80 x 65mm Brass right angle hydrant valve with cap and chain	No	2
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SUNDRIES

91	Unreinforced concrete encasing to 110mm horizontal pipe	m	10
92	Unreinforced concrete encasing to 110mm vertical bend	No	2
93	Cutting into existing 160mm drain pipe for and forming junction with 110mm pipe	No	1

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	<u>BILL NO. 15</u>			
	<u>GLAZING</u>			
	For preambles see "Model Preambles for Trades (2008 Edition)" and Supplementary preambles as specified in the Trades			
	<u>GLAZING TO ALUMINIUM WITH SCREWED ON BEADS</u>			
	<u>4mm Clear float glass</u>			
1	Panes exceeding 0,5m2 and not exceeding 2m2	m2	14	
	<u>4mm Obscure glass</u>			
2	Panes exceeding 0,1m2 and not exceeding 0,5m2	m2	9	
	<u>6mm "Fadaban or Simila and approved" normal strength clear laminated safety glass</u>			
3	Panes exceeding 2m2 and not exceeding 4m2	m2	4	
4	Panes exceeding 4m2 and not exceeding 6m2	m2	61	
	<u>MIRRORS, ETC</u>			
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BILLS OF QUANTITIES
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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

5	Mirror 300 x 450mm high with four brass screws	No	8
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Carried to Collection

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 Bill No. 15
 Glazing

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	<u>BILL NO 16</u>			
	<u>PAINTWORK</u>			
	For preambles see "Model Preambles for Trades (2008 Edition)" and Supplementary preambles as specified in the Trades as well as Engineering Specifications attached to these documents.			
	<u>SUPPLEMENTARY PREAMBLES</u>			
	<u>PAINTWORK, ETC TO NEW WORK ON</u>			
	<u>ON FLOATED PLASTER</u>			
	<u>Apply one coat plaster primer and two coats Plascon Double velvet</u>			
1	On internal walls	m2	2,774	
	<u>Apply one coat plaster primer and two coats Plascon Double velvet</u>			
2	On external walls	m2	77	
	<u>ON SMOOTH CONCRETE</u>			
	<u>Apply one coat plaster primer and two coats Plascon Double velvet</u>			
3	On concrete soffits	m2	152	
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	Section No. 3 Building Work Bill No. 16 Paintwork			
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ON PLASTER BOARD

Plascon Polvin Super Acrylic to interior new rhinolite (NW 462).Surface to be dry, sound and free of dirt and loose particles. Wipe down with a damp cloth and allow to dry completely. Prime with one coat of Plascon Plaster Primer (UC 56) with an overcoating time of 16 hours and finish with two coats of Polvin Super Acrylic (EPL) with 1 hour drying time between coats, for a maintenance cycle of 5 years in a C1 - inland environment.

4	On ceilings and cornices	m2	887
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Plascon Sure Coat Gloss Enamel to exterior new fibre cement (NW 174).Surface to be dry, sound and clean, with a moisture content, measured with a Doser Hygrometer (or equivalent), of BD 2 scale - 8% or less. Prime with one coat of Plascon Plaster Primer (UC 56) with an overcoating time of 16 hours and finish with two coats of Sure Coat Gloss Enamel (SGE) with 16 hours drying time between coats, for a maintenance cycle of 2 years in a C1 - inland environment.

5	On fascias and barge boards	m2	18
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ON METAL

One coat alkyd based universal undercoat and one coat superior quality universal enamel paint

6	On door frames etc	m2	53
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7	On gates, grilles, burglar screens, balustrading, etc (both sides measured over the full flat area)	m2	57
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8	On steel mesh, etc (both sides measured over the full flat area)	m2	45
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	<u>Spot priming defects in pre-primed surfaces with red oxide metal primer, one coat universal undercoat and two coats "Super Universal Enamel" paint (NY-1/G) on steel</u>		
9	On members of lattice columns and beams	m2	50
	<u>ON TIMBER</u>		
	<u>Stop, fill, sand down and prepare wood surfaces. Apply one coat Plascon Wood Primer, one coat Plascon Universal Undercoat and two coats Plascon Super Universal Enamel paint</u>		
10	On doors	m2	277
	<u>Prepare and apply three coats polyurethane suede varnish, lightly sanded between applications</u>		
11	On skirtings, rails, cornices etc not exceeding 300 mm girth	m	351
12	On window sills not exceeding 300 mm girth	m	112

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Paintwork

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	<p><u>SECTION NO. 4</u></p> <p><u>BILL NO. 1</u></p> <p><u>EARTHWORKS (PROVISIONAL)</u></p> <p>For preambles see "Model Preambles for Trades (2008 Edition)" and Supplementary preambles as specified in the Trades as well as Engineering Specifications attached to these documents.</p> <p><u>EARTHWORKS (PROVISIONAL)</u></p> <p><u>SUPPLEMENTARY PREAMBLES</u></p> <p><u>NOTE</u></p> <p>All earthworks shall comply with the requirements of the latest relevant SABS 1200 Specifications: 1200C; 1200D;1200DM</p> <p><u>Nature of ground</u></p> <p>The nature of the ground is assumed to be gravel, therefore "earth", but possibly interspersed with soft rock</p> <p><u>Specific Requirements of imported G6 material</u></p> <p>The imported material must conform to the following criteria:</p> <p>(1) Minimum CBR at 93% Mod. AASHTO Density: 15 (2) Minimum swell at 100% Mod. AASHTO Density: 1,5% (3) Maximum PI: 12 (4) Maximum size particles in material: 63mm (5) Grading modulus: $2,7 \geq GM \geq 0,75$</p> <p style="text-align: center;">Carried to Collection</p> <p>Section No. 4 External works Bill No. 1 Bulk Earthworks</p> <p>DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE</p>			
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BILLS OF QUANTITIES

**CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
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	<u>Carting away of excavated material</u>			
	Descriptions of carting away of excavated material shall be deemed to include loading excavated material onto trucks directly from the excavations or, alternatively, from stock piles situated on the building site			
	<u>SITE CLEARANCE, ETC.</u>			
	<u>Site clearance</u>			
1	Digging up and removing rubbish, debris, vegetation, hedges, shrubs and trees not exceeding 200mm girth, bush, etc	m2	2,000	
2	Rip and scarify ground level to a depth of 200mm and consolidate to 93% mod. AASHTO density	m2	2,000	
	<u>BULK EXCAVATION, FILLING, ETC</u>			
	<u>Open face excavation in earth over sloping site</u>			
3	Open face excavation	m3	1,000	
	<u>Extra over bulk excavation in earth for excavation in</u>			
4	Soft rock	m3	100	
5	Hard rock	m3	50	
	<u>Extra over all excavations for carting away</u>			
6	Surplus material from excavations and/or stock piles on site to a dumping site to be located by the contractor	m3	600	
	<u>Risk of collapse of excavations</u>			
7	Sides of trench and hole excavations not exceeding 1 500mm deep	m2	1,000	
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**CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
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	<u>Keeping excavations free of water</u>			
8	Keeping excavations free of all water other than subterranean water	Item		
	<u>Earth filling supplied by the contractor compacted to 95% Mod AASHTO density</u>			
	The following to be natural selected gravel layers evenly spread and consolidated in layers and dimensions as specified and on the drawings. All thicknesses to be consolidated thicknesses.			
	Where described as "imported" the gravel to be supplied and carted on by the contractor from an approved borrow pit			
9	Earth filling obtained from excavations compacted to 95% Mod AASHTO density	m3	1,400	
	<u>Prescribed density tests on filling</u>			
10	"Modified AASHTO Density" test	No	20	
11	Maximum dry density and optimum moisture content (MOD)	No	20	
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Item No		Quantity	Rate	Amount
	<u>SECTION NO.4</u>			
	<u>BILL NO.2</u>			
	<u>FOUNDATIONS</u>			
	<u>EXCAVATION, FILLING, ETC</u>			
	<u>Site clearance</u>			
1	Digging up and removing rubbish, debris, vegetation, hedges, shrubs and trees not exceeding 200mm girth, bush, etc	m2	34	
2	Rip and scarify ground level to a depth of 200mm and consolidate to 93% mod. AASHTO density	m2	34	
	<u>Excavation in earth not exceeding 2m deep</u>			
3	Trenches	m3	16	
	<u>Extra over trench and hole excavations in earth for excavation in</u>			
4	Soft rock	m3	2	
5	Hard rock	m3	1	
	<u>Extra over all excavations for carting away</u>			
6	Surplus material from excavations on site to a dumping site to be located by the contractor	m3	7	
	<u>Risk of collapse of excavations</u>			
7	Sides of trench and hole excavations not exceeding 1,5m deep	m2	39	
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<u>Keeping excavations free of water</u>		
8	Keeping excavations free of all water other than subterranean water	Item
<u>Earth filling obtained from the excavations and /or prescribed stock piles on site including compacted to 93% Mod AASHTO density</u>		
9	Backfilling to trenches, holes, etc	m3 17
10	Under floors, steps, paving etc.	m3 3
<u>Compaction of surfaces</u>		
11	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 93% Mod AASHTO density	m2 18
<u>Prescribed density tests on filling</u>		
12	"Modified AASHTO Density" test	No 5
<u>SOIL POISONING</u>		
<u>Weedkiller mixed in accordance to supplier's specifications</u>		
13	To bottoms and sides of trenches, etc.	m2 55
14	Under floors etc, including forming and poisoning shallow furrows against foundation walls etc, filling in furrows and ramming	m2 18

CONCRETE, FORMWORK AND REINFORCEMENT

UNREINFORCED CONCRETE CAST AGAINST EXCAVATED SURFACES

Carried to Collection

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	<u>15MPa/19mm concrete</u>			
15	Surface blinding under footings and bases	m3	1	
	<u>REINFORCED CONCRETE</u>			
	<u>30MPa/19mm concrete</u>			
	<u>REINFORCED CONCRETE CAST AGAINST EXCAVATED SURFACES</u>			
	<u>25MPa/19mm concrete</u>			
16	Strip footings	m3	4	
	<u>TEST CUBES</u>			
17	Allow for preparing a set of three concrete strength test cubes, each size 150 x 150 x 150mm, sending them to an approved Testing Laboratory for testing and paying all charges in connection therewith.	Sets	5	
	<u>BRICKWORK IN FOUNDATIONS</u>			
	<u>Brickwork of NFP bricks in class II mortar</u>			
18	One brick walls	m2	15	
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<u>BRICKWORK SUNDRIES</u>		
<u>Brickwork reinforcement</u>		
19	150mm Wide reinforcement built in horizontally	m 83
<u>CONCRETE, FORMWORK AND REINFORCEMENT</u>		
<u>REINFORCED CONCRETE</u>		
<u>15MPa/19mm concrete</u>		
20	Surface beds cast in panels on waterproofing.	m3 2
<u>TEST CUBES</u>		
21	Allow for preparing a set of three concrete strength test cubes, each size 150 x 150 x 150mm, sending them to an approved Testing Laboratory for testing and paying all charges in connection therewith. (Provisional)	Sets 4.0
<u>CONCRETE SUNDRIES</u>		
<u>Finishing top surfaces of concrete smooth with a steel trowel</u>		
22	Surface beds, slabs, etc	m2 18
<u>Fabric reinforcement</u>		
23	Steeledale Mesh standard square fabric mesh, nominal mass 3,95 kg/m ² with nominal 5,6mm thick wires and 200 x 200mm pitch (code 399), complying with SANS 1024/2006 requirements, in sheets 2,4 x 6m long.	m2 18
<u>MASONRY</u>		
<u>SUPERSTRUCTURE</u>		
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BILLS OF QUANTITIES
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EXISTING HALL AT LIMPOPO TRAFFIC TRAINING COLLEGE**

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<u>Brickwork of NFP bricks in class II mortar</u>			
24	Half brick walls in beamfilling.	m2	2
25	One brick walls	m2	51
<u>Brick-on-edge header course copings, sills, etc of face bricks(Purchase price of R4 000,00/1000 VAT excl. delivered to site) pointed with recessed joints on all exposed faces</u>			
26	220mm Wide sill set sloping and slightly protecting outside	m	1
<u>BRICKWORK SUNDRIES</u>			
<u>Brickwork reinforcement</u>			
27	75mm Wide reinforcement built in horizontally	m	7
28	150mm Wide reinforcement built in horizontally	m	187
<u>Galvanised hoop iron cramps, ties, etc</u>			
29	30 x 1,6mm Roof tie 1,5m long with one end fixed to timber and other end built into brickwork	No	20
<u>"Allied Concrete" or similar approved prestressed fabricated lintels</u>			
30	110 x 75mm Lintels in lengths not exceeding 3m	m	3
<u>NUTEC-CEMENT/FIBRE-CEMENT WINDOW SILLS</u>			
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	<u>Nutec window internal sill, size 150mm x 15mm thick, manufactured in accordance with SANS 803:2005 and installed below window with window sill lug screwed to underside of sill at 400mm centres, minimum of 75mm from end of window sill and bedded in Class II mortar with plastic slip joints at end of sills at plaster reveals and projecting from the finished face of wall, all in accordance with the manufacturer's recommendations.</u>		
31	15mm x 150mm Wide sills set flat and slightly projecting	m	1
	<u>WATERPROOFING</u>		
	<u>DAMP-PROOFING OF WALLS AND FLOORS</u>		
	<u>One layer of 375 micron Consol Plastic Brikqrip DPC" embossed damp proof course</u>		
32	In walls	m2	5
	<u>One layer of 250 micron "Consol Plastic USB Green" waterproof sheeting sealed at laps with "Gunplas Pressure Sensitive Tape"</u>		
33	Under surface beds	m2	18
	<u>ROOF COVERINGS ETC</u>		
	<u>PROFILED METAL SHEETING AND ACCESSORIES</u>		
	<u>0,6mm "IBR" Z275 spelter galvanised troughed sheet steel in single lengths fixed to timber purlins and 0,6mm galvanised sheet steel accessories</u>		
34	Roof covering with pitch not exceeding 50 degrees	m2	23
35	Counter flashing girth 185mm counter flash (Code: FK77), fixed in accordance with manufacturer's specifications.	m	6

Carried to Collection

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Section No. 4
 External works
 Bill No. 2
 Pump House

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

BILLS OF QUANTITIES
**CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
EXISTING HALL AT LIMPOPO TRAFFIC TRAINING COLLEGE**

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CARPENTRY AND JOINERY

ROOFS

36	Complete supply and erection of 22m2 mono pitched timber roof including wall plates, trusses, jack rafters, permanent bracing and 50 x 76mm purlins, etc. all as per the drawings attached to these bills of quantities	No	1
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Allow for the preparation and submission of the following documents in respect of all buildings

37	Detailed shop drawings indicating truss sizes, truss positions, bracings, details, etc. to be submitted for approval prior the commencement of any fabrication		Item
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38	Design certificate indicating the licensed programme used, SABS specifications adhered to, general procedures and loadings adopted, sizes and grading of timber components, details, etc.		Item
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39	Erection guarantee certificate after the whole completed roof truss structure have been inspected, all defective work have been taken out and made good, etc. to the full satisfaction of the Representative/Agent		Item
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EAVES, VERGES, ETC

"Everite FC77" pressed fibre-cement

40	15 x 250mm Fascias and barge boards including galvanised steel H-profile jointing strips	m	6
----	--	---	---

METALWORK

GALVANIZED PRESSED STEEL DOOR FRAMES

0.88mm Zinc coated Combi standard steel door

41	Double door 1550 x 2032mm high including door louvres	No	1
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DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

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<u>Standard residential windows with burglar bars to all sashes</u>			
42	Window 1022 x 600mm high	No	1
<u>PLASTERING</u>			
<u>SCREEDS</u>			
<u>Screeds on concrete</u>			
43	30mm Thick on floors	m2	18
<u>INTERNAL PLASTER</u>			
<u>Cement plaster on brickwork</u>			
44	On walls	m2	51
45	On narrow widths	m2	1
<u>EXTERNAL PLASTER</u>			
<u>Cement plaster on brickwork</u>			
46	On walls	m2	51
<u>GLAZING</u>			
<u>GLAZING TO STEEL WITH PUTTY</u>			
47	Panes exceeding 0,5m2 and not exceeding 2m2	m2	1
<u>PAINTWORK</u>			
<u>PAINTWORK ETC TO NEW WORK</u>			
<u>ON FLOATED PLASTER</u>			

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<u>Apply one coat plaster primer and two coats Plascon Double velvet</u>		
48	On internal walls	m2 51
<u>Apply one coat plaster primer and two coats Plascon Double velvet</u>		
49	On external walls	m2 51
<u>ON FIBRE-CEMENT</u>		
<u>Plascon Polvin Super Acrylic to interior new rhinolite (NW 462).Surface to be dry, sound and free of dirt and loose particles. Wipe down with a damp cloth and allow to dry completely. Prime with one coat of Plascon Plaster Primer (UC 56) with an overcoating time of 16 hours and finish with two coats of Polvin Super Acrylic (EPL) with 1 hour drying time between coats, for a maintenance cycle of 5 years in a C1 - inland environment.</u>		
50	On fascias and barge boards	m2 2
51	On window sills not exceeding 300 mm girth	m 2
<u>ON METAL</u>		
<u>One coat alkyd based universal undercoat and one coat superior quality universal enamel paint</u>		
52	On door frames	m2 1
53	On door	m2 7
54	On windows with burglar bars	m2 1

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COLLECTION

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BILLS OF QUANTITIES
 CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
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Item No		Quantity	Rate	Amount
	<u>SECTION NO. 4</u>			
	<u>BILL NO.3</u>			
	<u>STORMWATER DRAINAGE</u>			
	<u>Excavation in earth not exceeding 2m deep</u>			
1	Trenches	m3	10	
	<u>Extra over trench and hole excavation in earth for excavation in</u>			
2	Soft rock	m3	2	
3	Hard rock	m3	1	
	<u>Extra over all excavations for carting away</u>			
4	Surplus material from excavations and/or stockpiles on site to a dumping site to be located by the contractor.	m3	4	
	<u>Keeping excavations free of water</u>			
5	Keeping excavations free of all water other than subterranean water		Item	
	<u>Earth filling obtained from the excavations and/or prescribed stock piles on site compacted to 93% Mod AASHTO density</u>			
6	Under floors, steps, paving, etc	m3	23	
	<u>REINFORCED CONCRETE</u>			
	<u>25MPa/19mm concrete</u>			
7	V-Channel	m3	13	
	<u>CONCRETE SUNDRIES</u>			
	Carried to Collection			R
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BILLS OF QUANTITIES
**CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
 EXISTING HALL AT LIMPOPO TRAFFIC TRAINING COLLEGE**

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<u>Finishing top surfaces of concrete smooth with a wood float/steel trowel</u>				
8	Surface beds, slabs, etc	m2	75	
<u>SMOOTH FORMWORK (DEGREE OF ACCURACY II)</u>				
<u>Rough formwork to sides</u>				
9	Edges, risers, ends and reveals not exceeding 300mm high or wide	m	200	
<u>Fabric reinforcement</u>				
10	Type 193 fabric reinforcement in concrete surface beds, slabs etc.	m2	75	
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EXISTING HALL AT LIMPOPO TRAFFIC TRAINING COLLEGE

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Item No		Quantity	Rate	Amount
	<u>SECTION NO. 4</u>			
	<u>BILL NO. 4</u>			
	<u>APRONS AROUND BUILDINGS</u>			
	<u>Compaction of surfaces</u>			
1	Compaction of ground surface under aprons including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to 90% Mod AASHTO density	m2	234	
	<u>15 MPa/20 mm concrete</u>			
2	Aprons cast in panels to falls	m3	33	
3	Stormwater channel cast in panels	m3	23	
	<u>Finishing top surfaces of concrete smooth with a wood float</u>			
4	Aprons to falls	m2	234	
	<u>Grooves, channels, mortices, sinkings, etc. in concrete</u>			
5	Segmental channel with radius 290mm minimum depth of 100mm on top of concrete	m	64	
	<u>Smooth formwork to sides</u>			
6	Edges, risers, ends and reveals not exceeding 300mm high or wide	m	64	
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	DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE			

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Item No		Quantity	Rate	Amount
	<u>SECTION NO 4</u>			
	<u>BILL NO 5</u>			
	<u>SITE WORKS</u>			
	<u>PARKING AND PAVINGS</u>			
	<u>Materials and workmanship must be in accordance to the following SABS 1200 specifications:</u>			
	C	- Site clearance		
	D	- Earthworks		
	DM	- Earthworks (Roads, subgrade)		
	M	- Roads (General)		
	ME	- Sub-base		
	MF	- Base		
	MK	- Kerb and Channeling		
	MM	- Ancillary Roadworks		
	<u>EARTHWORKS</u>			
	<u>Excavations</u>			
	<u>Site clearance</u>			
1	Digging up and removing rubbish, debris, vegetation, hedges, shrubs and trees not exceeding 200mm girth, bush, etc for paving and bulk site clearance	m2	1,100	
2	Rip and scarify ground level to a depth of 150mm and consolidate to 90% mod. AASHTO density (minimum CBR 3)	m2	1,100	
3	Excavate in pickable earth to reduce ground level below paving and set aside for later use	m3	220	
4	Ditto, but cart away excavated material to a dumping place to be found by the contractor (cut to spoil)	m3	220	
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BILLS OF QUANTITIES
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5	Extra over excavation for excavation in soft rock	m3	20
6	Ditto, but in hard rock	m3	10
<u>Earth filling supplied by the contractor under pavings etc</u>			
The following to be natural selected gravel layers evenly spread and consolidated in layers and dimensions as specified and on the drawings. All thicknesses to be consolidated thicknesses.			
Where described as "imported" the gravel to be supplied and carted on by the contractor from an approved borrow pit			
7	Over site of G6 material in accordance with SABS 1200 DM compacted to 95% Mod AASHTO density	m3	165
8	150mm Imported G7 material compacted to 95% mod. AASHTO density	m3	165
9	150mm Imported C4 material with and including 3% 32,50 BV cement and consolidated to 97% mod. AASHTO density	m3	165
<u>Compaction of surfaces</u>			
10	Compaction of ground surface under parking areas etc by wetting and compacting	m2	42
11	Compaction of ground surface under pavings 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	1,100
<u>Prescribed density tests on filling</u>			
12	In-situ dry density (sand replacement) test in accordance with method A10 (a) of TMH 1	No	5

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Paving and Carports

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BILLS OF QUANTITIES

**CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
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13	25mm Thick layer clean,dry, riversand layer treated with an approved weed killer at the rate of 50 grams per square metre,spread and levelled to receive paving blocks (elsewhere measured)	m2	1,100	
14	Tests to determine the degree of comapction, etc of ground filling.	No	2	
<u>PAVING</u>				
<u>Interlocking Pavings</u>				
15	80mm Thick double interlocking (DZZ) precast grey coloured concrete paving blocks laid in a herringbone pattern on and including 25mm sand founding layer and covered with sandlayer and sweep into joints	m2	1,100	
16	Circular cutting to paving	m	140	
<u>Kerbs, etc</u>				
17	Precast concrete figure 7 mountable kerb (SABS 927), levelled and jointed in 1:5 cement mortar complete with 15Mpa/19mm in situ concrete support blocks size 225 x 150 x 225mm high, at joints at 1,0m centres, including leaving 6mm expansion joints at 10m intervals between kerbs	m	296	
18	Precast concrete figure 7 kerb (SABS 927), circular on plan n.e 4m area levelled and jointed in 1:5 cement mortar complete with 15Mpa/19mm in situ concrete support blocks size 225 x 150 x 225mm high, at joints at 1,0m centres, including leaving 6mm expansion joints at 10m intervals between kerbs	m	41	
<u>Sundries</u>				
19	Mass concrete (25MPa) in 300 x 150mm edge filler strip finished smooth on top with a wood float, including all excavation, formwork, etc	m	60	

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Section No. 4
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**CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
EXISTING HALL AT LIMPOPO TRAFFIC TRAINING COLLEGE**

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<u>PAINTWORK</u>			
<u>Prepare and paint one coat reflective road marking paint on concrete paving block surfaces</u>			
20	Lines 100mm wide	m	120
21	Disable persons pictorial 1000mm high	No	1
<u>Sign Faces with Painted or Galvanised (as stated) Background, with Painted Symbols, Characters, Legend and Borders, and with Signboardings Constructed from:</u>			
<u>Sheet Steel 1,6mm thick, of area:</u>			
22	up to 2m ² .	m ²	25
<u>Sign Supports supplied and installed including excavations, backfilling, concrete, disposal, etc</u>			
23	Steel tubing 76mm diameter x 2,5mm thick CHS sections 3m long, with two coats bitumen tar below ground and zinc phosphate primer and two coats metal paint above ground	No	10
<u>CARPORTS</u>			
<u>Excavation in earth not exceeding 2m deep</u>			
24	Holes	m ³	19
<u>Extra over all excavations for carting away</u>			
25	Surplus material from excavations and/or stock piles on site to a dumping site to be located by the contractor	m ³	11
<u>Risk of collapse of excavations</u>			
26	Sides of trench and hole excavations not exceeding 1,5m deep	m ²	43

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<u>Keeping excavations free of water</u>				
27	Keeping excavations free of water		Item	
<u>Earth filling obtained from the excavations and/or prescribed stock piles on site, compacted to 93% Mod AASHTO density</u>				
28	Backfilling to trenches, holes, etc	m3	8	
29	Allow for compaction tests as required by the Engineer		Item	
<u>Soil insecticide to be executed with SABS compliance by a firm of specialists under a 10 year guarantee</u>				
30	To bottoms and sides of trenches etc	m2	53	
<u>25MPa/20mm concrete</u>				
31	Column bases (Provisional)	m3	19	
<u>0.5mm thick light industrial "Klip-Lok 406" Z275 spelter galvanised steel sheeting with Classicoat finish to one side and half coat Classicoat Grey other side and accessories fixed to steel purlins or rails</u>				
32	Roof coverings with pitches not exceeding 25 degrees	m2	576	
<u>Steel structure to carport</u>				
33	150mm Diameter x 3mm x 8.9kg/m Hollow section	t	5.76	
<u>Spot priming defects in pre-primed surfaces with red oxide metal primer, one coat universal undercoat and two coats "Super Universal Enamel" paint (NY-1/G) on steel</u>				
34	On members of lattice columns and beams	t	6	
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SECTION NO 5

PROVISIONAL SUMS

BILL NO 1

PROVISIONAL SUMS

SUPPLEMENTARY PREAMBLES

General

All prime cost amounts and provisional sums are net and include for delivery to site of all articles concerned

Sub contractors will be treated as domestic sub contractors for the purpose of this contract. They shall be selected sub contractors and the main contractor will be afforded the opportunity to reject such sub contractors prior to appointment provided reasonable justification is given

Profit

Where stated, the contractor may allow for profit if required

General attendance upon selected sub-contractors

The item "Attendance" which follows each provisional sum for selected sub-contractors work, shall be deemed to cover all the contractor's costs incurred in providing free of charge to the selected sub-contractors, the following:

1. The services as in clause B7 of the Preliminaries
2. Making good in all trades and cleaning down and removal of rubbish on completion

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Section No. 5
 Provisional Sums
 Bill No. 1
 Provisional items

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BILLS OF QUANTITIES
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<u>SIGNAGE</u>		
1	Provide the sum of R 80,000-00 for the supply and installation of signage by the specialist	Item 80,000,00
2	Allow for profit.	Item
3	Allow for attendance on sub-contractor	Item
<u>RAINWATER HARVEST/STORAGE TANKS ETC</u>		
4	Provide the sum of R 180,000-00 for the supply and installation of Rainwater Harvest/Storage Tanks	Item 180,000,00
5	Allow for profit.	Item
6	Allow for attendance on sub-contractor	Item
<u>FIRE WATER STORAGE TANKS INCLUDING EQUIPPING AND RETICULATION ETC</u>		
7	Provide the sum of R 2 800,000-00 for the supply and installation of fire water storage tank including equipping and reticulation	Item 2,800,000,00
8	Allow for profit.	Item
9	Allow for attendance on sub-contractor	Item
<u>LANDSCAPING ETC</u>		
10	Provide the sum of R 150,000-00 for the supply and installation of Landscaping	Item 150,000,00
11	Allow for profit.	Item
12	Allow for attendance on sub-contractor	Item
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<u>FIRE EQUIPMENT</u>		
13	Provide the sum of R 250,000-00 for the supply and installation of fire safety equipment	250,000.00
14	Allow for profit.	
15	Allow for attendance on sub-contractor	
<u>EMERGENCY FIRE STAIR CASE</u>		
16	Provide the sum of R 350,000-00 for the supply and installation of emergency fire stair case	350,000.00
17	Allow for profit.	
18	Allow for attendance on sub-contractor	
<u>CRANE FOR THE HEAT PUMPS</u>		
19	Provide the sum of R 40,000-00 for hiring of the crane for the heat pumps	40,000.00
20	Allow for profit.	
21	Allow for attendance on sub-contractor	
<u>LOOSE FURNITURE & EQUIPMENT</u>		
22	Provide the sum of R 450,000-00 for the supply and installation of loose furniture and equipment.	450,000.00
23	Allow for profit.	
24	Allow for attendance on sub-contractor	
<u>HALL FIXED FURNITURE</u>		
25	Provide the sum of R 1,850,000.00 for the supply and installation of fixed furniture and equipment.	1,850,000.00
26	Allow for profit.	
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27	Allow for attendance on sub-contractor	Item	
	<u>STAGE CURTAIN</u>		
28	Provide the sum of R 150,000.00 for the supply and installation of motorised stage curtain	Item	150,000.00
29	Allow for profit.	Item	
30	Allow for attendance on sub-contractor	Item	
	<u>MISCELLANEOUS CARPENTRY AND JOINERY</u>		
31	Provide the sum of R 250,000-00 for miscellaneous carpentry and joinery	Item	250,000.00
32	Allow for profit.	Item	
33	Allow for attendance on sub-contractor	Item	
	<u>LAUNDRY WASHING MACHINE AND DRYES</u>		
34	Provide the sum of R 100,000-00 for laundry washing machine and dryes	Item	100,000.00
35	Allow for profit.	Item	
36	Allow for attendance on sub-contractor	Item	
	<u>CURTAINING AND BLINDS</u>		
37	Provide the sum of R 100,000-00 for curtaining and blinds	Item	100,000.00
38	Allow for profit.	Item	
39	Allow for attendance on sub-contractor	Item	
	<u>COMMUNITY LIAISON OFFICER</u>		
40	Provide the sum of R 132 000-00 for the appointment of the CLO	Item	132,000.00
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**CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
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41	Allow for profit.	Item	
42	Allow for attendance on sub-contractor	Item	
<u>PROJECT STEERING COMMITEE</u>			
43	Provide a sum of R25 000,00 (twenty five thousand rand) for the provision of a Project Steering Committee	Item	25,000,00
44	Allow for profit on above if required	Item	
45	Allow for giving every to specialist as described	Item	
<u>SOCIAL FACILITATION</u>			
46	Provide the sum of R 250,000-00 for social facilitation	Item	250,000,00
47	Allow for profit.	Item	
48	Allow for attendance on sub-contractor	Item	

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Section No. 5
Provisional Sums
Bill No. 1
Provisional Items

DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE

BILLS OF QUANTITIES
CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
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BILLS OF QUANTITIES
CONSTRUCTION OF NEW ACCOMODATION BLOCK C AND RENOVATIONS TO
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	Sub-total		R	
	Electrical Installation (VAT excl. carried over from a Separate Document)	Item		
	Allow the sum of R 1 000 000. 00 NET for Contingencies to be used as directed by the Principal Agent and deducted in whole or in part if not required.	Item		1,000,000.00
	Allow the sum of R 750 000. 00 (Seven Hundred Fifty Thousand Rand) for Fluctuations in cost.	Item		750,000.00
	Sub-Total		R	
	Add: VAT @ 15%		R	
	Total:		R	
	Carried to Form of Tender		R	
	DEPARTMENT OF PUBLIC WORKS, ROADS AND INFRASTRUCTURE			

RESIDENCE BLOCK C
(INCLUDING RENOVATIONS TO EXISTING HALL)

AT

LIMPOPO TRAFFIC TRAINING COLLEGE

FOR THE

DEPARTMENT OF ROADS & TRANSPORT
(LIMPOPO PROVINCE)

PART B

ELECTRICAL INSTALLATION

PREPARED FOR

Department of Roads & Transport

PREPARED BY

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JANUARY 2021

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IMPORTANT NOTICE:

Only electrical contractor companies that are registered with the Electrical Contract Board will be considered for the electrical installation of the project.

The Company shall further have a person qualified as an Installation Electrician employed on a full-time basis and shall be responsible for the management of the electrical installation.

PART 1

STANDARD ELECTRICAL SPECIFICATIONS

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PART 1A

STANDARD ELECTRICAL SPECIFICATIONS

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DEPARTMENT OF PUBLIC WORKS

SECTION A

PRE-AMBLE TO STANDARD SPECIFICATION

FOR

ELECTRICAL INSTALLATIONS

SECTION A1

GENERAL

1. INTRODUCTION

- (a) These Standard Specifications cover the general technical requirements for the equipment, materials, installation, testing, commissioning and maintenance of electrical installations for the Department. These requirements shall be read in conjunction with the Documents as specified below.
- (b) "Document" shall mean the complete set of contract documents, including the Department's Tender Conditions PW 206, Tender Qualifications (Appendix A1), the Standard Specification and the Detail Technical Specification including all drawings and variation orders issued in terms of the contract.
- (c) "Contractor" shall mean the person, partnership, company or firm appointed for the supply, installation, testing, commissioning and maintenance of the Electrical Installation. In the case of the Electrical Installation being a sub-contract, nominated in terms of the Main Contract or otherwise, the word "Contractor" shall also mean "Sub-Contractor" in terms of the Sub-Contract Conditions for the specific installation. Where applicable the Builder or Principal Contractor shall be referred to as "Main Contractor".

2. INSTALLATION WORK

- (a) The complete installation shall comply with the requirements of this Specification. Should any discrepancies or contradictions exist between this specification and the Detail Technical Specification for the specific installation, then the latter shall take precedence.

In the event of discrepancies between the drawings, specifications and bill of quantities the Department shall decide whether the work as executed shall be remeasured on site or whether remeasurement shall be effected from the working drawings only.
- (b) The Department's authorized representative will inspect the installation from time to time during the progress of the work. Discrepancies will be pointed out to the Contractor and these shall be remedied at the Contractor's expense. Under no circumstances shall these inspections relieve the Contractor of his obligations in terms of the Documents.
- (c) The Contractor shall notify the Department timeously when the installation reaches important stages of completion (e.g. before closing cable trenches, before casting concrete, etc.) so that the Department's authorized representative may schedule his inspections in the best interest of all parties concerned.

3. REGULATIONS

- (a) The installation shall be erected and tested in accordance with the following Acts and regulations:
- (i) the latest issue of SABS 0142: "Code of Practice for the Wiring of Premises",
 - (ii) the Occupational Health and Safety Act, 1993 (Act 85 of 1993) as amended,
 - (iii) the Local Government Ordinance 1939 (Ordinance 17 of 1939) as amended and the municipal by-laws and any special requirements of the local supply authority,
 - (iv) the Fire Brigade services Act 1993 Act 99 of 1987 as amended,
 - (v) the National Building Regulations and Building Standards Act 1977 (Act 103 of 1977) as amended.
 - (vi) the Post Office Act 1958 (Act 44 of 1958) as amended,
 - (vii) the Electricity Act 1984 Act 41 of 1984 and
 - (viii) the Regulations of the local Gas Board where applicable.
- (b) The Contractor shall issue all notices and pay all of the required fees in respect of the installation to the authorities, and shall exempt the Department from all losses, claims, costs or expenditures which may arise as a result of the Contractor's negligence in complying with the requirements of the regulations.
- (c) It shall be assumed that the Contractor is conversant with the above-mentioned requirements. Should any requirement, by-law or regulation, which contradicts the requirements of this Document, apply or become applicable during erection of the Installation, such requirement, by-law or regulation shall overrule this Document and the Contractor shall immediately inform the Department of such a contradiction. Under no circumstances shall the Contractor carry out any variations to the installation in terms of such contradictions without obtaining the written permission to do so from the Department.

4. SITE CONDITIONS

Tenderers are advised to visit the site and acquaint themselves with all local conditions pertaining to the execution of the installation before tender closing date. No claims from the Contractor which may arise from insufficient knowledge of site access, type of site, labour conditions, establishment space, transport and loading/unloading facilities, power and water supply, etc. will be considered after submission of tenders.

For services where prior permission is required before contractors can visit the site, a visit will be arranged for all interested parties.

5. ARRANGEMENTS WITH THE SUPPLY AUTHORITY

- (a) The contractor shall give all notices required by and pay all necessary fees, including any inspection fees, which may be due to the local Supply Authority unless specified to the contrary.
- (b) It shall be the responsibility of the Contractor to make the necessary arrangements with the local Supply Authority at his own cost and to supply the labour, equipment and means to inspect, test and commission the installation to the satisfaction of the Local and Supply Authorities.
- (c) The Contractor shall supply and install all notices and warning signs that are required by the relevant laws, regulations and/or the Documents.

6. MATERIAL AND EQUIPMENT

- (a) All material and equipment shall conform in respect of quality, manufacture, tests and performance, with the requirements of the South African Bureau of Standards or where no such standards exist, with the relevant current Specification of the British Standards Institution.
- (b) All material and equipment shall be of high quality and suitable for the conditions on site. These conditions shall include weather conditions as well as conditions under which materials are installed, stored and used. Should the materials not be suitable for use under temporary site conditions then the Contractor shall at his own cost provide suitable protection until these unfavourable site conditions cease to exist.
- (c) The Contractor shall, where requested to do so, submit samples of equipment and material to the Department for approval prior to installation. Samples may be retained in the Department's possession until the contract is completed after which they will be returned.

7. CONNECTIONS INVOLVING ALUMINIUM (CABLES AND TRANSFORMERS)

As a result of the fact that aluminium flows when subjected to pressure and electrical connections based on this principle thus loses proper contact during the course of time, it should be noted that bolted connections between aluminium and copper or any other metal is not acceptable to this Department.

8. CODES OF PRACTICE OR STANDARD SPECIFICATION

Where reference is made to any Code of Practice or Standard Specification in this document the latest edition or amendment shall be applicable, except where specified to the contrary

PART 1B

SECTION B

INSTALLATION SPECIFICATIONS

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SECTION B

SECTION B1

INSTALLATION AND TERMINATION OF CONDUITS AND CONDUIT ACCESSORIES

1. GENERAL

1.1 Scope

1.1.1 This section covers the installation of conduits and conduit accessories in buildings and other structures under normal environmental conditions and for system voltages up to 600 V.

1.1.2 The following types of conduit installations are included:

- (a) Screwed metallic conduit - black enamelled and galvanised.
- (b) Plain-end metallic conduit - black enamelled and galvanised.
- (c) Non-metallic conduit.
- (d) Flexible conduit.

1.1.3 Conduits may be installed as follows:

- (a) In open roof spaces.
- (b) Cast in concrete.
- (c) Surface mounted against walls, concrete slabs, etc.
- (d) In wall chases.

1.1.4 Where conduits are to be installed in concrete, this shall be undertaken while the building work is still in progress. Conduits may only be surface mounted where specified or where the Department has given its written consent.

1.2 Other Services

Conduits may not be installed closer than 150 mm to pipes containing gas, steam, hot water or other materials which may damage the conduits or conductors. Conduits may not touch pipes of other service installations in order to prevent electrolytic corrosion. Where this is unavoidable, cathodic protection shall be provided.

2. SCREWED METALLIC CONDUIT

2.1 General

2.1.1 In general, screwed steel conduit shall be used in the wiring of buildings.

2.1.2 The installation shall comply with SABS 0142.

2.2 Galvanised Conduit

Galvanised conduit and accessories shall be used in the following:

- (a) In damp areas.
- (b) In areas exposed to the weather.
- (c) For all installations within 50 km of the coast.
- (d) In plenum chambers containing humidifying equipment.
- (e) For surface mounted conduit installations in kitchens and boiler rooms.

- (f) In screeds resting directly on soil.
- (g) For connection points to future installations.
- (h) For underground conduit containing earthing conductors.
- (i) In buildings where animals are housed such as cattle, sheep, dogs, etc.

2.3 Terminations

2.3.1 Spouted Connections.

Conduits shall be connected directly to draw-boxes with spouted connections. Conduits shall be screwed tightly home and no threads shall be visible.

2.3.2 Switchboards, Power skirting, etc.

Conduits shall be terminated by means of a brass female bush and two locknuts in pressed steel switchboards and distribution boxes, cable ducts, power skirting, etc. The conduit end shall only project far enough through the entry hole to accommodate the bush and locknut. Alternatively the method detailed in 2.3.3 may be used.

2.3.3 Draw-boxes.

A female bush and two locknuts shall be used to terminate conduits at draw-boxes and outlet boxes without spouts, should there be sufficient room in the box. Where there is insufficient room, a coupling, brass male bush and locknut may be used with sufficient allowance for the reduction of the internal diameter by the male bush.

2.3.4 Holes.

Holes to accommodate brass bushes shall be large enough to accommodate the bush with a minimum of clearance.

2.3.5 Bush-nuts.

Bush-nuts for the connection of earth conductors to conduits are not acceptable.

2.4 Screws, Bolts and Nuts

Steel locknuts of thick gauge steel with milled sides shall be used in all cases. Cadmium-plated bolts and nuts shall be used except where the installation is exposed to the weather in which case brass bolts and nuts shall be used. Screws shall be installed in all tapped holes in fittings and accessories to prevent damage to the screw thread by concrete or plaster. The screws shall be screwed completely down to prevent damage to the thread on the screw.

2.5 Conduit Ends

Conduit ends shall be cut at right angles to ensure that ends butt squarely at joints. Threads shall not be visible at joints and connections except at running joints. The total length of the thread on the two conduit ends shall not exceed the length of the coupling.

2.6 Joints

All conduit ends shall be reamed and all joints tightly screwed. Only approved couplings shall be used. Running joints with long threads shall be kept to a minimum and locknuts shall be provided to ensure a strong mechanical and a continuous electrical joint.

2.7 Finish

All joints shall be painted with red lead to prevent them from rusting in damp areas, areas within 50 km of the coast and in cases where the installation is exposed to the weather for any length of time. Where the galvanising or black paint has been damaged, the area shall first be cleaned and a coat of zinc base paint applied subsequently. Additional coats of paint shall only be applied

after the undercoat has completely dried. All surface mounted non-galvanised metallic conduit must be painted. (Refer to par. 8.8 of Section B1).

2.8 Continuity

Mechanical and electrical continuity shall be maintained throughout the conduit installation.

3. **PLAIN-END METALLIC CONDUIT**

As an alternative to the screwed conduit, plain-end conduit complying with the Department's standard specification for "CONDUITS AND CONDUIT ACCESSORIES", par. 7 of Section C1, may be installed subject to the following additional conditions:

3.1 Bending and setting of plain-end conduit must be done with special benders and apparatus manufactured for this purpose and which are obtainable from the suppliers of the system. Damaged conduit resulting from the use of incorrect bending apparatus shall be completely removed and any wiring already drawn into such damaged conduits shall be completely renewed at the Contractor's expense.

3.2 Screwed conduit must be used in the following instances:

- (a) In flameproof installations.
- (b) Load bearing conduit.
- (c) For the suspension of luminaires.
- (d) Surface mounted conduit.

3.3 Plain-end conduit and associated accessories shall be manufactured of mild steel having a minimum thickness of 1,2 mm and shall comply with SABS 1007. Conduit manufactured of lighter gauge material, i.e. 0,97 mm, will not be permitted.

3.4 All conduit and accessories used in areas within 50 km of the coast shall be hot-dip galvanised to SABS 763. In inland areas Electro-galvanised or cadmium-plated accessories will be accepted.

4. **NON-METALLIC CONDUIT**

4.1 Installation Conditions

Where specified for a particular service, non-metallic conduit may be installed under the following conditions:

4.1.1 All non-metallic conduit shall comply fully with SABS 950 and shall be installed in accordance with Appendix C of the same specification as well as SABS 0142.

4.1.2 Insulated heat-resistant boxes shall be used for outlets of totally enclosed luminaires and other fittings where excessive temperatures are likely to occur.

4.1.3 Luminaires and other fittings shall not be supported by non-metallic conduit or conduit boxes. These fittings shall be secured to the surrounding structure in a way that is acceptable to the Department. Refer to the Department's standard specification for "INSTALLATION OF LUMINAIRES", Section B9.

4.1.4 The conduit shall be supported and fixed with saddles with a maximum spacing of 1 m, even in roof spaces. (Refer to SABS 0142.) The Contractor shall supply and install all additional supporting timbers required.

4.1.5 It shall be possible to rewire the completed installation in the future without undue difficulty.

4.1.6 Non-metallic conduit and fittings shall not be used under the following conditions:

- (a) Outside a building (unless protected, or sheltered under eaves).
- (b) For mechanical load bearing.

- (c) Where they may be subjected to temperatures below -10EC or above 70EC for prolonged periods.
- (d) As primary electrical insulation.
- (e) In areas where they may be subject to mechanical damage.
- (f) For applications other than those for which they are designed.
- (g) In concrete slab unless specified to the contrary.

4.2 Painting of Conduits

Exposed conduit may be painted with normal oil or PVA paints, but care must be taken to ensure that the paint used does not contain any component that will soften or have any other detrimental effect on the materials from which the conduit and fittings are manufactured.

4.3 Connecting of Conduit to Metal Equipment/Components

When any part of a non-metallic conduit system has to be connected to metal equipment or components (e.g. switchboard, surface socket-outlet or switch box, existing metallic conduit system, etc.) fittings and joints manufactured specifically for this purpose must be used. Non-metallic conduit must not be threaded to fit metallic connectors.

4.4 Bends

In conduit of nominal size not exceeding 25 mm, bends may be made in accordance with par. 4.5. In all other cases bends must be achieved by the use of accessories that are introduced into the conduit run. Bends shall comply with SABS 0142.

4.5 Bending

Conduit of nominal size up to and including 25mm may be cold bent by hand provided that the radius of the bend is greater than six times the nominal size of the conduit, and that the external angle of the bend does not exceed 90E. The procedure (which involves the use of a bending spring) should be as follows:

- (a) Determine the angle through which the conduit is to be bent.
- (b) Warm the cold conduit over the length to be bent by rubbing with hands.
- (c) Select a bending spring which matches the conduit size and insert in to the conduit at the point where the bend is required.
- (d) Bend the conduit slowly with one motion (either with the hands alone approximately 1 m apart, or across the knee) to double the required angle, release the conduit and, when its position is stable, withdraw the bending spring (turning it in an anti-clockwise direction to reduce its diameter) and gently correct the angle.
- (e) Install and secure the conduit immediately following bending.

4.6 Adhesive Joints

All adhesive joints must be made in a clean dry area. The surfaces of all components to be bonded must be dry and clean.

The insertion depth should be marked on the conduit end and the adhesive applied (by means of a soft clean brush) as quickly as possible to the surfaces to be bonded by brushing lengthwise along the conduit, ensuring that a thin coating of uniform thickness is formed. The joint must be made immediately after the application of the adhesive by pushing the prepared parts squarely

together with a twisting motion to the full insertion depth. Care must be taken to avoid squeezing adhesive into the cableway and all excess adhesive must be wiped off.

NOTE: Solvent adhesives contain highly volatile liquids and their containers should not be left open.

4.7 Cutting

A fine-tooth hacksaw should be used to cut conduit to the required length. Each cut end should be square and free from swarf, burrs and loose material. When determining the length of conduit to be cut, allowance must be made for the length of couplings or accessories attached to the conduit. Incorrect determination will cause bulging of the conduit or insufficient joint length.

5. FLEXIBLE CONDUIT

5.1 In installations where the equipment has to be moved frequently to enable adjustment during normal operation, for the connection of motors or any other vibrating equipment, for the connection of thermostats and sensors on equipment, for stove connections and where otherwise required by the Department, flexible conduit shall be used for the final connection to the equipment.

5.2 The installation shall comply with SABS 0142.

5.3 Flexible conduit shall preferably be connected to the remainder of the installation by means of a draw-box. The flexible conduit may be connected directly to the end of a conduit if an existing draw-box is available within 2 m of the junction and if the flexible conduit can easily be rewired.

5.4 Flexible conduit shall consist of metal-reinforced plastic conduit or PVC-covered metal conduit with an internal diameter of at least 15mm, unless approved to the contrary. In false ceiling voids, flexible conduit of galvanised steel construction may be used. connectors for coupling to the flexible conduit shall be of the gland or screw-in type, manufactured of either brass or mild steel plated with either zinc or cadmium.

6. INSTALLATION REQUIREMENTS

6.1 Positions of Outlets

All accessories such as boxes for socket-outlets, switches, lights, etc. shall be accurately positioned. It is the responsibility of the Contractor to ensure that all outlets are installed level and square, at the correct height from the floor, ceiling or roof level and in the correct position relative to building lines and equipment positions as specified. It shall be the responsibility of the Contractor to determine the correct final floor, ceiling and roof levels in conjunction with the Main Contractor. Draw-boxes shall not be installed in positions where they will be inaccessible after completion of the installation. Draw-boxes shall be installed in inconspicuous positions to the approval of the Department's representative and shall be indicated on the "as built" drawings.

6.2 Cover plates

All draw-boxes and outlets shall be fitted with cover plates, either as part of the switch or socket assembly or with blank cover plates if unused. Blank cover plates shall match other cover plates in the same area. Flush mounted cover plates in both ceilings and walls shall overlap the draw-box and edges of the recess. If the fixing lugs are substantially deeper than the finished wall surfaces, suitable coiled steel wire or tubes shall be used as spacers.

6.3 Draw-wires

Galvanised steel draw-wires shall be installed in all unwired conduits e.g. conduits for future extensions, telephone installations and other services.

6.4 Bends

A maximum of two 90 bends or the equivalent displacement will be allowed between outlets and/or boxes.

Draw-boxes shall be installed at maximum intervals of 15 m in straight runs. All bends shall be made without heating the conduit or without reducing the diameter of the conduit. The inside radius of a bend shall not be less than five times the outside diameter of the conduit. (Refer to SABS 0142,

6.5 Wall Socket-outlets

Where more than one socket-outlet is connected to the same circuit, the conduit shall be looped from one outlet box to the following on the same circuit. Where a metal channel is used, the conduit may be installed from the channel directly to the outlet box on condition that the conductors can be looped from one outlet to the next without making any joints in the wires.

6.6 Luminaires

Where the conduit end is used to support luminaires, a ball-and socket type lid shall be fitted to the pendant box in all cases where the conduit is longer than 500 mm. In all other cases a dome lid may be used. Where luminaires are specified which are fixed directly to the pendant box, the pendant box shall be fixed independently of the conduit installation except where the pendant box is cast into concrete.

6.7 Flush Mounted Outlet Boxes

The edges of flush mounted outlet boxes shall not be deeper than 10 mm from the final surface. Spacer springs shall be used under screws where necessary.

6.8 Excess Holes

All excess holes in draw-boxes or other conduit accessories shall be securely blanked off by means of brass plugs to render the installation vermin proof.

6.9 Debris

Care shall be taken to prevent debris or moisture from entering conduits during and after installation. Conduit ends shall be sealed by means of a solid plug which shall be screwed to the conduit end. Conduits shall be cleaned and swabbed to remove oil, moisture or other debris that may be present before conductors are installed. Swabs shall not be attached to the conductors.

6.10 Defects

Each length of conduit shall be inspected for defects and all burrs shall be removed. All conduits that are split, dented or otherwise damaged or any conduits with sharp internal edges shall be removed from site. The Contractor shall ensure that conduits are not blocked.

6.11 Withdrawal of Conductors

To ensure that all electrical conductors are easily withdrawable from conduits and to ensure that there are no joints in the conductors, the Department's representative will have the right to have the conductors of any circuit removed at his discretion. If the conductors are found to be in a satisfactory condition after having been withdrawn, the Department shall bear the cost of withdrawing and re-installing such conductors. If the conductors are found to have been damaged during installation or removal or if joints are found, they shall be replaced and the cost shall be borne by the Contractor.

7. **INSTALLATION IN CONCRETE**

7.1 Timeous Installation

In order not to delay building operations, the Contractor shall ensure that all conduits and accessories which are to be cast in concrete are placed in position in good time. The Contractor or his representative shall be in attendance when the concrete is cast.

7.2 Draw-boxes

Draw-boxes, expansion joints and round ceiling boxes shall be installed where required and shall be neatly finished to match the finished slab and wall surfaces. Ceiling draw-boxes shall be of the deep type. In hollow block slabs, rear-entry draw-boxes shall be used. In columns where flush mounted draw-boxes are installed, the conduits shall be offset from the surface of the column immediately after leaving the draw-box.

7.3 Elbows

Elbows for conduits of 32mm dia. and smaller and sharp bends will not be allowed in concrete slabs.

7.4 Cover Plates

Draw-boxes and/or inspection boxes shall, where possible, be grouped together under a common approved cover plate. The cover plate shall be secured by means of screws.

7.5 Neutral Axis

All conduits shall be installed as close as possible to the neutral axis of concrete beams, slabs and columns. The conduits shall be rigidly secured to the reinforcing to prevent movement towards the surface of the concrete.

7.6 Fixing to the Shuttering

All conduits, draw-boxes etc. shall be securely fixed to the shuttering to prevent displacement when concrete is cast. Draw-boxes and outlet boxes shall preferably be secured by means of a bolt and nut installed from the back of the box through the shuttering. Fixing lugs may also be used to screw the boxes to the shuttering. Wire will not be accepted for securing boxes to the shuttering where off-shutter finishes are required. Where fibreglass shuttering is used by the Builder, the equipment shall be fixed to the steel only and no holes shall be drilled or made in shuttering. All draw-boxes and outlet boxes shall be plugged with wet paper before they are secured to the shuttering.

7.7 Concrete Floor Slabs

Conduits will not be allowed in concrete floor slabs of boiler rooms (or boiler houses), laundries or other damp areas. All socket outlets and three phase outlets in damp areas shall be supplied from above with galvanised conduit and accessories.

7.8 Expansion Joints

As far as possible, conduits shall not be installed across expansion joints. Where this is unavoidable a conduit expansion joint shall be provided. (Refer to par. 10)

7.9 Screeds

The installation of conduits in floor screeds shall be kept to a minimum. Where conduits are installed in screeds, the top of the conduit shall be at least 20 mm below the surface of the screed. Where the screed is laid directly on the ground, galvanised conduits shall be used. This ruling will always be applicable to the lowest floor of a building. A minimum distance of twice the outside diameter of the conduit shall be left free between adjoining conduits. Conduits shall be secured to the concrete slab at intervals not exceeding 2 m. The Contractor shall ensure that

conduits are not visible above the screed where the conduits leave the screed.

7.10 Inspection

All draw-boxes, conduits, etc. which are installed in concrete shall be cleaned with compressed air and provided with draw-wires two days after removal of the shuttering. Errors that occurred during the installation of the conduits, or any lost draw-boxes, or blocked conduits shall be immediately reported to the Department by telephone and confirmed in writing in order that an alternative route can be planned and approved by the Department before the additional concrete is cast. Any additional cost shall be for the Contractor's account.

8. SURFACE INSTALLATIONS AND INSTALLATIONS IN ROOF SPACES

8.1 Appearance

- (a) All conduits shall be installed horizontally or vertically as determined by the route and the Contractor shall take all measures to ensure a neat installation.
- (b) Where conduits are to be installed directly alongside door frames, beams, etc. that are not true, conduits shall be installed parallel to the frames, beams, etc.
- (c) All labels shall be removed from surface mounted conduit.

8.2 Saddles

Conduits shall be firmly secured by means of saddles and screws and in accordance with SABS 0142. Where saddles are used to secure vertical lengths of conduit connected to surface mounted switch boxes or socket outlet boxes, the saddles shall be spaced so that the intervals between the box and the first saddle, between any two successive saddles and between the last saddle and the ceiling or roof are equidistant. Conduits shall be secured within 150 mm before and after each 90° bend and within 100mm of each outlet box.

8.3 Joints

Joints will only be allowed in surface conduit lengths exceeding 3,5 m. Threads shall not be visible at joints of completed installations, except where running joints are used. Running joints will be allowed only when absolutely necessary. All running joints shall be provided with locknuts and shall be painted with red lead immediately after installation.

8.4 Accessories

Inspection bends or tee pieces shall not be used. Non-inspection type bends may be used in the case of 32mm or 50 mm diameter conduits. All draw-boxes supporting luminaires or other equipment shall be fixed independently of the conduit installation.

8.5 Offsets

Where an offset is required at conduit terminations or crossovers, the conduit shall be saddled at the offset.

8.6 Cross-over

Conduit routes shall be carefully planned to avoid crossovers. Where a crossover is inevitable, one conduit only shall be offset to cross the other. Crossovers shall be as short as possible and shall be uniform. Alternatively, crossovers shall be installed in purpose-made boxes. This method

shall be employed on face brick walls and in other circumstances where required by the Department.

8.7 Parallel Conduit

Parallel conduit runs shall be equidistant and saddles shall be installed in line. Alternatively, a special clamp may be used to secure all conduits in unison. In the case of conduits of different diameters, the latter method shall only be used if a purpose-made clamp designed to accommodate the various conduit sizes, is provided.

8.8 Painting of Conduit

All surface mounted conduits and accessories shall be painted with a high quality enamel paint or as otherwise specified. The colour shall comply with the colour code specified for the installation or where no code has been specified, shall match the colour of the surrounding finishes.

8.9 Conduit in Roof Spaces

8.9.1 In open roof spaces (no ceiling) conduits shall run along the wall plates and the rafters. The installation of conduits suspended between the rafters is not acceptable.

8.9.2 Conduit in roof spaces shall be installed parallel or at right angles to the roof members and shall be secured at intervals not exceeding 1,5 m by means of saddles screwed to the roof timbers for metallic conduit and 1m for non-metallic conduit.

8.9.3 Nails or crumpets will not be allowed.

8.9.4 Under flat roofs in false ceilings or where there is less than 900 mm clearance, or in instances where the ceilings are insulated with glass-wool or other insulating material impeding access, the conduit shall be installed in a manner which allows for wiring from below the ceilings.

8.9.5 Conduit runs from switchboards shall terminate in fabricated sheet steel draw-boxes installed directly above or in close proximity to the boards. Refer to the Department's standard specification for "CONNECTIONS TO SWITCHBOARDS", par. 2 of Section B10.

8.9.6 Spare conduits covering the total number of spare ways on switchboards, shall be provided between the boards and the roof draw-box.

8.10 Fixing to Walls

Only approved plugging materials such as fibre plugs or plastic plugs, etc., and round-head screws shall be used when fixing saddles, switches, plugs etc. to walls. Wood plugs are not acceptable nor should plugs be installed in joints in brick walls.

9. FUTURE EXTENSIONS

9.1 Open Roof Spaces

Conduits intended for future switches and socket outlets, shall terminate 40 mm above the tie beams in roof spaces with more than 900 mm free space. The conduit ends shall be threaded and fitted with a coupling and brass plug.

9.2 Concrete Slabs

Conduit ends shall protrude 150 mm from the concrete to facilitate the installation of future extensions above, below or to the side of the concrete slabs. All these conduits shall be connected to a draw-box, which is cast into the concrete within 2 m of the end of the concrete. Conduit ends shall be threaded and fitted with a coupling and brass plug. In cases where holes cannot be drilled through the shuttering to accommodate the conduit end, a deep draw-box with rear entry may be placed over the conduit end.

9.3 Cover Plates

Unused boxes for switches and socket-outlets shall be covered with metal cover plates. Unused boxes for luminaires shall be covered with round galvanised metal cover plates, which fit tightly against the finished surface. The cover plate shall overlap the outlet box and recess.

9.4 Galvanised Conduit

Galvanised conduit shall be installed at all free ends intended for future extensions. The conduit shall be treated with a paint, which will prevent corrosion and white rust.

10. EXPANSION JOINTS

10.1 Where conduits cross expansion joints in the structure, approved draw-boxes which provide a flexible connection in the conduit installation shall be installed. Refer to the Department's standard drawing No EE3/136/139.

10.2 The draw-box shall be installed adjacent to the expansion joint of the structure and a conduit sleeve, one size larger than that specified for the circuit, shall be provided on the side of the draw-box nearest the joint. The one end of the sleeve shall terminate at the edge of the joint and the other shall be secured to the draw-box by means of locknuts.

10.3 The circuit conduit passing through the sleeve shall be terminated 40 mm inside the draw-box and in the case of metallic conduit, the conduit end shall be fitted with a brass bush. The gap between the sleeve and the conduit at the joint shall be sealed with 'Pratley Tic-Tac' or equal sealing compound, to prevent the ingress of wet cement. In the case of metallic conduit, an earth clip shall be fitted to the conduit projection inside the draw-box and the conduit bonded to the box by means of 2,5mm² bare copper earth wire and a brass bolt and nut.

10.4 The end of the other circuit conduit shall be secured to the draw-box by means of locknuts and a brass bush in the case of screwed metallic conduit or a standard bushed adaptor for other conduit types.

10.5 In the case of metallic conduit, a 2,5mm² bare copper wire shall be installed between the first conduit boxes on either side of the joint, in addition to an earth wire, which may be specified for the circuit. The conduit boxes shall be drilled and tapped and the earth wire shall be bonded to the boxes by means of lugs and brass screws.

10.6 Suitable steel cover plates shall be screwed to draw-boxes installed along the expansion joint. The cover plates shall be installed before the ceilings are painted.

10.7 Where a number of conduits are installed in parallel they shall cross the expansion joint of the structure via a single draw-box. A number of draw-boxes adjacent to each other will not be allowed.

11. CHASES AND BUILDER'S WORK

11.1 Except where otherwise specified the Builder or Main Contractor shall be responsible for the builder's work related to the installation of conduits, outlet boxes, switchboard trays, bonding trays and other wall outlet boxes and will undertake the necessary chasing and cutting of walls and the provision of openings in ceilings and floors for luminaires and other electrical outlets. The Contractor shall notify the Builder or Main Contractor of his requirements and the responsibility lies with the Contractor to ensure that all builder's work is clearly indicated or marked in accordance with his requirements.

11.2 Electrical materials to be built in must be supplied, placed and fixed in position by the Contractor when required to do so by the Builder or Main Contractor. The Contractor shall also ensure that these materials are installed in the correct positions.

11.3 Where no Builder or Main Contractor is available, the Contractor must provide all chases and is required to cover conduits installed in chases by a layer of 4:1 mixture of coarse sand and cement, finished 6 mm below the face of the plaster and roughened. Chases shall be deep

enough to ensure that the top of conduits are at least 12 mm below the finished surface of the plaster.

- 11.4 Where the Contractor is responsible for the cutting of chases or the building in of conduits and other equipment, he will be held responsible for all damage as a result of this work and will be required to make good to the satisfaction of the Department.
This ruling is particularly applicable but not exclusively to the rewiring and renewal of existing installations. Chases shall be made by means of a cutting machine.
- 11.5 Under no circumstances shall face brick walls or finished surfaces be chased or cut without the written permission of the Department. Where it is necessary to cut or drill holes in the concrete structure, the prior permission of the Department shall be obtained.

SECTION B2

INSTALLATION OF WIRING CHANNELS, UNDERFLOOR DUCTING AND POWER SKIRTING

1. RESPONSIBILITY OF THE CONTRACTOR

The Contractor shall supply and install all wiring channels, underfloor ducting and power skirting as specified or as required for the cable, socket outlet and wiring installation including the necessary supports, hangers, fixing materials, bends, angles, junctions, T-pieces, etc. He shall further liaise with the Main contractor to verify the position of holes and access routes through the structure and finishes.

(Refer to the Department's quality specification for "WIRING CHANNELS, UNDERFLOOR DUCTING AND POWER SKIRTING", Section C2 to determine which types are acceptable).

2. WIRING CHANNELS

2.1 Fixing

The Contractor shall supply and install all hangers, supports or fixings for the channels. Channels up to and including 76 x 76 mm shall be supported at maximum intervals of 600 mm and larger channels at maximum intervals of 1 m. Channel runs shall be carefully planned to avoid clashes with other services and to ensure that all covers can be removed after completion of the entire installation. Purpose made clamps, hangers, etc. shall be used as required. Where it is not possible to support the channels at the specified intervals, they shall be supported in a sound manner to the satisfaction of the Department.

2.2 Installation in Concrete

Where channels are cast into concrete, the insert type shall be used. Additional spacer blocks shall be used where necessary to prevent ducts from being deformed while the concrete is cast. Channels shall be filled with polystyrene or other suitable fillers to prevent the ingress of concrete and shall be securely fixed in position to the shuttering.

2.3 Cover Plates

All channels up to and including 127mm width shall have snap-in cover plates of metal or PVC. Cover plates for wider channels shall be of metal and shall be fixed by means of screws at suitable intervals to prevent warping. Cover plates shall be installed over the full length of the channels. Flush mounted wiring channels shall be fitted with overlapping metal cover plates with plastic edge trim to cover irregularities in the wall recess.

2.4 Joints

Adjoining lengths shall be aligned and securely joined by means of fishplates fixed by mushroom bolts, washers and nuts or connection pieces that are pop-riveted to both adjoining sections. All adjoining sections shall be rectangular and shall butt tightly. Covers shall fit tightly across the joints.

Where channels cross expansion joints in the structure, suitable expansion joints shall be provided in the channels by means of fishplates pop-riveted or screwed to the channel on one side of the expansion joint and floating freely in the channel on the other side of the expansion joint.

2.5 Support for Conductors

All conductors in inverted cable channels shall be retained by means of metal clips or metal spacer bars at not more than 1m centres. Where vertical duct lengths exceed 5m, conductors installed in the channels shall be secured at intervals not exceeding 5m to support the weight of the conductors. Clamps shall be provided in suitable draw-boxes for this purpose.

2.6 Conduit Connections

Conduit connections shall be terminated by means of two locknuts and a brass female bush. Where the channel is wide enough, conduit connections may be made by means of a conduit box and hole through the back or side of the channel. All holes through which conductors pass shall be fitted with bushes or grommets or shall be sleeved.

2.7 Internal Finishes

Bends and T-joints shall be constructed to ensure compliance with the allowable bending radii specified in SABS 0142, Appendix D in the case of PVC-insulated cables and conductors and shall comply with the relevant specification in the case of other cables. Burrs and sharp edges shall be removed and the inside edges of the joints shall be lined with rubber cement or other suitable rubberised or plastic compound to prevent laceration of the conductor insulation.

2.8 Vermin proofing

All cable channels shall be vermin proofed after installation. Holes shall be covered by means of screwed metal plugs or by means of metal strips, which are bolted, or pop-riveted to the channel. Wooden or other plugs which are driven into holes or other temporary plugs or covers are not acceptable.

2.9 Services

Multiple duct runs or internal metal partitions shall be used where conductors for power, control, communication and other services are present.

3. UNDERFLOOR DUCTING

3.1 General

3.1.1 Two or three compartment underfloor ducting as specified shall be supplied and installed in the positions and according to the layouts indicated on the drawings.

3.1.2 Three compartment ducting shall have a cross-section of approximately 200 x 32mm, subdivided into three approximately equal compartments, of which the centre compartment shall be used for electrical power distribution with the two outer compartments for telephone and other light current services respectively.

3.1.3 Unless specified to the contrary in the Detail Technical Specification or on the drawings, each compartment shall be provided with openings (occurring in line) at 1,5 m centres to permit installation of pedestals or recessed outlets in accordance with the design of the system. The openings shall have removable, flush, cover plates and shall have prepared fixing holes for future installation of pedestals or recessed outlets. The centre of the openings shall be offset a distance of 200 mm from the building nodule lines.

3.2 Junctions

The underfloor ducting installation shall be provided with flush cross-over, T-junction and right angle bend draw-boxes installed in the runs of ducting, generally as indicated on the drawings. The junction boxes shall be complete with cross-over of services. The junction boxes shall have nominal 300 x 300mm removable cover plates secured by means of four countersunk screws.

3.3 Pedestal Units

Where the system accommodates floor pedestal units, these shall consist of pressed steel or die cast aluminium units, suitable for either two or three services, as specified in the Detail Technical Specification. Where the pedestals are installed on vinyl tiled or similar floors which will be subject to washing, a matching waterproofing gasket shall be supplied below each pedestal to render the junction waterproof.

3.4 Installation

The underfloor ducting, junction boxes, pedestals, outlets and other accessories shall be installed strictly in accordance with the manufacturer's instructions and according to the following procedure:

- a) The underfloor ducting shall be installed on a mortar bed, provided by the Plasterer for purposes of levelling the channel to the final floor screed level. The Contractor shall assist the Plasterer in marking out the layout of the ducting to enable the mortar bed to be laid. Final height of the underfloor ducting shall be determined in close liaison with the Builder.
- b) After installation of the mortar bed, the components of the underfloor ducting shall be assembled and installed by the Contractor, following which the screeding will be completed.

3.5 Terminations

Up bends manufactured by the supplier of the underfloor ducting shall be supplied and installed wherever the ducting is terminated at a switchboard, telephone duct or telephone distribution box or where the ducting terminates behind power skirting.

3.6 Wiring

3.6.1 Power circuit wiring shall be installed in the centre compartment of the underfloor ducting. Sufficient slack shall be provided to allow for the installation of a floor pedestal outlet at each opening in the ducting, whether an outlet is specified at that position or not. This provision shall take the form of loops in the wiring, including the earth wire, wherever the openings occur. The loops shall be pushed back into the channel and the cover plates replaced. In the instances where pedestals/outlets are not installed, these provisions shall of necessity only be made for the area covered by the circuit and not for the run from the switchboard.

3.6.2 The entire underfloor ducting installation shall be effectively earthed and bonded together.

3.6.3 Galvanised draw-wires shall be supplied and installed along the entire length of the telephone and light current service compartments of the underfloor ducting. The draw-wires shall be interrupted at the junction boxes, with enough slack left coiled up to facilitate the drawing in of cables by others.

3.7 Expansion Joints

Where expansion joints in the buildings are crossed by underfloor ducting, expansion joints shall be provided as detailed in par. 2.4 of this section.

4. POWER SKIRTING

4.1 General

4.1.1 Two or three compartment power skirting as specified shall be supplied and installed in the positions and according to the layouts indicated on the drawings.

4.1.2 The top compartment shall be used for power wiring and switched socket outlets, whilst the bottom compartments shall be for telephone and other light current services.

4.2 Module

4.2.1 The power skirting shall be manufactured from 1mm (minimum) thick sheet steel or aluminium (as specified) in approximately 2,5m lengths.

4.2.2 The covers shall be manufactured in modular lengths, as specified in the Detail Technical Specification or otherwise in 1 m lengths and shall be secured to the wall channel by means of toggle or swivel nuts. Snap-in covers are also acceptable.

- 4.2.3 At the building module lines, covers of specified length or otherwise in 250 mm lengths shall be installed, against which partition walls may be installed, thereby trapping these covers. The removable modular covers shall be installed between these "fixed" covers.
- 4.2.4 Each modular cover associated with the power compartment shall be punched and prepared for the installation of either a 13A or a 16A, 3-pin standard flush switched socket outlet, whether any is specified or indicated for that module or not. Where socket outlets are not installed, the punched holes shall be blanked off with a metal blanking plate, painted the same colour as the power skirting and installed at the back of the covers. These blanking plates shall be easily removable to permit future installation of socket outlets.
- 4.2.5 Unless otherwise specified, no provision shall be made on the covers of the telephone or light current services compartments for the installation of sockets.
- 4.2.6 Factory-made end covers shall be installed at the ends of all runs of power skirting. All internal and external bends or offsets shall be factory-made and shall be installed to provide a neat and workmanlike appearance.
- 4.3 Painting
- The power skirting shall be painted in a colour as specified in the Detail Technical Specification. The painting of steel power skirting shall comply with the Department's "STANDARD PAINT SPECIFICATION", Section C39. Aluminium power skirting shall be anodised. The power skirting channels and covers shall be individually wrapped or packed to protect them against damage in transit and before installation.
- 4.4 Socket-outlets
- 4.4.1 Standard 13 A or 16 A, 3-pin flush switched socket outlets (100 x 50 mm nominal size) shall be supplied and installed in the positions indicated on the drawings and as specified in the Detail Technical Specification.
- 4.4.2 The switched socket outlets shall be secured to the channel by means of suitable brackets.
- 4.4.3 After installation of the modular front covers, they shall be screwed to the socket outlets to ensure proper alignment between the two components. Separate standard covers need not be provided for the socket outlets.
- 4.5 Conduit Feeders
- 4.5.1 Conduits for the circuit wiring to the power skirting shall be installed in the floor slab and shall terminate in flush conduit or boxes, behind the power skirting and installed to match the height of the power, telephone and light current services compartments of the skirting.
- 4.5.2 The wiring/cables shall pass through large diameter holes cut in the rear of the power skirting. The holes shall be suitably bushed or trimmed to prevent damage to the wiring or cables.
- 4.5.3 Alternatively conduits feeding to the telephone compartment may be terminated in boxes facing upwards in the floor slab immediately below the power skirting, with suitable bushed or trimmed openings being provided through the bottom of the power skirting duct for the cables to pass through. (Applicable only where the power skirting occurs at floor level).
- 4.6 Power skirting at Doorways
- Where a section of power skirting is interrupted by a doorway, bridging conduits shall be installed to interconnect the power skirting sections. Where conduits are not specifically indicated, a minimum of 1 x 32mm bridging conduit shall be installed for each of the power, light current and telephone compartments.

4.7 Cleaning

Prior to fitting front covers, the power skirting shall be thoroughly cleaned to remove all dust and rubble and damage to paintwork where this has occurred, shall be repaired.

SECTION B3

INSTALLATION OF CABLE TRAYS AND LADDERS

1. GENERAL

Cable trays and cable ladders complying with the Department's standard specification for "CABLE TRAYS AND LADDERS", Section C3 shall be supplied and installed where specified and/or where generally suitable for cable distribution.

2. RESPONSIBILITY OF THE CONTRACTOR

The Contractor shall supply and install all cable trays and/or ladders as specified or as required by the cable routes including the necessary supports, clamps, hangers, fixing materials, bends, angles, junctions, reducers, T-pieces etc. He shall further liaise with the Main Contractor for the provision of holes and access through the structure and finishes.

3. SUPPORTS

Cable tray supports shall consist of two steel hangar rods, at least 8mm in diameter, on both sides of the tray with a substantial steel cross-member on the underside of the tray and bolted to the rods. Alternatively, cable trays may be cantilevered from walls on suitable brackets.

4. SPACING OF HORIZONTAL SUPPORTS

4.1 Horizontal trays shall be supported at the following maximum intervals:

- | | | |
|-----|---|----------------------|
| (a) | 1,2 mm to 1,6 mm thick metal with 12mm to 19 mm return trays | 1m maximum spacing |
| (b) | 2,5 mm thick metal trays with 76 mm return | 1,5m spacing. |
| (c) | Cable ladders with 76mm side rail of 2mm thickness and with crossrungs. | 1,5m spacing |
| (d) | Metal cable ladders other than c) above, including site manufactured angle iron types | 1m spacing |
| (e) | 3 mm thick PVC trays with 40mm return. | 1m maximum spacing |
| (f) | 4 mm thick PVC trays with 60mm return | 1,5m maximum spacing |

4.2 In addition to the above spacing on the longitudinal run, trays and ladders shall be supported at each bend, offset and T-junction.

5. JOINTS

- 5.1 Joints shall be smooth and without projections or rough edges that may damage the cables. The Contractor will be required to cover joints with rubber cement or other non-hardening rubberised or plastic compounds if in the opinion of the Department joints may damage cables.
- 5.2 Joints shall as far as possible be arranged to fall on supports. Where joints do not coincide with supports, joints shall be made by means of wrap-around splices of the same material as the tray and at least 450mm long. The two cable tray ends shall butt tightly at the centre of the splice and the splice shall be bolted to each cable tray by means of at least 8 round head bolts, nuts and washers. Splices shall have the same finish as the rest of the tray.
- 5.3 Splices as described above shall be provided at joints, which do coincide with supports if the loaded tray sags adjacent to the joint due to the interruption of the bending moment in the tray.

6. **FIXING TO SUPPORTS**

Trays shall be bolted to supports by at least two round head bolts per support. Bolts shall be securely tightened against the tray surface to avoid projections which might damage cables during installation.

7. **FIXING TO THE STRUCTURE**

- 7.1 Where installed on concrete or brick, the supports for cable trays and ladders shall be securely fixed by means of at least 2 heavy duty, expansion type anchor bolts. Cantilevered trays shall be supported by a minimum of two 6mm diameter expansion bolts per support.
- 7.2 It is the responsibility of the Contractor to ensure that adequate fixing is provided since cable trays and ladders that work loose shall be rectified at his expense. The fixing shall take into account site conditions that prevail during installation.
- 7.3 Where installed on vertical steelwork, cable trays and ladders shall be fixed by means of 6mm diameter bolts and nuts.
- 7.4 On horizontal steelwork, use may alternatively be made of "CADDY" type fasteners.
- 7.5 Horizontal trays and ladders shall in general be installed 450 mm below slabs, ceilings, etc. to facilitate access during installation of cables.
- 7.6 Multiple runs shall be spaced at least 300 mm apart unless a different spacing is specified in the Detail Technical Specification.

8. **INSTALLATION OF CABLES**

Cables shall be installed adjacent and parallel to each other on the trays with spacings as specified in the Department's standard specification for "INSTALLATION OF CABLES", Section B6, and snaked slightly to allow for expansion. Cables shall present a neat appearance and shall under no circumstances be bunched. Cables shall be clamped at maximum intervals of 3 m when installed on horizontal trays and at maximum intervals of 600 mm when installed on vertical trays.

9. **EARTHING**

Metal trays and ladders shall be bonded to the earth bar of the switchboard to which the cables are connected. Additional bare copper stranded conductors or copper tape shall be bolted to the tray or ladder where the electrical continuity cannot be guaranteed. These additional conductors or tapes shall always be installed in outdoor applications and in coastal regions.

10. **CORROSION**

PVC trays shall be used in corrosive atmospheres. All supports shall be adequately protected against corrosion, preferably with a powder coated paint finish in accordance with the Department's "STANDARD PAINT SPECIFICATION", Section C39.

SECTION B4

FIXING MATERIALS

1. RESPONSIBILITY

It is the responsibility of the Contractor to position and securely fix conduits, ducts, cables and cable channels, switchboards, fittings and all other equipment or accessories as required for the Installation. The Contractor shall provide and fix all supports, clamps, brackets, hangers and other fixing materials.

2. FINISHING

All unpainted supporting steelwork installed by the Contractor shall be wire brushed and given one coat of rust-resisting primer, followed by one coat of high quality enamel paint before any other equipment is fixed.

3. STRUCTURAL STEEL

Supports, brackets, hangers, etc. may only be welded to structural steel members where prior permission of the Department has been obtained. "CADDY" or similar fasteners may be used to fix equipment to structural steel members.

4. SCREWS AND BOLTS

Where holes exist in equipment to be fixed, bolts and fixing screws as specified shall be used. Where sizes are not specified, the largest bolt or screw that will fit into the hole shall be used.

5. WALL PLUGS

Where the fixing holes in brick or concrete walls are smaller than 10mm dia. and where the mass of the equipment is less than 10kg, wall plugs may be used to fix conduits, cables and other equipment. Fibre or plastic plugs shall be used. Wooden Plugs are not acceptable. Aluminium plugs may be used in face bricks. Plugs installed in joints between bricks are not acceptable. A masonry drill of the correct size shall be used to drill holes for plugs. Round-headed screws of the correct diameter to match the specific plug shall be used throughout.

6. ANCHOR BOLTS

Where the fixing holes are 10mm and larger or where the mass of the equipment is 10kg, equipment shall be fixed by means of expanding anchor bolts or by means of bolts cast into the concrete or built into walls.

7. GALVANISED EQUIPMENT

Brass screws bolts and nuts shall be used to fix galvanised equipment.

8. SHOT-FIRED FIXING

8.1 Materials such as metal cable ducts or channels may be fixed against walls and concrete slabs by means of the shot-fired fixings.

8.2 The Contractor shall ascertain whether this method of fixing will carry the weight of the material including conductors, cables and other items of equipment to be installed later. Should it be found that the method of fixing is inadequate and supports tend to loosen, the Contractor will be required to fix the material by an alternative method to the satisfaction of the Department.

8.3 Where the shot-fired method is used, warning signs shall be placed at all entrances leading to the area where this work is in progress. The Contractor shall take all reasonable precautions to prevent accidents. Refer also to The Occupational Health and Safety Act.

8.4 Nails and explosive charges recommended by the manufacturer shall be used throughout.

9. **CLAMPS AND BRACKETS**

Clamps and brackets used to fix or support equipment such as cable trays, ducts, etc. shall be of a purpose-made type suitable for the specific application. Refer also to the Department's standard specification for "CABLE TRAYS AND LADDERS", Section B3 and "INSTALLATION OF WIRING CHANNELS", Section B2.

SECTION B5

WIRING

This section covers wiring in approved wire-ways for electrical installations in buildings or other structures under normal environmental conditions for 50 Hz systems not exceeding 600 V.

1. TYPE OF CONDUCTORS

PVC-insulated or equivalent, stranded copper conductors and bare stranded or green PVC-insulated copper earth conductors complying with the Department's quality specification for "PVC-INSULATED CABLES", Section C4, shall be used exclusively. Only where cables are specified or in instances where the exceptions stipulated in SABS 0142 are applicable, may the Contractor deviate from this requirement.

2. WIRE-WAYS

- 2.1 All unarmoured conductors shall be installed in conduits, cable channels (trunking) or power skirting and shall under no circumstances be exposed. Cable channels and power skirting shall be of metal construction unless specifically approved to the contrary.
- 2.2 Tenderers must note that common wire-ways will only be permitted for relatively light current-carrying conductors such as lighting and socket-outlet circuits. Refer also to par. 4 below. Heavy current-carrying conductors such as feeders to distribution boards and large power points, must be installed in separate conduits or wire-ways.

3. ORDER OF WORK

Wiring shall only be carried out after the wire-way installation has been completed, but before painting has commenced. Debris and moisture shall be removed from the wireways prior to the installation of the conductors.

4. CIRCUITS

Conductors that are connected to different switchboards, shall not be installed in the same wireway. The wiring of one circuit only will be allowed in a 20 mm dia. conduit with the exception of the wiring from switchboards to fabricated sheet metal boxes close to switchboards in which case more than one circuit will be allowed. For larger conduit sizes the requirements of SABS 0142, shall be met.

5. LOOPING AND JOINTS

A loop-in wiring system where conductors are looped from outlet to outlet, shall be employed. Joints in conductors shall be avoided as far as possible but where it becomes unavoidable, joints will be accepted in cable channels only and not in conduits. Joints shall be soldered or shall alternatively consist of approved ferruling, properly covered with heat-shrink sleeves. The use of PVC insulation tape is not acceptable.

6. GROUPING OF CONDUCTORS

In cases where the conductors of more than one circuit are installed in the same wireway, the conductors of each separate circuit (including earth conductor) shall be taped at intervals of 1m with PVC insulation tape. The conductors of different circuits shall however remain separate in order that any given circuit can be withdrawn. Conductors entering switchboards or control boards shall be grouped and bound by means of plastic or metal bands (not tape).

7. CABLE TRAYS

Conductors may only be installed directly on cable trays if specifically approved by the Department. In these cases cable trays shall be at least 2m above walkways or working areas. Conductors of the same circuit shall be grouped in the same manner as described in the previous paragraph. All the conductors on the cable tray shall then be tied down securely to the cable tray at intervals of 2m or less by means of plastic or metal bands (not tape).

8. DRAWING-IN OF CONDUCTORS

When conductors are drawn through conduit, care shall be taken that they are not kinked or twisted. Care shall also be taken that the conductors do not come into contact with materials or surfaces that may damage or otherwise adversely affect the durability of the conductor.

9. THREE-PHASE OUTLETS

9.1 With the exception of three-phase outlets, circuits connected to different phases shall not normally be present at lighting, switch or socket outlet boxes. Where this is unavoidable, barriers shall be provided between terminals or connections of the various phases and the box shall be suitably labelled internally to indicate the presence of three phase voltages.

9.2 A neutral conductor shall be installed to all three phase outlets intended for equipment connection, whether sockets or isolators, irrespective of whether the particular equipment normally requires a neutral or not.

10. VERTICAL CONDUIT INSTALLATION

Conductors installed in vertical wire-ways shall be secured at intervals not exceeding 5m to support the weight of the conductors. Clamps shall be provided in suitable drawboxes for this purpose.

11. CONNECTIONS

The insulation of conductors shall only be removed over the portion of the conductors that enter the terminals of switches, socket outlets or other equipment. When more than one conductor enters a terminal, the strands shall be securely twisted together. Under no circumstances shall strands be cut off.

12. EARTHING CONDUCTORS

12.1 When earth continuity conductors are looped between terminals of equipment, the looped conductor ends shall be twisted together and then soldered or ferruled to ensure that earth continuity is maintained when the conductors are removed from a terminal.

12.2 The installation shall be earthed to comply with SABS 0142.

12.3 The installation shall be bonded to comply with SABS 0142.

13. COLOURS

The colours of conductor insulation shall comply with SABS 0142. The colours of conductors for sub-circuits shall as far as possible correspond with the colour of the supply phase. The colours of conductors for wiring to two-way and intermediate switches shall preferably differ from the colour of phase conductors.

14. SINGLE-POLE SWITCHES

Single-pole switches shall be connected to the phase conductor and not to the neutral conductor.

15. SIZE OF CONDUCTORS

Where conductor sizes are not specified, the following minimum conductor sizes shall be used:

Lighting circuits: 1,5mm² and 2.5mm² copper earth conductor
Socket-outlet circuits: 2,5mm² and 2,5mm² copper earth conductor.

Bell circuits: 1,5mm²

Stove circuits: 10mm² and 6mm² copper earth conductor

Clock circuits: 1,5mm²

16. PARTITIONS

16.1 When wiring is installed in removable partitions, the vertical and/or horizontal metal supports of the walls may be utilised for wiring on condition that:

- (a) the conductors are not exposed,
- (b) the metal supports are properly earthed,
- (c) a separate bare earth continuity conductor is drawn in together with the current carrying conductors and is earthed to the metal parts of the switches and/or the socket-outlets, and
- (d) conductors are installed in the metal and non-inflammable sections of the partitions.

16.2 Conductors enclosed in a copper braiding (harness wiring) may be installed in removable partitions. The braiding can be used as earth continuity conductor. The wiring shall be joined to the conduit (or cable) installation by interconnecting the conductor and the earth conductors in a draw-box using suitable ferrules and heat-shrink sleeves or screwed terminals.

SECTION B6

INSTALLATION OF CABLES

This section covers the installation of cables for the distribution of power in buildings, other structures and in ground for system voltages up to 11 kV, 50 Hz.

1. GENERAL

1.1 Cable Types

- (a) All cables and jointing and termination accessories used for power distribution shall comply with the Department's Quality Specifications, Section C.
- (b) Cables with copper conductors shall be used throughout unless otherwise specified or approved.
- (c) All unarmoured cables shall be installed in metal trunking, sleeves or conduit unless clearly specified to the contrary.
- (d) XLPE Cables shall only be used in exceptional circumstances with the written permission of the Department.

1.2. Competence of Personnel

It is a definite requirement that the Contractor shall only employ personnel fully conversant with cable manufacturer's recommendations for joining and terminating cables.

2. IDENTIFICATION OF CABLES

- 2.1 Cables shall be identified at all terminations by means of punched metallic bands or marked with labels or tags. (Refer also to SABS 0142).
- 2.2 The use of PVC tape with punched characters is not acceptable.
- 2.3 The identification numbers of cables shall be shown on "as built" drawings of the Installation.

3. TRENCHING

3.1 General

- 3.1.1 The Contractor shall be responsible for all trenching excavations unless specified to the contrary.
 - 3.1.2 The Contractor shall, before trenching commences, familiarise himself with the routes and site conditions and the procedure and order of doing the work shall be planned in conjunction with the general construction programme for other services and building requirements.
 - 3.1.3 The Contractor shall acquaint himself with the position of all the existing services such as stormwater pipes, water mains, sewer mains, gas pipes, telephone cables, etc. before any excavations are commenced. For this purpose he shall approach this Department's representative, the local municipal authority and any other authority which may be involved, in writing.
 - 3.1.4 The Contractor will be held responsible for damage to any existing services brought to his attention by the relevant authorities and shall be responsible for the cost of repairs.
 - 3.1.5 The Contractor shall take all the necessary precautions and provide the necessary warning signs and/or lights to ensure that the public and/or employees on site are not endangered.
 - 3.1.6 The Contractor shall ensure that the excavations will not endanger existing structures, roads, railways, other site constructions or other property.
- ##### 3.2 Mechanical Excavators

- 3.2.1 Power driven mechanical excavators may be used for trenching operations provided that they are not used in close proximity to other plant, services or other installations likely to be damaged by the use of such machinery.
- 3.2.2 The use of power driven mechanical excavators shall be subject to the approval of the Department. Should the excavator produce trenches that exceed the required dimensions, payment based on volumetric excavation rates will be calculated on the required dimensions only.
- 3.3 Blasting
- 3.3.1 No guarantee is given or implied that blasting will not be required.
- 3.3.2 Should blasting be necessary and approved by the Department, the Contractor shall obtain the necessary authority from the relevant Government Departments and Local Authorities. The Contractor shall take full responsibility and observe all conditions and regulations set forth by the above authorities.
- 3.4 Routes
- 3.4.1 Trenches shall connect the points shown on the drawings in a straight line. Any deviations due to obstructions or existing services shall be approved by the Department beforehand. Refer also to par. 10.4.
- 3.4.2 The Department reserves the right to alter any cable route or portion thereof in advance of cable laying. Payment in respect of any additional or wasted work involved shall be at the documented rates.
- 3.4.3 The removal of obstructions along the cable routes shall be subject to the approval of the Department.
- 3.5 Shoring and Waterlogging
- 3.5.1 The Contractor shall provide shoring for use in locations where there is a danger of the sides of the trench collapsing due to waterlogging or other ground conditions. Refer to the The Occupational Health and Safety Act.
- 3.5.2 The strength of shoring must be adequate for site conditions prevailing and the shoring must be braced across the trench.
- 3.5.3 The Contractor shall provide all pumps and equipment required to remove accumulated water from trenches. Water or any other liquid removed shall be disposed of without any nuisance or hazard.
- 3.6 Trenching
- 3.6.1 Trenching shall be programmed in advance and the approved programme shall not be departed from except with the consent of the Department.
- 3.6.2 Trenches shall be as straight as possible and shall be excavated to the dimensions indicated in this specification.
- 3.6.3 The bottom of the trench shall be of smooth contour, and shall have no sharp dips or rises which may cause tensile forces in the cable during backfilling.
- 3.6.4 The excavated material shall be placed adjacent to each trench in such a manner as to prevent nuisance, interference or damage to adjacent drains, gateways, trenches, water furrows, other works, properties or traffic. Where this is not possible the excavated materials shall be removed from site and returned for backfilling on completion of cable laying.

- 3.6.5 Surplus material shall be removed from site and disposed of at the cost of the Contractor.
- 3.6.6 Trenches across roads, access ways or footpaths shall not be left open. If cables cannot be laid immediately the Contractor shall install temporary "bridges" or cover plates of sufficient strength to accommodate the traffic concerned.
- 3.6.7 In the event of damage to other services or structures during trenching operations the Contractor shall immediately notify the Department and institute repairs. (Refer to par. 3.1.3 and 3.1.4)
- 3.6.8 Prior to cable laying the trench shall be inspected thoroughly and all objects likely to cause damage to the cables either during or after laying shall be removed.
- 3.6.9 Where ground conditions are likely to reduce maximum current carrying capacities of cables or where the cables are likely to be subjected to chemical or other damage or electrolytic action, the Department shall be notified before installing the cables. The Department will advise on the course of action to be taken.
- 3.6.10 Extreme care shall be taken not to disturb surveyor's pegs. These pegs shall not be covered with excavated material. If the surveyor's pegs are disturbed, they shall be replaced by a person qualified to do so.
- 3.7 Dimensions of trenches
- 3.7.1 Cable trenches for one or two cables shall not be less than 300 mm wide and need not be more than 450 mm wide. This dimension shall be valid for the total trench depth.
- 3.7.2 The width shall be increased where more cables are installed to allow for the spacings stipulated in par. 4.2.
- 3.7.3 Where trenches change direction or where cable slack is to be accommodated, the Contractor shall ensure that the requirements of the relevant SABS Specification regarding the bending radii of cables are met when determining trench widths.
- 3.7.4 Trench depths shall be determined in accordance with cable laying depths and bedding thickness.
- 3.7.5 Payment will be made on a volumetric excavation rate calculated on the basis of the given maximum dimensions or the actual dimensions, whichever is the lesser. Refer also to par. 3.2.2 and 3.7.1 above.
- 3.8 Joint Holes
- Where cable joints are required to be made in the course of a cable run, a joint hole shall be excavated of sufficient size to enable the cable jointer to work efficiently and unimpeded.
- 3.9 Bedding
- 3.9.1 The bottom of the trench shall be filled across the full width with a 75mm layer of suitable soil sifted through a 6mm mesh and levelled off.
- 3.9.2 Only sandy clay or loam soil with a satisfactory thermal resistivity (not exceeding 1,5EC m/W) may be used for this purpose. Sea or river sand, ash, chalk, peat, clinker or clayey soil shall not be used. The use of crusher sand is acceptable.
- 3.9.3 Where no suitable soil is available on site, the Contractor shall import fill from elsewhere and make all the necessary arrangements to do so. The cost of importing soil for bedding purposes shall be included in the unit rates for excavations.
- 3.9.4 After cable laying a further layer of bedding shall be provided to extend to 75 mm above the cables.

3.9.5 The bedding under joints shall be fully consolidated to prevent subsequent settling.

3.10 Cable Sleeves

3.10.1 Where cables cross under roads, railway tracks, other service areas, etc. and where cables enter buildings, the cables shall be installed in Polyethylene (6mm thickness), asbestos cement pipes or earthenware pipes. Pitch fibre and PVC pipes are not acceptable because of the adhesion that occurs after a period of time between the pipe and the sheathing or outer serving of the cables.

3.10.2 Pipes shall be joined in accordance with the manufacturer's instructions.

3.10.3 Sleeves shall cross roads and railway tracks at right angles.

3.10.4 Sleeves shall have a minimum diameter of 100mm. They shall extend at least 2m beyond the tracks of a railway line or of the outermost tracks where there is more than one line. In the case of roads, the sleeves shall extend at least 1m beyond the road edge or kerb on both sides of the road.

3.10.5 All sleeves shall be graded 1:400 for water drainage.

3.10.6 Cable sleeves shall be installed to the spacings and depths stated in paragraph 4 below.

3.10.7 Galvanised metallic sleeves up to and including 76mm dia. shall be supplied and installed by the contractor.

3.10.8 The ends of all sleeves shall be sealed with a non-hardening watertight compound after the installation of cables. All sleeves intended for future use shall likewise be sealed.

3.11 Backfilling

3.11.1 The Contractor shall not commence with the backfilling of trenches without prior notification to the Department so that the cable installation may be inspected. Should the Contractor fail to give a timeous notification, the trenches shall be re-opened at the Contractor's cost. Such an inspection will not be unreasonably delayed.

3.11.2 For high voltage cables (1 kV to 11 kV) a coloured plastic marking tape shall be installed 400 mm above the cable. The tape shall be yellow, marked with the words "ELECTRIC CABLE/ELEKTRIESE KABEL" in red. These markings shall not be more than 1m apart from centre to centre.

3.11.3 Backfilling shall be undertaken with soil suitable to ensure settling without voids. The maximum allowable diameter of stones present in the backfill material, is 75mm.

3.11.4 The Contractor shall have allowed in his tender for the importation of suitable backfill material if required.

3.11.5 The backfill shall be compacted in layers of 150mm and sufficient allowance shall be made for final settlement. The Contractor shall maintain the refilled trench at his expense for the duration of the contract. Surplus material shall be removed from site and suitably disposed of.

3.11.6 On completion, the surface shall be made good to match the surrounding area.

3.11.7 In the case of roadways or paved areas the excavations shall be consolidated to the original density of the surrounding material and the surface finish reinstated.

3.12 Cable Markers (for HV cables only, except where otherwise specified)

3.12.1 Cable markers shall be provided along all HV cable routes but need only be provided along LV

cable routes where specified.

- 3.12.2 Cable markers shall consist of concrete blocks in the shape of truncated pyramids, approx. 300mm high, 150 x 150mm at the top and 250 x 250mm at the bottom.
- 3.12.3 Brass plates shall be cast into the tops of the blocks in such a manner that they cannot be prised loose. The wording "ELECTRIC CABLE/ELEKTRIESE KABEL" shall be stamped on the brass plates as well as direction arrows and the cable voltage rating.
- 3.12.4 Cable markers shall be installed on the surface along all the underground routes and shall project 35 mm above normal ground level unless the projected markers could be a hazard to pedestrian or other traffic in which case they shall be installed flush with the surface.
- 3.12.5 Cable markers shall be installed at the beginning and end of a cable run (e.g. where a cable enters a substation or building), at all changes of direction, above all joints, above cable pipe entries and exits and at intervals not exceeding 50 m along the cable route.
- 3.12.6 The position of cable markers shall be indicated on the "as built" drawings.
- 3.13 TRANSNET, Provincial Administration or National Road Crossings
 - 3.13.1 The Contractor shall not trench beneath any railway tracks without the TRANSNET Administration's supervision. The Contractor shall request the Department timeously to arrange for the necessary supervision. The cost of such supervision will be paid for by the Department.
 - 3.13.2 The Department will arrange for the necessary wayleave and permission to cross TRANSNET property and railway tracks, or Provincial or National road reserves and TELKOM Authority approval of proposed cable routes.
 - 3.13.3 The Contractor shall carry out the crossing installation in strict accordance with the TRANSNET and Provincial Administration's requirements and stipulations. Where these requirements are in contradiction with this specification, the Department's ruling shall be sought.
 - 3.13.4 The Contractor shall ensure that he will comply with the various Administration's requirements regarding crossing of Provincial and National roads, especially with regard to the safeguarding of the public. The Contractor shall also provide proof of adequate insurance cover against any claim from any accident as a result of work done by the Contractor during the crossing operation. The Department shall also be indemnified from all liability in this regard.
 - 3.13.5 The Contractor shall liaise with the various Administrations well in advance regarding the intended dates, times and expected duration of the crossing operations and obtain their approval of the programme and method of operation before commencing with the work.

4. INSTALLATION OF UNDERGROUND CABLES

4.1 Installation Depths

- 4.1.1 Cables shall be installed at the following minimum depths below final ground level :

Up to 11kV : 800mm

- 4.1.2 All cable depth measurements shall be made to the top of the cable when laid directly in ground or to the top of the duct or sleeve where these are provided.
- 4.1.3 The above depths shall apply to the top layer where cables are installed in layers.
- 4.1.4 The Contractor may only deviate from the above depths provided prior authority in writing has been obtained from the Department. In this event the cables shall be protected with a suitable concrete covering.

4.1.5 The depth of cable pipes or ducts beneath railway lines or roads shall be not less than 1,1 m below the formation level.

4.2 Cable Spacings

4.2.1 Cables installed in the same trench shall be laid parallel to each other with the following spacings between cables (LV: up to 1 kV; HV: 1 kV to 11 kV):

LV/LV	:	2 cable diameters
LV/HV	:	150mm minimum
HV/HV	:	150mm minimum
LV/HV/PILOT	:	1 cable diameter

4.2.2 Where HV and LV cables have to be installed in the same trench, both shall be laid at a depth of 800 mm and then covered with 200mm of soil. The soil shall then be compacted, and then backfilled layer by layer and compacted until the trench is completely backfilled.

4.2.3 Cables for telephones, communication systems and other low voltage systems (less than 50 V) shall be separated from power cables by at least 1m. All control or pilot cables without a lead sheath and steel armouring shall be laid at least 300mm from power cables.

4.2.4 Cables shall not be buried on top of each other unless layers are specified. The minimum spacing between layers shall be 200mm.

4.3 Cable Laying

4.3.1 Except where ducts, tunnels or pipes are provided, cables shall be laid directly in the ground.

4.3.2 The cable shall be removed from the drum in such a manner that the cable is not subjected to twisting or tension exceeding that stipulated by the cable manufacturer.

4.3.3 Cable rollers shall be used as far as possible to run out cables. Rollers shall be spaced so that the length of cable in the trench will be totally suspended during the laying operation and sufficiently close to prevent undue sagging and the cable from touching the ground. Rollers shall also be placed in the trench in such a manner that they will not readily capsize.

4.3.4 Cable rollers shall have no sharp projecting parts liable to damage the cables.

4.3.5 Where cables have to be drawn around corners, well-lubricated skid plates shall be used. The skid plates shall be securely fixed between rollers and shall constantly be examined during cable laying operations.

4.3.6 Where cables have to be drawn through pipes or ducts, a suitable cable sock shall be used and particular care shall be exercised to avoid abrasion, elongation or distortion of any kind. In the case of oil filled cables, a cable sock may never be used. Special eyes giving access to the interior of the cable, must be utilised.

4.3.7 The maximum allowable tension when pulling a cable, is 70 N/mm² of conductor area.

4.3.8 It will be assumed that the price or rates contained in the tender includes for the installation of cables in pipes and ducts or below existing or newly installed services.

4.3.9 The Department shall be informed timeously of the intention to carry out all cable laying operations to allow an inspection of the works by the Department if so required.

5. INSTALLATION OF CABLES IN CONCRETE TRENCHES

5.1 General

This paragraph covers the installation of cables in building trenches, service ducts, etc. The trenches, ducts, etc. inside buildings will be constructed and installed by others.

5.2 Installation

Cables shall be installed in one of the following ways:

- (a) On horizontal cable trays.
- (b) On horizontal metal supports with suitable clamps.
- (c) On vertical cable trays or metal supports fixed to the side of the trench. The cables shall be clamped in position.

Cables shall not be bunched and laid on the floor of the building trenches.

5.3 Covers

5.3.1 The covering of concrete trenches shall as a rule fall outside the scope of the electrical installation. The Contractor shall however be responsible for the cutting or drilling and smoothing of holes for cables through chequer plates, concrete or other coverings as required.

5.3.2 Cables shall enter and exit the trench through sleeves protruding 300mm beyond the covering. The sleeves shall be permanently secured in position and the open space between the cable and sleeves shall be sealed with a non-hardening, watertight compound.

5.4 Filled trenches

5.4.1 Where specified, floor trenches shall be filled with fine crusher sand (no river or sea sand).

5.4.2 If a sand filling is specified, the cables shall be fixed to non-corroding supports.

5.4.3 Sand-filled trenches other than in substations shall be covered in one of the following ways:

- (a) Reinforced concrete covers.
- (b) Sand and cement screed.
- (c) Removable chequer plates.

5.4.4 Method (a) above shall be used where vehicular traffic may be encountered over trenches. Unless otherwise specified allowance for a mass of 2 tons shall be made.

5.4.5 Cable trenches in substations, switch rooms and generator rooms shall be covered in accordance with the Department's standard specification for "COVERING AND SEALING OF CABLE TRENCHES", Par. 9 of Section B13.

6. FIXING OF CABLES TO TRAYS OR STRUCTURES

6.1 Installation

Cables may be installed in one of the following ways:

- (a) On horizontal cable trays.
- (b) Against vertical cable trays with suitable clamps.

- (c) Against horizontal or vertical metal supports or brackets with suitable clamps.
- (d) On clamps which are fixed to the structure.

6.2 Clamps

Suitable clamps (cleats) which will secure cables without damage shall be used. Metal clamps or drilled hard wood blocks shall be used. Clamps shall consist of adjustable metal wings which clamp to a metal support, or consist of two halves that are bolted together. The correct clamp size to fit the cable shall be used. Cables of different sizes may only be fixed by a common clamp when the clamp is specially made to accommodate the various cables.

6.3 Spacing of Supports

Two methods of supporting cables are found in practice. The most generally known method is the restrained installation where the distance between supports is small enough to prevent any noticeable sag in the cable. The alternative method is the unrestrained installation where the distance between supports should be great enough to ensure that there will be obvious sag in each span between supports.

6.4 Spacing of Supports of Unrestrained Cables

Large single core cables shall always be installed according to this method. Generally, single core cables with conductors exceeding a cross sectional area of 185mm² should be supported at spacings in excess of 2m since the sag between supports will safely accommodate any thermal expansion.

Reducing the spacing between the supports to 1,5m or less shall be avoided at all costs, as expansion cannot be taken up by a change of sag and chances of sheath failure become considerable.

6.5 Spacing of Supports of Restrained Cables

Additional cleats shall be installed at each bend or offset in the cable run. The maximum distance between supports or cleats for multi-core control cables shall be 20 times the outside diameter of the cable with a maximum spacing of 550mm for unarmoured cables and 30 times the outside diameter of the cable with a maximum spacing of 900mm for armoured cables. Spacing of supports for cables for high voltage lighting shall be in accordance with Table 8 of SABS 0142. A minimum of 20mm ventilation clearance shall be maintained between cables and the wall to which they are cleated.

7. GROUPING AND SPACING OF CABLES IN BUILDINGS AND STRUCTURES

7.1 Spacing correction factors

Cables shall as a rule be spaced two cable diameters apart, for which no grouping correction factor need be applied.

7.2 Cables on Different Levels

Where parallel cable runs are installed at different levels (e.g. on parallel cable trays) and where the spacing of the layers is not specified, a minimum spacing of 300mm shall be maintained.

7.3 Single Core Cables

Where single core cables are installed along a three-phase circuit, the cables shall be installed in trefoil formation and bound together at 300mm intervals.

7.4 High Voltage Cables

High voltage cables shall be separated from other cables and services throughout the installation and shall as far as possible be installed in separate floor trenches, pipes or metal channels. Where this is not feasible a minimum spacing of 500 mm shall be maintained.

7.5 Cables for Other Services

Cables for telephones, communication systems and other low voltage systems (less than 50 V) shall be separated from power cables. In building ducts a physical barrier shall be provided between power cables and cables for other services. Where armoured cables are used for such other services, they shall be installed on separate cable trays or shall otherwise be at least 1m away from power cables. Where unarmoured cables are used for these other services, they shall be installed in separate conduits or metal channels.

TABLE B6.1

Cross-Section Area of Cable Conductors (mm ²)	MAXIMUM SPACING OF SUPPORTS (CLEATS)(mm) FOR RESTRAINED CABLES			
	Wire Armoured Cables		Other than Wire Armoured Cables and Unarmoured Cables	
	Horizontal Cable Routes	Vertical Cable Routes	Horizontal Cable Routes	Vertical Cable Routes
1,5	450	750	300	400
2,5	450	750	300	400
4,0	600	750	300	400
6,0	600	750	300	400
10,0	750	900	400	450
16,0	750	1000	400	550
25,0	900	1000	450	550
35,0	900	1000	450	550
Bigger than 35,0	900	1000	450	550

For larger cables the spacing shall be 10 x outside diameter of the cable.

8. TERMINATION AND JOINTING OF CABLES

8.1 General

8.1.1 Cable ends shall be terminated with glands or in cable boxes with the associated accessories such as clamps, shrouds, etc. complying in all respects with the Department's quality specifications, Section C.

8.1.2 Connection of cables to switchgear shall always be effected in such a way that the various phases, seen from the front of the switchgear will be in the following positions:

- No. 1 conductor : left (red) (A)
- No. 2 conductor : centre (white) (B)
- No. 3 conductor : right (blue) (C)

8.1.3 Exposed armouring shall be covered with bitumen-base paint.

- 8.1.4 All cable ends shall be supplied with the necessary earth connection.
- 8.1.5 A channel or other approved means of support shall be provided to remove mechanical stress from the glands.
- 8.1.6 Cable cores shall be marked with heat-shrunk sleeves where necessary to identify the phases. Refer to SABS 0142.
- 8.1.7 The current-carrying capacity and breakdown voltage of the cable end shall be the same as for the complete cable.
- 8.1.8 Cables shall be terminated in accordance with the recommendations laid down by the manufacturers of the cables and glands employed.
- 8.2 Termination of Paper-Insulated Cables
- 8.2.1 The ends shall be terminated in cable end boxes filled with bituminous, cold filling or resin oil semi-fluid compound or heat-shrinkable terminations in accordance with the Department's standard specification for "CABLE END BOXES AND COMPOUND", Section C8 or "CABLE TERMINATIONS AND JOINTS", Section C6.
- 8.2.2 Heat-shrinkable materials shall only be used in exceptional circumstances with the written permission of the Department.
- 8.2.3 Before terminating or jointing paper-insulated cables, a test to establish the presence of moisture must be carried out.
- The following procedure may be followed:
- (a) Place an adequate quantity of cable impregnating oil in a suitable container and heat up to 130 C " 5 C.
 - (b) Cut a small length (" 300mm) of the cable concerned and remove the armouring and sheath, taking care not to handle the dielectric in any way.
 - (c) Dip a section of the outer insulating impregnated paper (belt paper) in the heated oil, taking care not to contaminate the tapes with moisture from the hands. If frothing appears on the surface of the oil, this is a clear indication of the presence of moisture in the paper.
 - (d) The same procedure should then be repeated on the insulating impregnated paper around the conductors (especially those layers closest to the conductors). Frothing will also indicate the presence of moisture.
 - (e) Should only a small number of bubbles appear on the surface of the oil, this is an indication of air bubbles on the paper and not moisture since the presence of moisture will result in a series of bubbles rising to the surface of the oil for a number of seconds, until all moisture has been removed.
- 8.2.4 The armouring shall be bonded to the main earth bar of the switchgear or transformer, but the bond shall be easily removable for testing purposes.
- 8.2.5 The lead sheath shall be wiped against the conical wiping gland.
- 8.2.6 All cut cable ends which will be exposed to the atmosphere for more than two hours shall be sealed and wiped to prevent penetration of moisture.
- 8.3 Termination of XLPE Cables
- 8.3.1 These cables shall only be used in exceptional circumstances and only with the written permission of the Department.

- 8.3.2 Cross-linked polyethylene cables (XLPE) shall be terminated in accordance with the Department's standard specification for "CABLE TERMINATIONS AND JOINTS", Section C6 unless a pre-fabricated system based on pre-moulded slip-on EPR stress cones is used.
- 8.3.3 The copper tapes of the earth screen on the cable shall be bonded to the main earth bar of the switchgear or transformer, but the bond shall be easily removable for testing purposes.
- 8.3.4 The cable shall be firmly secured on the switchgear by means of a clamp to prevent mechanical stress on the cable and terminations.
- 8.4 Termination of PVC-insulated Cables
- 8.4.1 Cable ends shall be terminated by means of adjustable glands in accordance with the Department's standard specification for "GLANDS FOR PVC-INSULATED CABLES", Section C5.
- 8.4.2 The glands shall be fitted in accordance with the cable and gland manufacturers instructions.
- 8.4.3 The correct size and type of gland shall be used for the particular cable and application.
- 8.5 Connection of Cable Conductors
- 8.5.1 Suitable lugs shall be used, preferably solidly sweated to the cable conductor ends. Lugs may be crimped, using mechanical or pneumatic tools designed for this purpose, on condition that evidence is submitted that the method used complies with the performance requirements of BS 4579, Part 1 : "COMPRESSION JOINTS IN COPPER".
- 8.5.2 Contact surfaces shall be thoroughly cleaned and smoothed and fixing bolts shall match the hole size of the lug.
- 8.5.3 Cables that are connected to clamp type terminals where the clamping screws are not in direct contact with the conductor, need not be lugged but the correct terminal size shall be used.
- 8.5.4 Ferrules shall be used as far as possible where cable conductors are connected directly to equipment with screws against the conductor strands.
- 8.5.5 When cutting away insulation from cable conductors to fit into lugs, care shall be taken that no strands are left exposed. Under no circumstances may any of the conductor strands be cut away to fit into lugs.
- 8.6 Joints
- 8.6.1 Joints in cable runs will not be allowed unless specified in the Detail Technical Specification or authorised by the Department.
- 8.6.2 Jointing shall be carried out strictly in accordance with the manufacturer's instructions and by personnel competent in jointing the types of cables used.
- 8.6.3 During outdoor jointing operations, the joint bays shall be adequately covered by tents of waterproof material suitably supported. Where necessary a trench shall be excavated around the bay to prevent the ingress of moisture. The sides of the hole shall be draped with small tarpaulin or plastic sheeting to prevent loose earth from falling in during jointing operations.
- 8.6.4 The joint shall not impair the anti-electrolysis characteristics of the cable.
- 8.6.5 The Contractor shall notify the Department timeously of the day on which jointing is to be carried out in order that an inspection may be arranged if so required. Any cable joint not inspected by the Department because of insufficient notice being given, shall be opened for inspection and redone at the discretion of the Department at the cost of the contractor.
- 8.6.6 HV cable joints on paper insulated cables shall be of the compound cast type and the compound

used shall comply with the Department's standard specification for "CABLE END BOX FILLING COMPOUND", par. 2 of Section C8.

- 8.6.7 HV cable joints on XLPE-insulated cables shall be of the heat shrinkable type and shall comply with the Department's standard specification for "CABLE TERMINATIONS AND JOINTS" Section C6, or shall be based on a prefabricated system utilising pre-moulded slip-on stress cones.
- 8.6.8 LV cable joints shall be of the epoxy-resin type.
- 8.6.9 Joints shall be fully water and air tight and shall be free of voids and air pockets.
- 8.6.10 The crossing of cores in joints will not be permitted under any circumstances.

9. TESTING

- 9.1 Each cable shall be tested after installation in accordance SABS 150 (up to 1 kV) and SABS 97 (up to 11 kV) as well as the requirements of the Local and Supply Authorities.
- 9.2 LV Cables shall be tested by means of a suitable megger at 1 kV and the insulation resistance shall be tabulated and certified.

TABLE B6.2

Cable Rating (kV)	TEST VOLTAGE (Applied for 15 minutes) (kV)				
	Paper-insulated cables				XLPE- insulated cables
6,6 11	Between conductors		Conductors to sheath		Conductors to screen
	AC (r.m.s.)	DC	AC	DC	DC
	12 20	18 30	12 20	18 30	11 18

* High Voltage test with DC to 2kV for 1 minute only. Discharge cable slowly via discharge stick (1 minute). Clamp all conductors to earth for 24 hours.

- 9.3 HV Cables shall be high voltage tested in accordance with Table B6.2 and the exact leakage current shall be tabulated and certified.
- 9.4 The Contractor shall make all arrangements, pay all fees and provide all equipment for these tests. The cost of testing shall have been included in the tender price.
- 9.5 The Contractor shall notify the Department timeously so that a representative of the Department may witness the tests.
- 9.6 On completion of the tests on any cable, the Contractor shall without delay, submit three copies of the certified Test Reports to the Department.

10. MEASUREMENTS

- 10.1 All measurements for payments shall be made jointly by the representatives of the Department

and the Contractor and the Contractor shall obtain the signature of the Department's representative including approval of such measurements.

10.2 No allowance shall be made for the breaking away of the trench sides, other earth movements or for trenches excavated in excess of the stipulated dimensions. Refer also to par. 3.7.5 above.

10.3 The classification shall be as follows:

Very hard rock shall mean rock that can only be excavated by means of explosives.

Hard rock shall mean granite, quartzitic sandstone, slate and rock of similar or greater hardness, solid shale and boulders in general requiring the use of jack hammers and other mechanical means of excavations.

Soft rock and earth shall mean rock and earth that can be loosened and removed by hand-pick and shovel.

10.4 Where very hard rock and hard rock are encountered, the prior approval of the Department shall be obtained before proceeding with the excavation. This requirement is stipulated in order to afford the Department the opportunity to determine whether an alternative cable route is justified.

10.5 All cable lengths indicated in the Detail Technical Specification and/or shown in the cable route drawings shall be regarded as estimates and are given for tendering purposes only. The successful tenderer shall measure actual cable lengths on site before ordering.

10.6 The final price for the supply and installation of all cables will be adjusted, on the basis of the actual lengths of installed cables, in accordance with the unit rates quoted at the time of tendering. Cable lengths shall be measured on site to the nearest 500mm for this purpose and surplus cable will not be paid for.

11. **COMPLETION**

11.1 The Department reserves the right to inspect the installation at any stage during the course of construction. Such inspections will however not deem the portions inspected as being complete or accepted and the Contractor shall remain responsible for completing the installation fully in accordance with the Contract Documents.

11.2 The Contractor shall carry out a final "as built" survey of the cable routes and present to the Department "as built" route plans of the complete installation. The following information shall be reflected on the plans or submitted as separate schedules with the plans :

- (a) Overall length of each cable.
- (b) Locations of all joints (if any) in relation to permanent reference points. Dimensions shall be shown and the method of triangulation i.e. two dimensions to each joint, shall be used.
- (c) Identification of each cable.

11.3 The works will be deemed to be incomplete until all tests have been conducted successfully and all "as built" drawings and schedules have been handed to the Department.

SECTION B7

INSTALLATION OF LIGHT SWITCHES AND SOCKET-OUTLETS

1. GENERAL

1.1 Standards

Light switches and socket-outlets shall comply with the Department's quality specification for "LIGHT SWITCHES", Section C10 and UNSWITCHED AND SWITCHED SOCKET-OUTLETS", Section C11. Surface or flush mounted boxes and cover plates, complying with the Department's quality specification for "CONDUIT AND CONDUIT ACCESSORIES", Section C1, shall be provided.

1.2 Position of Outlets

Switches and socket-outlets shall be accurately positioned in accordance with the drawings. It is the Contractor's responsibility to ensure that all outlets are installed level and square, at the correct height from the floor and at the correct position relative to building lines and equipment positions as specified. It is the Contractor's responsibility to determine the correct final floor level and ceiling level in conjunction with the Main Contractor.

1.3 Cover Plates

All switches and socket-outlets shall be fitted with standard metal cover plates. The colour of cover plates shall be as specified or shall otherwise match the surrounding finishes as closely as possible. Unless specified to the contrary, ivory cover plates shall be installed on painted walls. Cover plates in the same area shall have the same colour. Flush mounted cover plates shall overlap the draw-box and edges of the recess. Cover plates shall under no circumstances be cut unless authorised by the Department.

1.4 Escutcheon Plates

Where flush mounted switches or socket-outlets are installed in special wall finishes e.g. wood or board panels, acoustic tiles or other cladding, etc. and where the wall finishes must be cut to accommodate the switch, it may be necessary to fix an escutcheon plate to the wall to cover the cut-outs. The escutcheon plate shall fit closely around the outlet boxes and shall be fixed independently of the boxes and cover plates. Bevelled cover plates shall be fixed to the outlet boxes and shall fit firmly against the escutcheon plate.

1.5 Appearance

The sides of adjacent switches, plugs, push-buttons etc. shall be parallel or perpendicular to each other and uniformly spaced. A common escutcheon plate shall be placed around flush mounted outlets and accessories where the standard cover plates do not cover the cut-outs in the finishes.

1.6 Deep Boxes

Where switch or socket-outlet boxes have been set deep, spiral type steel wire spacers shall be used to fix the yoke of the switch or socket.

2. INSTALLATION OF SOCKET-OUTLETS

2.1 Mounting Height

Unless specified to the contrary, socket-outlets shall be installed at the following heights above finished floor level, measured to the centre of the outlet:

Flush mounted in general:	300mm
Showrooms, shops, servants quarters:	1,4m
Domestic kitchens, tea kitchens:	1,05m
Commercial kitchens:	1,4m
Factories, workshops, garages:	1,4m

2.2 Walls

In cases where socket-outlets must be mounted at a nominal height of 300mm and where the lower portion of the wall consists of face bricks and the upper portion is plastered, the outlets shall be installed in the plastered portion of the wall. If however the plastered portion of the wall commences 500mm or more above floor level the outlets shall be installed in the face bricks. Where a wall has different surface finishes the outlets shall be installed within the same finish and not in the dividing lines between the different wall finishes. All outlets shall be installed at least 150mm away from door frames.

3. INSTALLATION OF LIGHT SWITCHES

3.1 Mounting

Light switches shall be installed 1,4m above finished floor level unless specified to the contrary. Mounting heights given shall be measured from the finished floor level to the centre of the switch. All single switches shall be installed with the long side of the toggle vertical.

3.2 Doors

Unless specified to the contrary, switches adjacent to doors shall be installed on the side containing the lock. If the position of the lock is not shown on the drawings, the position shall be verified before the switch-box is installed. Switch boxes in brick or concrete walls shall be installed 150mm from the door frame. Light switches installed in partitions or door frames shall be of the type designed for that purpose.

3.3 Walls

Where the lower portion of a wall is face brick and the upper portion plastered, light switches shall be installed wholly in the plaster provided that the lower edge of the plaster is not higher than 1,6m above the finished floor level. In general where different wall finishes are used in the same area. Switches shall be installed within the same finish and not on the dividing lines between finishes.

3.4 Partitions

Light switches installed in partitions shall preferably be of the type designed to be accommodated in the partition construction. Switches installed in the metal supports do not require switch boxes. Switches may not be flush mounted in partition walls without switch boxes.

3.5 Watertight Switches

Switches that are exposed to the weather or are installed in damp areas, shall be of the watertight type complying with the Department's quality specification for "WATERTIGHT

SWITCHES", par. 3 of Section C10.

3.6 Multiple Switches

Where several switches are required in one position, multi-lever switches in a common switch box shall be provided wherever possible. All circuits wired into this box shall be on the same phase in order that voltages in excess of 250 V are not present in the box. Where it is not possible or practical to do this, barriers shall be installed and a label shall be prominently displayed within the box stating that voltages in excess of 250 V are present.

SECTION B9

INSTALLATION OF LUMINAIRES

1. POSITIONS

The mounting positions of luminaires shall be verified on site. All luminaires shall be placed symmetrically with respect to ceiling panels, battens, beams, columns or other architectural features of the space unless otherwise indicated. The layout as shown in the Documents shall generally be adhered to but any discrepancies or clashes with structural or other features must be referred to the Department, before commencing erection of the installation.

2. COVER PLATES

Cover plates shall be fitted over all draw-boxes and outlets intended for luminaires that are not covered by the luminaire canopy, lamp-holder, ceiling rose or similar accessories.

3. FIXING TO DRAW-BOXES

Where an outlet box or draw-box provides the necessary support for a luminaire, all luminaires with the exception of fluorescent luminaires mounted against ceilings, shall be fixed directly to the box. Fluorescent luminaires and luminaires with a mass in excess of 10kg shall however be suspended independently of the outlet box.

4. HANGERS AND SUPPORTS

Where provision has not been made for the fixing of luminaires, the Contractor shall supply the necessary supports, hangers, conduit extensions, angle brackets or any other fixing method approved by the Department.

5. SUSPENDED LUMINAIRES

The necessary hangers shall be provided where luminaires which are of the non-suspension type have to be fixed below false ceilings or roof slabs. The use of 20mm conduits fixed to the roof slab or ceiling is preferred. Provision shall be made for adjustments to enable the levelling of luminaires. Suspended conduits shall be fixed to the ceiling by means of screwed dome lids, bolts and nuts. Ball-and-spigot type domelids shall be used where conduit lengths exceed 600mm. Wiring shall be installed in the conduit hangers.

6. SUSPENDED WIRING CHANNELS

Luminaires (especially fluorescent luminaires) may also be suspended from ceilings by means of suspended metal channels. The metal channel may be supported by conduits or threaded rods. Should metal rods be utilised, these shall be screwed to anchor bolts fixed in the roof slab. Wiring shall either be installed in conduits fixed to the metal channel or in the metal channels and covered with a suitable cover plate. Purpose-made clamps shall be used to fix the luminaires to the cable channel.

7. CEILING BATTENS

Where wooden blocks are used to suspend luminaires, ceiling battens shall not be cut. The wooden blocks shall be cut to fit around battens and shall be screwed to the ceiling. Battens may however be cut where fluorescent or incandescent luminaires with metal canopies have to be installed against a false ceiling.

8. GLASS-BOWL LUMINAIRES

Unless specified to the contrary, suspended glass-bowl luminaires shall be installed with the underside at least 2,1 m above finished floor level.

9. FLUORESCENT LUMINAIRES FIXED TO CONCRETE SLABS

Fluorescent luminaires to be installed directly against concrete slabs or walls shall be securely fixed to the outlet box and at two additional points. Shot-fired fixings are not acceptable. Where approved, fluorescent luminaires may be installed against metal wiring channels in which the wiring is housed. The channel fixing may in this case be shot-fired. Purpose-made fluorescent fixing adaptors shall be used to fix luminaires to cable channels.

10. FLUORESCENT LUMINAIRES FIXED TO CEILINGS

10.1 In all cases where luminaires are fixed to false ceilings, the Contractor shall ensure that the ceiling is capable of carrying the weight of the luminaires before commencing installation. Should any doubt exist in this regard, the matter shall be referred to the Department.

10.2 In cases where the weight of the luminaire is not carried by the ceiling but by a support or other suspension method, provision shall be made to prevent relative movement between the ceiling and luminaire, ceiling rose or connection point.

10.3 Surface mounted fluorescent luminaires shall fit firmly against the ceiling brading without leaving gaps between luminaire and ceiling. The luminaire shall be fixed directly to the ceiling by means of brass plated round-head wood screws and washers.

10.4 In the case of tiled ceilings with exposed or concealed T-section supports, surface mounted luminaires shall be fixed only to the tiles by means of butterfly screws or bolts with nuts and washers. The tiles shall be suitably reinforced.

10.5 Luminaires may alternatively be fixed to metal cross-pieces resting in the ceiling tees.

10.6 Drilling of holes in ceiling tees to support luminaires will not be allowed.

10.7 Luminaires shall be fixed in neat relation to the ceiling lay-out.

11. CONTINUOUS ROWS OF LUMINAIRES

In cases where fluorescent luminaires are installed in tandem, only one connection outlet need be supplied per circuit. All luminaires shall be coupled to one another by means of nipples or brass bushes and locknuts to ensure that wiring is not exposed and that earth continuity is maintained. Luminaires on the same circuit may be wired through the channel formed by the luminaire bodies. In this case silicon-rubber insulated conductors shall be used and internal connections shall be made at porcelain terminal blocks. "SCREW-IT" or similar connectors may only be used if prior permission is obtained from the Department. The wiring for any other circuits or outlets, even though these may be in the same row, may not be installed through the luminaire bodies. The Contractor shall ensure that continuous rows are straight and parallel to the relevant building lines.

12. RECESSED LUMINAIRES

12.1 Where recessed luminaires are specified, the Contractor shall maintain close liaison with the ceiling Contractor. In the case of tiled ceilings, the luminaires shall preferably be installed while the metal supports are being installed and before the tiles are placed in position. The Electrical Contractor shall be responsible for the co-ordination of the cutting of ceiling tiles with the other contractors concerned.

12.2 All mounting rings and other accessories shall fit closely into cut-outs to ensure a proper finish.

12.3 In all false ceilings where wiring channels are used, recessed luminaires shall be connected to the wiring channels by means of unswitched 5 A socket-outlets.

12.4 The following requirements shall be adhered to:

- (a) Socket-outlets used shall comply with the Department's quality specification for "UNSWITCHED AND SWITCHED SOCKET-OUTLETS", par. 4 of Section 11 and shall be of 5 A minimum rating.
- (b) The connector cord attached to the luminaire may not exceed 3m in length and shall consist of 1,5mm² minimum, 3-core, PVC-insulated flexible cord.
- (c) The 5A socket-outlets shall be positioned such that they are not more than 600mm above the false ceiling.

13. **SPECIAL CEILINGS**

In cases where special ceilings e.g. aluminium strips, decorative glass, metal leaves, etc. are to be installed, the Contractor and the Manufacturer of the ceiling shall agree upon the method of fixing of luminaires in the ceiling.

14. **BULKHEAD LUMINAIRES**

Surface mounted bulkhead luminaires shall not be screwed directly to conduit ends. The conduit shall terminate in a round draw-box at the top or rear of the luminaire. The PVC-insulated conductors shall terminate in a porcelain terminal strip in the draw-box. Silicon-rubber-insulated conductors shall be installed from the terminal strip to the luminaire lamp-holder. "SCREW-IT" or similar connectors may only be used if prior permission is obtained from the Department.

15. **TYPE OF CONDUCTOR**

PVC-insulated conductors, unless protected by an approved heat-resistant sheathing, shall not be used where the temperature of the insulation is likely to exceed 70EC. In unventilated luminaires or luminaires capable of housing incandescent lamps over 60W, the interconnecting wiring from the lamp-holder to the circuit wiring shall consist of silicon-rubber insulated conductors. Silicon-rubber insulated conductors shall be used exclusively in the case of high bay fittings. Refer also to the provisions of SABS 0142.

16. **WIRING OF LAMP HOLDERS**

The central terminal of Edison Screw (E.S.-type) LAMP-HOLDERS shall be connected to the phase conductor and the screwed housing to the neutral conductor.

17. **HIGH BAY LUMINAIRES**

- 17.1 High bay luminaires shall be securely suspended from the roof structure.
- 17.2 The luminaires may be fixed to suspended wiring channels containing the wiring on condition that:
 - (a) rigid channels with a maximum width of 42 mm be used,
 - (b) the channels are supported at intervals that will prevent sag or warp and
 - (c) the channels are large enough to accommodate the wiring.
- 17.3 Luminaires may be suspended from metal roof trusses with the aid of "CADDY" or similar fasteners.
- 17.4 Luminaires shall preferably be connected to unswitched 5A socket outlets. Silicon-rubber insulated flexible cord shall be used exclusively to connect the luminaire to the outlet.
- 17.5 A safety chain to keep the luminaire from falling when loosened shall be provided.

SECTION B10

CONNECTIONS TO EQUIPMENT

1. GENERAL

This section covers the final electrical connections to switchboards and various equipment in general electrical installations under normal environmental conditions for system voltages up to 600 V. Refer also to the Department's standard specifications for "WIRING", Section B5 and "INSTALLATION OF CABLES", Section B6.

2. CONNECTIONS TO SWITCHBOARDS

2.1 Conduit Entries

2.1.1 Where sufficient space for conduit entries as well as adequate space for future conduit entries is available, conduits may be terminated directly on the switchboard.

2.1.2 Alternatively, conduits connected to switchboards shall terminate in a common fabricated sheet steel draw-box installed in the vicinity of the switchboard. In open roof spaces this draw-box shall be placed in a roof space of not less than 900mm clearance.

2.1.3 Lighting and socket-outlet circuits may be separately grouped in common conduits or metal ducts (trunking) from the distribution board to the draw-box. The drawbox shall be of sheet steel with a minimum thickness of 1,6mm and shall be fitted with a removable cover plate.

2.2 Flush Mounted Switchboards

Where flush mounted switchboards are required, the recessed switchboard tray shall be built into the brick or concrete wall. All conduits from the floor or roof shall be fully recessed and shall be bonded directly to the tray by means of locknuts on both sides and the ends of the conduits fitted with a brass bush.

2.3 Surface Mounted Switchboards

Where surface mounted switchboards are specified but where the conduits can be fully recessed, the conduit shall be connected to a recessed connection box installed behind the switchboard. An opening with the same dimensions as the connection box shall be cut in the back of the switchboard and fitted with a suitable grommet.

2.4 Spare Conduits

Where conduits from a switchboard run into a false ceiling space above the board, a minimum of two 25mm and two 20mm spare conduits shall be installed into the ceiling space immediately above the board.

2.5 Cable Connections

2.5.1 Where underground cables are to be connected to switchboards, it shall be the responsibility of the Contractor to ensure that metal, earthenware, asbestos-cement or other approved sleeves are built in correctly to enable installation and connection of the cable to the switchboard.

2.5.2 PVC or pitch fibre sleeves are not acceptable - refer to par. 3.10 of the Department's standard specification for "INSTALLATION OF CABLES", Section B6.

2.5.3 Sleeves shall be installed with a fall from inside to outside of the building to facilitate drainage. The sleeves shall be sealed with a non-hardening compound after installation of the cables to render the installation vermin proof and waterproof.

- 2.5.4 A metal cable channel with removable metal cover plate shall be installed by the Contractor and shall extend from the switchboard to the floor or into the ceiling void as required. The channel shall coincide with the position of sleeves. The channel shall be flush mounted except in the case of surface mounted switchboards and then only with the permission of the Department's representative.
- 2.5.5 The cable channel shall be large enough to permit the installation of cable glands and future cables, particularly where spare sleeves have been provided.
- 2.5.6 The colour of the channel cover shall match that of the associated switchboard.

2.6 Cable Trenches

Where cables in floor trenches have to be connected to wall mounted switchboards, approved sleeves or conduits shall be installed from the side of the trench to the bottom of the switchboard. These sleeves shall be positioned and fixed before the concrete is cast.

3. CONNECTIONS TO MOTOR DRIVEN EQUIPMENT.

- 3.1 An isolator or starter containing an isolator shall be installed within 2m of motor driven equipment. The requirements of SABS 0142 shall be met. If this isolator cannot be installed on a wall, switchboard or other suitable place, an approved free-standing pedestal shall be provided. The pedestal shall be 1m high and outside normal walkways, access routes, etc.
- 3.2 The connection to the equipment shall be carried out as follows:
- (a) Metal reinforced plastic or PVC-covered flexible metal conduits with individual conductors or a multi-core PVC insulated cable and separate bare earth conductor installed inside the conduit may be used. The flexible conduit shall not exceed 600mm. Screwed conduit shall be used from the end of the flexible conduit to the isolator and/or starter. Refer to the department's standard specification for "FLEXIBLE CONDUIT", Section B1, par. 5.
 - (b) Multi-core armoured PVC- or rubber-insulated cable and earth conductor. The installation and termination of the cables shall comply with the Department's specification for "INSTALLATION OF CABLES, Section B6.
 - (c) Cables and flexible conduits shall be provided with sufficient slack to allow positional adjustment of the equipment.
- 3.3 Supply cables to equipment may not be installed across floors which are for general use.

4. CONNECTIONS TO WATER HEATERS

- 4.1 Each water heater shall be connected to a separate circuit with a separate earth conductor.
- 4.2 The conduit from the switchboard to the water heater shall terminate in a draw-box within 1 m of the water heater terminals. The connection from the draw-box shall be conductors in conduit or PVC-insulated cable. Only in instances where heaters are mounted out of normal reach may flexible conduit and round boxes with dome lids be used for the final connection.
- 4.3 Three-phase supplies to fixed storage water heaters shall be in accordance with the wiring diagram, Fig. B10.1.
- 4.4 The mounting of the water heater and the provision of the water connections will be undertaken by others. The Contractor shall ensure that the elements and thermostats can easily be replaced.
- 4.5 Before testing a water heater, the Contractor shall confirm with the Plumbing Contractor that the unit is filled with water.

4.6 Unless otherwise specified in the Detail Technical Specification, the wiring of hot water heater circuits not exceeding 4 kW shall consist of 4mm² conductors and 2,5mm² earth conductor.

4.7 Unless it is specified that isolators for water heaters shall be provided in the switchboard, a local isolator shall be provided for each water heater. In the case of water heaters not exceeding 4 kW, a 30 A double-pole metal-clad isolator shall be surface mounted over the flush conduit outlet box.

5. CONNECTIONS TO HEATERS, FANS AND AIR CONDITIONING UNITS

5.1 Isolators

A flush mounted suitably rated double-pole isolator shall be provided within 1m of the unit. Where the equipment is mounted out of reach, the isolator shall be installed at 1,5m above floor level. Only where units are mounted in easily accessible positions and where an isolating switch is incorporated in the unit, may this isolator be omitted. Where flush isolators are used, flush conduit shall be installed to link with the equipment outlet point. Flexible cords of sufficient rating may be used for the final connection to the equipment.

5.2 Wiring

The minimum conductor size to be used shall be 4 mm². Each fan, heater or air-conditioning unit shall be on a separate circuit.

5.3 Flush Mounted Convection Heaters

The heater frame or tray shall be built or cast into the wall at a height such that the underside of the heater is at 250mm above floor level. Conduits shall terminate on the frame near the terminals.

5.4 Surface Mounted Equipment

5.4.1 Connections to surface mounted equipment shall consist of a draw-box located in the vicinity of the terminals of the unit. In workshops and industrial areas the connections shall be made by means of flexible conduit connected to dome lids on the draw-box. Conductors shall be connected directly to the unit.

5.4.2 In non-industrial applications PVC-insulated 3-core flexible cables may be used for the connection.

5.4.3 Where flexible cables are used, a bush shall be provided at the rear of the unit for cable entry and a bush and clamp (or gripper gland) at the draw-box. The clamp shall tightly grip the outer insulation of the cable to prevent tension on the connections between cable and conductors in the draw-box.

5.4.4 Where heaters or air-conditioning units are situated above power skirting, the isolator shall be installed in the power skirting and the flexible cable or cord to the unit shall be installed in the power skirting through a gripper or compression gland. The cable shall be made as short as practical and shall be neatly saddled to the surface of the wall.

5.5 Radiant Heaters

The installation of radiant heaters and asbestos heaters, where specified, shall comply with the requirements of paragraph 5.4, with the exception that they shall be mounted on spacers, 25mm away from the mounting surface.

5.6 Fan Heaters

5.6.1 The contractor shall allow for the supply, installation and electrical connection of the fan heaters as indicated on the drawings. The fan heaters shall be rated at 3 kW and shall be complete with

control units.

- 5.6.2 The heaters shall be secured by means of approved expansion bolts at 2,4m above floor level in positions as shown, with the control units at 1,5m above floor level, directly below the unit.
- 5.6.3 The fan heater shall be installed on a box directly behind the unit.
- 5.6.4 Each connection shall be protected by means of a single-pole circuit-breaker on the associated switchboard.
- 5.6.5 Brass bushes shall be provided to protect the wiring at the rear cable entries to the control unit and fan connection box.

6. CONNECTIONS TO UNDERFLOOR HEATING

- 6.1 Where underfloor heating cable is specified, the Contractor shall supply the cable and thermostats which shall be purchased from a specialist supplier. The cable shall be laid by the specialist supplier and connected by the Contractor. The Contractor shall also be responsible for testing of the cables prior to their being covered by the screed and immediately thereafter. Details of circuit wiring and control of underfloor heating will be specified in the Detail Technical Specification.
- 6.2 PVC-insulated heating cable with a rating of not higher than 13 W per linear metre shall be used. Thermal insulation will be provided by the Builder.
- 6.3 The capacity of the heating cable shall be sufficient to give a 20EC temperature rise with an outside ambient temperature of 5EC.
- 6.4 The total heating load shall, however, not be more than 135 W/m².

7. CONNECTIONS TO INCINERATORS

7.1 General

This section covers connections to incinerators used for domestic purposes in buildings. Unless specified to the contrary, the supply and installation of incinerators will form part of the electrical installation and shall comply with the Department's quality specification, "INCINERATORS", SECTION C14.

7.2 Flush Mounted Incinerators

Where flush mounted incinerators have been specified, the Contractor shall supply the mounting tray to the Builder in good time for it to be built into the structure.

7.3 Mounting Height

Unless specified to the contrary, incinerators shall be installed with the bottom 1m above finished floor level.

7.4 Isolator

A flush mounted 30 A double-pole isolator shall be installed approximately 1,5m above the finished floor level adjacent to each incinerator. The isolator cover plate shall wholly fall within either the tiled or plastered surface of the wall. Unless specified to the contrary, the cover plate shall be finished in white baked enamel. An engraved label shall be provided at each isolator marked as follows:

"SWITCH OFF TO CLEAN AND REMOVE ASH"
"SKAKEL AF VIR SKOONMAAK EN ASVERWYDERING"

7.5 Flues

The Contractor shall supply flue pipes to the Builder for installation. Two bends and an "H" piece exhaust canopy shall be allowed for each flue pipe.

7.6 Exhaust Fans

Where more than 5 incinerators are connected to the same flue or where more than two 90E bends are used in the flue, an exhaust fan shall be installed at the flue outlet. In addition a small fan must be provided at each incinerator.

7.7 Wiring

Single incinerators shall be connected by means of 2 x 4mm² PVC insulated conductors and a 2,5mm² bare copper earth conductor in a 20mm conduit. Each incinerator shall be connected to a separate circuit where a common exhaust fan is not used. Where a common exhaust fan is needed, the following applies:

- (a) All fans and incinerators connected to the same flue shall be on the same circuit.
- (b) The current rating of the circuit-breaker shall be sufficient to allow the simultaneous operation of all the fans and 50 % of the incinerators.
- (c) A 30 A double-pole isolator shall be flush mounted adjacent to each incinerator as described in paragraph 7.4. However if the current rating of the circuit-breaker protecting the circuit is larger than 15A, a 15A fuse and fuse holder shall be installed at each incinerator in addition to the isolator. The draw-box and cover plate for the isolator shall be large enough to accommodate the isolator and fuse. Alternatively, a 15A circuit-breaker may be installed adjacent to each incinerator in lieu of the isolator and fuse.
- (d) The circuitry shall be arranged to ensure that all the fans will operate when any one of the incinerators is switched on.
- (e) Earth leakage protection shall be installed on all incinerator circuits.

8. CONNECTIONS TO COOKING APPLIANCES

8.1 Unless specified to the contrary, the circuit connection to each cooking appliance shall consist of:

- (a) 2 x 10mm² PVC-insulated conductors and 6mm² bare copper earth conductor for single phase connections, or
- (b) 4 x 4mm² PVC-insulated conductors and 2,5mm² bare copper earth conductor for three phase connections.

8.2 A 60A double pole or 30A triple pole micro-gap isolator flush mounted in a wall outlet box, shall be installed 1,5m above floor level to the left or right of the appliance in accordance with SABS 0142. A white baked enamel cover plate shall be provided, situated wholly on the tiled or plastered surface as applicable.

8.3 The conduit shall terminate 450mm above floor level behind the appliance position. The conduit end shall be approximately 75mm long and shall face downwards. Connections from the conduit end to the appliance shall be installed in accordance with SABS 0142. Sufficient slack shall be provided in the flexible connection to move the appliance 600mm away from its normal position for cleaning or maintenance.

8.4 Alternatively a 45A, 3-pin socket-outlet may be mounted on a round draw-box 450mm above floor level. The connection to the appliance shall consist of a plug and 10mm², rubber-insulated and sheathed cable in accordance with SABS 168. The cable shall be long enough to enable the appliance to be moved 600mm from its normal position for cleaning or maintenance.

8.5 Crimped or soldered lugs shall be provided on all conductors intended for connection to cooking

appliances.

- 8.6 Each appliance shall be connected to a separate circuit. A separate earth wire shall be provided for each appliance.

SECTION B11

EARTHING

This section covers the earthing of electrical installations in buildings or other structures. The total earthing system of any electrical installation shall be in complete accordance with SABS 0142.

1. GENERAL RECOMMENDATIONS ON THE PRACTICAL INSTALLATION OF EARTH ELECTRODES

1.1 Requirements of an Effective Earth

1.1.1 An effective earth must prevent dangerous over voltages arising between metallic structures, frames, supports or enclosures of electrical equipment and the ground during fault conditions.

1.1.2 An effective earth must be able to permit fault currents of sufficient magnitude to flow so as to operate protective devices to isolate the fault before damage can occur.

1.1.3 The ohmic resistance of an effective earth must be low enough to ensure that the step potential on the ground in the vicinity of the earthing point is within safe limits under fault conditions i.e. a voltage gradient not exceeding 40 V/m for fault durations exceeding 1s.

1.2 Types of Earth Electrodes

Three types of earth electrodes are suitable:

1.2.1 Trench Earths

Trench earths comprise a bare copper or galvanised iron conductor laid at a minimum of 800mm below ground level, usually when underground cables are installed. This type of earth electrode provides a relatively large contact area between electrode and surrounding ground, makes contact with a variety of types of soil and soils of varying moisture content en route and is economical to install.

1.2.2 Spike Earths

Spike earths comprise rods of bare copper, copper-coated steel, stainless steel or galvanised steel designed for the purpose of penetrating ground to depths of up to several metres. A low resistance earth may sometimes be obtained by driving multiple spikes at some distance from each other in order to provide parallel paths.

In hard or rocky ground, it is usually necessary to drill holes into which earth spikes are inserted and then packed with soft soil.

1.2.3 Foundation Earths

Foundation earths comprise bare copper or galvanised iron conductors laid under the foundations of buildings, miniature substations, distribution pillars, bases of wooden, concrete or steel poles and structures. Because soil under foundations usually retains moisture, foundation earths are located to take advantage of this favourable condition. Furthermore, they are economical to install.

1.3 Materials for Earth Electrodes

1.3.1 Bare copper, either in stranded, strip or rod form, is considered the most suitable general purpose material for earth electrodes. Its main disadvantage is its cost and susceptibility to theft.

1.3.2 Bare galvanised iron and steel, either in stranded, strip or rod form, has a satisfactory record of survival in non-aggressive soils and is more economical than copper.

1.3.3 Bare aluminium is unsuitable as electrode material.

1.4 Corrosion

Because galvanised ferrous metals corrode sacrificially to copper, galvanised iron and steel electrodes should not be buried in close proximity to bare copper.

2. TECHNICAL REQUIREMENTS OF NEUTRAL EARTHING

The following relevant aspects have been extracted from the "AMEU CODE OF PRACTICE FOR THE APPLICATION OF NEUTRAL EARTHING ON LOW VOLTAGE DISTRIBUTION SYSTEMS."

2.1 Distribution Systems

Multiple Earthed Neutral (MEN) and Protective Multiple Earthing (PME) systems.

Distribution equipment associated with transformer substations that are either ground mounted or pole mounted and fed by underground cable or overhead line, with or without an earth continuity conductor, (ECC), should be installed, connected and earthed in accordance with the following requirements:

- (a) Where the resistance to earth of the HV equipment earth is 1 ohm or less, it is permissible to earth the LV neutral to the HV earth electrode.
- (b) Where the HV equipment earth exceeds 1 ohm the LV neutral shall be earthed at a minimum distance of 6m from the HV equipment earth (i.e. 6m from the HV electrode/s and also from any earthed metalwork connected thereto).
- (c) Notwithstanding the requirements of (a) above, where transformers are associated with HV overhead lines, it is considered good practice to separate the HV and LV earth electrodes. The minimum earth separation should be 6m or one LV span.
- (d) The overall resistance to earth of the neutral of an LV distributor or distribution system must not exceed 10 ohms.
- (e) The LV neutral may be connected to other supply neutrals, earth electrodes, cable sheaths and armouring and these connections used to obtain the required earthing value of 10 ohms or less specified in par. (d). above.
- (f) The neutral of underground and overhead LV distributors must be earthed at the remote ends of each distributor.
- (g) Where the overall resistance to earth of the neutral of the distribution system exceeds 10 OHMS, the neutral shall be earthed at intermediate positions on the distributor/s to reduce its resistance to earth to below this limit.
- (h) The cross-sectional area of the neutral of all LV distributors must not be less than that of a phase conductor.
- (i) No circuit-breakers, isolators, fuses, switches or removable links shall be installed in the neutral between the transformer star point and the remote end of any LV distributor or service connection.
- (j) All metallic sheathing and armouring of cables and all metalwork associated with meter cabinets, fuse pillars, etc., supporting or enclosing LV cables shall be bonded to the distributor neutral conductor.
- (k) Where a Separate Neutral Earth (SNE) cable is part of an MEN or PME system, the armouring and/or metallic sheath and any ECC shall be bonded to the neutral at the supply end of the cable.
- (l) To ensure the integrity of the neutral, it is recommended that all connections and joints on or to

overhead line conductors be made by compression fittings or, alternatively double bolted connectors.

- (m) MEN or PME may be applied to any single LV distributor without alterations to other LV distributors supplied from the same transformer.

2.2 Protective Neutral Bonding (PNB) System

Since the neutral is earthed at one point only, the question of multiple earthing does not arise and there is therefore no necessity to meet the MEN/PME technical requirements.

2.3 Service Connections

2.3.1 MEN System

The following conditions apply to consumers' service connections as well as service connections to traffic signals, road signs, street lighting and other power-consuming equipment installed in public places:

- (a) All service connections must be by means of cable with an insulated phase, an insulated neutral conductor and an ECC.
- (b) A single phase service connection comprises a live, a neutral and an ECC.
- (c) A polyphase service connection comprises two or three phase conductors, a neutral and an ECC.
- (d) The service neutral and ECC must be solidly and separately connected to the distributor neutral at the tee-off point.
- (e) The consumer's earthing lead is connected to the Supply Authority's earth terminal which is in turn connected to the ECC in the service cable at the consumer's supply point.
- (f) The neutral must not be connected to earth at the consumer's supply point.
- (g) If required by the Supply Authority, an earth electrode must be installed at the consumer's supply point.
- (h) In a service connection to traffic signals, street light and other power-consuming equipment installed in public places, such equipment is earthed to the ECC of the service connection.

2.3.2 PME System

- (a) All service connections must be by means of a cable with an insulated phase and an insulated neutral conductor.
- (b) A single phase service comprises a live conductor and a neutral.
- (c) A polyphase service connection comprises two or three phase conductors and a neutral.
- (d) The consumer's earthing lead is connected to the supplier's neutral and to a mandatory earth electrode at the consumer's supply point.
- (e) A label must be attached at the consumers supply point on his premises indicating that the installation is part of a PME system.

Note: It is not recommended that the PME system be applied to supply traffic signals, street signs or other power-consuming equipment installed in public places, because the PME system is inherently unsafe under "broken-neutral" conditions.

3. SUBSTATION EARTHING

In order to comply with the requirements of par. 1 and 2 above, an earth resistivity measurement shall be undertaken at the site of a new substation or miniature substation, preferably by a specialist firm. The contractor shall then submit to the Department details of a proposed substation earth indicating whether a trench earth, spike earth or foundation earth is intended and the proposed interconnections with the installation.

4. FENCES OF OUTDOOR SUBSTATIONS

In cases where substations contain transformers or switchgear installed outdoors, the compulsory fence shall be earthed as follows, if no other method is specified :

- (a) A 70mm² earth wire shall be installed 400mm below ground level and 500mm from the fence on the outside of the sub-station along the entire length of the fence. This earth wire shall be earthed at each corner by means of a 1,8m earth rod and the rod and earth wire bonded to the fence. The earth wire shall also be bonded, at least at two points, to the main earthing system.
- (b) A 70mm² earth wire shall also be buried at a depth of 400mm around each transformer and switch and bonded to the main earthing system.

5. EARTHING OF A GENERAL ELECTRICAL INSTALLATION

5.1 General

All earth conductors shall be stranded copper with or without green PVC insulation. The conductors shall comply with the Department's quality specification for "PVC-INSULATED CABLES", Section C4. All earth conductor sizes shall be determined in accordance with SABS 0142, par. 4.6 where the earth does not form an integral part of the cable.

5.2 Switchboards

A separate earth connection shall be supplied between the earth busbar of the main switchboard and the earth busbar of every sub-switchboard. These connections shall consist of bare or insulated stranded copper conductors installed along the same routes as the supply cables or in the same conduit as the supply conductors. Alternatively armoured cables with earth continuity conductors included in the armouring may be utilised.

5.3 Sub-circuits

The earth conductors of all sub-circuits shall be connected to the earth busbar in the supply switchboard in accordance with SABS 0142.

5.4 Ring Mains

Common earth conductors may be used where various circuits are installed in the same wiring channel in accordance with SABS 0142. In such instances the sizes of earth conductors shall be specifically approved by the Department. Earth conductors for individual circuits branching from the ring main shall be connected to the common earth conductor with T-ferrules or soldered. The common earth shall not be broken.

5.5 Connections

Under no circumstances shall connection points, bolts, screws, etc. used for earthing be utilised for any other purpose. It will be the responsibility of the Contractor to supply and fit earth terminals or clamps on equipment and materials that must be earthed where these are not provided. Unless earth conductors are connected to proper terminals, the ends shall be tinned

and lugged. Lugs may be crimped, using mechanical or pneumatic tools designed for this purpose, on condition that evidence is submitted that the method used complies with the performance requirements of BS 4579, Part 1: "COMPRESSION JOINTS IN COPPER."

5.6 Non-metallic Conduit

Where non-metallic conduit is specified or allowed, stranded copper earth conductors shall be installed in the conduits and fixed securely to all metal appliances and equipment, including switch boxes, socket-outlet boxes, draw-boxes, switchboards, luminaires, etc. The securing of earth conductors by means of self-threading screws will not be permitted.

5.7 Flexible Conduit

An earth conductor shall be installed in all non-metallic flexible conduit. This earth conductor shall not be installed external to the flexible conduit but within the conduit with the other conductors. The earth conductor shall be connected to the earth terminals at both ends of the circuit.

5.8 Water Pipes

Metal cold water mains shall be bonded to the earth busbar in the Main Switchboard by solid 15 x 2mm copper strapping. All other hot and cold water pipes shall be connected by 12 x 0,8mm perforated or solid copper strapping (not conductors) to the nearest switchboard. The strapping shall be fixed to the pipe work by brass nuts and bolts and against walls be brass screws at 150mm centres. In all cases where metal water pipes, down pipes, flues, etc. are positioned within 1,6 m of switchboards, an earth connection consisting of copper strapping shall be installed between the pipe work and the board. In vertical building ducts accommodating both metal water pipes and electrical cables, all the pipes shall be earthed at each switchboard.

5.9 Roofs

Where service connections consist of overhead conductors, all metal parts of roofs, gutters and down pipes shall be earthed. One bare 10mm² copper conductor shall be installed over the full length of the ceiling void, fixed to the top purlin and connected to the main earth conductor of each switchboard. The roof and gutters shall be connected at 15m intervals to this conductor by means of 12 x 0,8mm copper strapping (not conductors) and galvanised bolts and nuts. Self-tapping screws are not acceptable. Where service connections consist of underground supplies, the above requirements are not applicable.

SECTION B12

PROVISION FOR TELEPHONE INSTALLATION

1. CONTRACTOR'S RESPONSIBILITY

The Contractor shall only supply and install outlet points, wiring channels and/or conduits for telephones. The telephone installation will be carried out by others.

2. REGULATIONS

All provisions for telephones in buildings shall comply with the latest issue of "FACILITIES FOR TELECOMMUNICATION SERVICES IN BUILDINGS" as issued by the Department of Posts and Telecommunications.

3. SEPARATION OF SERVICES

3.1 Cables or conductors for telephone services shall be separated from all other services by:

- (a) providing separate metal channels or conduits, or
- (b) installing power cables, conductors and accessories at a minimum distance of 300mm from routes reserved for telephone cables, or
- (c) an earthed metal barrier installed in such a manner to ensure that the minimum distance through free air space between the telephone cables and other services is at least 300mm.

3.2 In cases where high voltage cable runs are parallel to telephone cable runs for more than 50m, the correct spacing shall be determined by conferring with the Department of Posts and Telecommunications.

3.3 Conduits or wiring channels provided for telephone services may not be used for any other purpose. Where non-metallic channels are used, the separation stated in par. 3.1 (b) shall be maintained throughout the installation.

4. MAIN TELEPHONE DISTRIBUTION BOARD

4.1 The size and position of the Main Telephone Distribution Board, where required, shall be in accordance with the requirements of the Detail Technical Specification.

4.2 The board shall consist of a metal tray, architrave frame and hinged doors and shall be flush mounted in the position shown on the drawing(s).

4.3 A 20mm thick soft wooden panel (fine grade pine to SABS 1098, without knots) shall be installed in the main telephone distribution board and shall cover the entire back of the board. Chipboard or similar materials are not acceptable.

4.4 All conduits and sleeves to telephone outlets or sub-distribution boards in the buildings or on the site as well as the main incoming sleeves, shall terminate at the main telephone distribution board as indicated on the drawing(s).

4.5 Where 100 x 100 x 50mm draw-boxes are specified as main or sub-distribution boards, the boxes shall be flush mounted and provided with a cover plate. A wooden panel need not be provided in these cases.

5. VERTICAL BUILDING (SERVICE) DUCTS

5.1 If the telephone cables are to be installed in the same duct as power cables the separation of services described in par. 3 shall be maintained.

5.2 Conduits and metal channels to and from building duct(s) shall be installed from the section containing the telephone cables to obviate telephone cables crossing power cables or other services in the duct.

5.3 Where more than one vertical building duct is provided in the structure, the ducts shall be interconnected by at least 2 x 32mm dia. conduits at each floor level unless otherwise specified or indicated on the drawings.

6. TELEPHONE OUTLETS

6.1 Blank cover plates shall be fitted to all telephone outlets.

6.2 Telephone outlets in walls shall consist of flush mounted 100 x 100 x 50mm draw-boxes.

6.3 Telephone outlets in floors shall be of the same type as floor outlets for power socket-outlets. These provisions also apply to underfloor ducting. If the type of floor outlet is not specified, 100 x 100 x 50mm flush mounted draw-boxes shall be provided in the floor at the positions indicated on the drawings. The cover plates for these draw-boxes shall be of the diecast type.

6.4 Where twin underfloor ducts are provided and where the one duct is intended for telephone cables, the separation between the ducts shall be maintained throughout the underfloor ducting installation.

6.5 Where power skirting is specified for telephone installations, the Contractor need only install the skirting with covers since the telephone socket will be fixed directly to the cover. Where multiple power skirting is provided containing other services, no other cables may be installed in the section intended for telephone cables and the separation between the sections shall be maintained throughout the installation.

6.6 Refer also to the Department's standard specification for the "INSTALLATION OF WIRING CHANNELS, UNDERFLOOR DUCTING AND POWER SKIRTING", Section B2.

7. CONNECTION OF TELEPHONE OUTLETS

7.1 Telephone outlets shall be inter-connected and connected to the telephone distribution boards as shown on the drawings.

7.2 If the inter-connecting conduits are not specified, conduit sizes shall be determined as follows:

Inter-connection of 10 outlets maximum - 25mm dia. conduit.

Inter-connection of 20 outlets maximum - 32mm dia. conduit.

7.3 Metal channels or power skirting installed on the same floor level on opposite walls of the same area as well as parallel runs of underfloor ducting intended for the installation of telephone cables, shall be interconnected at intervals of 6m. Conduit may be used for these inter-connections.

7.4 All conduits and all ducts or channels which do not have removable covers, shall be provided with galvanised steel draw-wires.

7.5 Conduit connections to power skirting or surface mounted metal channels, shall consist of a 100 x 100 x 50mm draw-box which is flush mounted immediately behind the duct or channel in which the telephone cables are to be installed. A hole shall be cut in the back of the duct or channel, immediately opposite the draw-box. The edges of the hole shall be grommeted. The draw-box shall be accessible from the front when the cover is removed.

7.6 Purpose-made accessories for the connection of conduits to underfloor ducts shall be used. Where these are not available, a 100 x 100 x 50mm draw-box shall be installed below the underfloor duct opposite a floor telephone outlet. Inter-connecting conduits shall terminate at the draw-box. The edges of the hole shall be grommeted. The draw-box shall be accessible from the

top via the floor outlet.

- 7.7 Exposed conduit ends intended for future extensions shall be terminated by means of a coupling and screwed brass plug. Only galvanised conduit shall be used in these instances.

SECTION B15

INSPECTIONS, TESTING, COMMISSIONING AND HANDING OVER

1. PHYSICAL INSPECTION PROCEDURE

- 1.1 Once the Contractor has completed the installation, written notice shall be given to the Department in order that a mutually acceptable date can be arranged for a joint inspection.
- 1.2 During the course of the inspection, the representative of the Department will compile a list of items (if any) requiring further attention. A copy of this list will be provided to the Contractor who will have a period of 7 days in which to rectify the offending items of the installation.
- 1.3 The Contractor shall then provide written notice that he is ready for an inspection of the remedial work to the offending items.
- 1.4 This procedure will continue until the entire installation has been correctly completed to the satisfaction of the Department.

2. TESTING AND OPERATIONAL INSPECTION PROCEDURE

- 2.1 In addition to the above the Contractor shall have the complete installation tested and approved by the local authorities where applicable.
- 2.2 Subsequent to the above testing and approval, the Contractor shall in the presence of the representative of the Department test all circuits with respect to:
 - (a) Phase balance.
 - (b) Insulation level.
 - (c) Polarity.
- 2.3 Upon completion of the installation and within 3 months of the handover date, the Contractor shall provide and make available a recording voltmeter to record the voltage at three locations in the complex over a period of 48 hours each. These locations will be nominated by the Department.

3. "AS BUILT" DRAWINGS

- 3.1 As each portion of the work is completed, the Contractor shall provide the Department with as-built drawings showing the exact location measured from fixed points of all cables, transmission lines, each outlet point, etc.
- 3.2 In addition a complete reticulation diagram showing all supply cables and switchboards shall be provided behind a plastic cover in the substation or adjacent to the Main Switchboard if not located in a substation.
- 3.3 The installation will not be regarded as complete until all of the above requirements listed in 1, 2 and 3 above have been met.

PART 1C

SECTION C

QUALITY SPECIFICATIONS FOR MATERIAL AND EQUIPMENT OF ELECTRICAL INSTALLATIONS

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SECTION C

SECTION C1

CONDUIT AND CONDUIT ACCESSORIES

1. CONDUIT AND ACCESSORIES.

The type of conduit and accessories required for the service, i.e. whether the conduit and accessories shall be of the screwed type, plain-end type or of the non-metallic type and whether metallic conduit shall be black enamelled or galvanised, is specified in Part 2 of this specification.

Unless other methods of installation are specified for certain circuits, the installation shall be in conduit throughout. No open wiring in roof spaces or elsewhere will be permitted.

The conduit and conduit accessories shall comply fully with the applicable SABS specifications as set out below and the conduit shall bear the mark of approval of the South African Bureau of Standards.

- (a) Screwed metallic conduit and accessories: SABS 1065 parts 1 and 2.
- (b) Plain-end metallic conduit and accessories: SABS 1065 Parts 1 and 2.
- (c) Non-metallic conduit and accessories: SABS 950

All conduit fittings except couplings shall be of the inspection type. Where cast metal conduit accessories are used, these shall be of malleable iron. Zinc base fittings will not be allowed.

Bushes used for metallic conduit shall be brass and shall be provided in addition to lock nuts at all points where the conduit terminates at switchboards, switch-boxes, draw-boxes, etc.

Draw-boxes are to be provided in accordance with the "Wiring Code" and wherever necessary to facilitate easy wiring.

For light and socket outlet circuits, the conduit used shall have an external diameter of 20mm. In all other instances the sizes of conduit shall be in accordance with the "Wiring Code" for the specified number and size of conductors, unless otherwise directed in part 2 of this specification or indicated on the drawings.

Only one manufacture of conduit and conduit accessories will be permitted throughout the installation.

Running joints in screwed conduit are to be avoided as far as possible and all conduit systems shall be set or bent to the required angles. The use of normal bends must be kept to a minimum with exception of larger diameter conduits where the use of such bends is essential.

All metallic conduits shall be manufactured of mild steel with a minimum thickness of 1,2mm for plain-end conduit and 1.6mm in respect of screwed conduit.

NOTE

Under no circumstances will conduit having a wall thickness of less than 1,6mm be allowed in screeding laid on top of concrete slabs.

Bending and setting of conduit must be done with special bending apparatus manufactured for the purpose and which are obtainable from the manufacturers of the conduit systems. Damage to conduit resulting from the use of incorrect bending apparatus or methods applied must on indication by the Department's inspectorate staff, be completely removed and rectified and any wiring already drawn into such damaged conduits must be completely renewed at the contractor's expense.

Conduit and conduit accessories used for flame-proof or explosion proof installations and for the suspension of luminaires as well as all load bearing conduit shall in all instances be of the metallic screwed type.

All conduit and accessories used in areas within 50km of the coast shall be galvanised to SABS 763.

Tenderers must ensure that general approval of the proposed conduit system to be used is obtained from the local electricity supply authority prior to the submission of their tender. Under no circumstances will consideration be given by the Department to any claim submitted by the contractor which may result from a lack of knowledge in regard to the supply authority's requirements.

2. CONDUIT IN ROOF SPACES.

Conduit in roof spaces shall be installed parallel or at right angles to the roof members and shall be secured at intervals not exceeding 1,5m by means of saddles screwed to the roof timbers.

Nail or crampets will not be allowed.

Where non metallic conduit has been specified for a particular service, the conduit shall be supported and fixed with saddles with a maximum spacing of 450mm throughout the installation. The contractor shall supply and install all additional supporting timbers in the roof space as required.

Under flat roofs, in false ceilings or where there is less than 0,9m of clearance, or should the ceilings be insulated with glass wool or other insulating material, the conduit shall be installed in such a manner as to allow for all wiring to be executed from below the ceilings.

Conduit runs from distribution boards shall, where possible terminate in fabricated sheet steel draw-boxes installed directly above or in close proximity to the boards.

3. SURFACE MOUNTED CONDUIT.

Wherever possible, the conduit installation is to be concealed in the building work; however, where unavoidable or otherwise specified under Part 2 of the specification, conduit installed on the surface must be plumbed or levelled and only straight lengths shall be used.

The use of inspection bends is to be avoided and instead the conduit shall be set uniformly and inspection coupling used where necessary.

No threads will be permitted to show when the conduit installation is complete, except where running couplings have been employed.

Running couplings are only to be used where unavoidable, and shall be fitted with a sliced couplings as a locknut.

Conduit is to be run on approved spaced saddles rigidly secured to the walls.

Alternatively, fittings, tees, boxes, couplings etc., are to be cut into the surface to allow the conduit to fit flush against the surface. Conduit is to be bedded into any wall irregularities to avoid gaps between the surface and the conduit.

Crossing of conduits is to be avoided, however, should it be necessary purpose-made metal boxes are to be provided at the junction. The finish of the boxes and positioning shall be keeping with the general layout.

Where several conduits are installed side by side, they shall be evenly spaced and grouped under one purpose-made saddle.

Distribution boards, draw-boxes, industrial switches and socket outlets etc., shall be neatly recessed into the surface to avoid double sets.

In situations where there are no ceilings the conduits are to be run along the wall plates and tie

beams.

In buildings where building operations are to be carried out, all surface conduit will be painted by the building contractor.

In all other instances the electrical contractor shall allow for painting of surface conduit with two coats of good quality enamel paint, and the colour shall match the surrounding building finish.

Only approved plugging materials such as aluminium inserts, fibre plugs, plastic plugs, etc., and round head screws shall be used for fixing saddles, switches, socket outlets, etc., to walls, wood plugs and the plugging in joints in brick walls are not acceptable.

4. CONDUIT IN CONCRETE SLABS.

In order not to delay building operations the contractor must ensure that all conduits and other electrical equipment which are to be cast in the concrete columns and slabs are installed in good time.

The contractor shall have a representative in attendance at all times when the casting of concrete takes place.

Draw-boxes, expansion joint boxes and round conduit boxes are to be provided where necessary. Sharp bends of any nature will not be allowed in concrete slabs.

Draw and/or inspection boxes shall be grouped under one common cover plate, and must preferably be installed in passages or male toilets.

All boxes, etc, are to be securely fixed to the shuttering to prevent displacement when concrete is cast. The conduit shall be supported and secured at regular intervals and installed as close as possible to the neutral axis of concrete slabs and/or beams.

Before any concrete slabs are cast, all conduit droppers to switchboards shall be neatly spaced and rigidly fixed.

SECTION C2

WIRING CHANNELS, UNDERFLOOR DUCTING AND POWER SKIRTING

1. WIRING CHANNELS

1.1 General

1.1.1 The channels shall be manufactured of rolled sheet steel.

1.1.2 The minimum thickness of the sheet steel shall be:

- (a) 1,6mm for ribbed channels with a maximum width of 42mm.
- (b) 2,5mm for unribbed channels with a maximum width of 42mm.
- (c) 1,2mm for channels with a width in excess of 42mm.

1.1.3 The channels shall be finished as follows:

- | | | |
|-----|---|---|
| (a) | In coastal areas (under all installation conditions) | Hot-dip galvanised to SABS 763 or epoxy powder coater |
| (b) | Cast in concrete | Pre-galvanised |
| (c) | False ceiling voids | Pre-galvanised |
| (d) | Vertical building ducts | Hot-dip galvanised to SABS 763 or epoxy powder coated |
| (e) | Surface mounted in plant rooms, substations, service tunnels, basements | epoxy powder coated or electro-galvanised |
| (f) | Damp areas, exposed to weather, underground runs in contact with earth | Hot-dip galvanised to SABS 763 or epoxy powder coated |
| (g) | Undercover industrial applications | Hot-dip galvanised to SABS 763 or epoxy powder coated |

1.1.4 The above-mentioned finishes shall apply unless specified to the contrary or approved by the Department. Hot-dip galvanised ducts shall be cold galvanised at all joints, sections that have been cut and at places where the galvanising has been damaged. Powder coated ducts shall likewise be touched up at joints, cuts and damaged portions using methods recommended by the manufacturer of the channels.

1.2 Cover Plates

1.2.1 All channels shall be supplied with cover plates,

1.2.2 Channels up to 127mm wide shall have snap-in cover plates of metal or PVC.

1.2.3 For channels wider than 127mm only metal cover plates shall be used.

1.2.4 The finish of steel cover plates shall be the same as the finish of the channels.

1.3 Accessories

All accessories i.e. hangers, brackets etc. shall be purpose made and in general have the same

finish as the channels.

1.4 Wiring Supports

Wiring supports shall be provided in order to prevent the wires falling out when cover plates are removed.

2. UNDERFLOOR DUCTING

2.1 General

2.1.1 The ducting shall be manufactured of 2mm thick rolled sheet steel or rectangular tubing. Galvanised steel shall be used or shall be epoxy coated after manufacture.

2.2 Outlets

2.2.1 Outlets shall be provided on a modular basis in the ducting to accommodate pedestal or recessed socket units. Tapped holes shall be provided to fix the pedestal units to the ducting.

2.2.2 Draw boxes at junctions of perpendicular ducts shall have removable barriers for wiring and shall be provided with a heavy gauge cover plate.

2.3 Pedestals

2.3.1 Pedestals shall be manufactured of die-cast aluminium or pressed steel.

2.3.2 The finish of pedestals shall be epoxy powder coating of an approved colour.

3. POWER SKIRTING

3.1 General

3.1.1 The channel and cover shall be manufactured of 1mm thick rolled sheet steel.

3.1.2 The channel and cover shall be epoxy coated after manufacture.

3.2 Outlets

3.2.1 Outlets pre-punched on a modular basis shall be provided to accommodate socket outlets or future socket outlets.

3.2.2 In addition to standard lengths, covers of 250mm length shall be provided for installation on building module lines.

SECTION C3

CABLE TRAYS AND LADDERS

1. METAL CABLE TRAYS

Metal cable trays shall be manufactured from perforated rolled steel. Metal trays manufactured to the following standards shall be used:

- (b) 150 mm to 457 mm 1,2 mm minimum thickness with 19 mm minimum return
- (c) 460 mm to 610 mm (Heavy duty) 2,5 mm minimum thickness with 76 mm return

2. CABLE LADDERS

- 2.1 Metal cable ladders shall consist of a 76 mm high side rail of 2 mm minimum thickness. Cross pieces shall be spaced at maximum intervals of 250 mm. Where cables of 10 mm² or smaller are installed on cable ladders, the spacing of the cross pieces shall be 125 mm. Cables shall be clamped in position by means of purpose-made cable clamps that fit into the cross pieces.
- 2.2 Cable ladders consisting of slotted metal rails which accommodate plastic or metal cable binding bands may be used in vertical cable runs against walls, etc. These cable ladders will be considered in horizontal cable runs for small cables for communication and control wiring upon the prior approval of the Department.
- 2.3 Purpose made cable trays consisting of 6 mm angle iron and 6 x 40 mm minimum cross pieces are acceptable in industrial applications. Cross pieces shall be welded in pairs at 250 mm maximum centre-to-centre intervals. The pairs shall be spaced approx. 10 mm apart to allow cable clamps or metallic binding bands to affix the cables to the tray.

3. PLASTIC CABLE TRAYS

Rigid un-plasticine PVC cable trays complying with the following standards may be used if specified in the Detail Technical Specification:

The up stands of trays listed in (a) and (b) shall not be perforated and the top of the up stand shall be smooth. The same cable tray type shall be used in long parallel tray runs.

4. FINISHES

Metal cable trays and ladders shall be finished as follows:

- (b) False ceiling voids Electro-galvanised baked enamel power coated
- (c) Vertical building ducts Hot-dip galvanised to SABS 763 or baked enamel epoxy powder coated
- (d) Plant rooms, substations, service tunnels, basements Electro-galvanised baked enamel or epoxy powder coated
- (e) Damp areas, exposed to weather Hot-dip galvanised to SABS 763 baked enamel or epoxy powder coated
- (f) Undercover industrial application Hot-dip galvanised to SABS 763 or baked enamel epoxy powder coated

The above-mentioned finishes shall apply unless specified to the contrary in the Detail Technical Specification. Hot-dip galvanised trays and ladders shall be cold galvanised at all joints, sections that have been cut and at places where the galvanising has been damaged. Powder coated or enamel painted trays and ladders shall likewise be touched up at joints, cuts and damaged portions using spray canisters recommended by the manufacturer of the trays and ladders.

5. **ACCESSORIES**

Horizontal and vertical bends, T-junctions and cross connections shall be supplied by the Contractor. The dimensions of these connections shall correspond to the dimensions of the linear sections to which they are connected. The radius of all bends shall be 1m minimum. The inside dimensions of horizontal angles or connections shall be large enough to ensure that the allowable bending radius of the cables is not exceeded. Sharp angles shall be 45° mitred.

SECTION C4

PVC-INSULATED CABLES - 600/1 000 V GRADE

1. GENERAL

This section covers the requirements for PVC-insulated cables for general installations under normal environmental conditions.

2. CONSTRUCTION

2.1 Cables shall be manufactured in accordance with SABS 150, shall come only from fresh stocks, and shall be constructed as follows:

- | | | |
|-----|--------------------|---|
| (b) | Armoured cables | PVC-insulated/PVC-bedded/armoured/black extruded PVC outer sheath |
| (c) | Single core cables | PVC-insulated/unsheathed |

2.2 The conductors shall be of high conductivity annealed stranded copper and the cores may be shaped or circular.

2.3 The insulation shall be general purpose PVC, 600/1 000V Grade.

2.4 The bedding shall consist of a continuous impermeable sheath of PVC extruded to fit the core or cores closely and in the case of multi-core cables, to fill the interstices between the cores.

2.5 Where armouring is specified it shall consist of one layer of galvanised steel wire in the case of multi-core cables and nonmagnetic metallic wire in the case of single core cables. Aluminium strip or tape armouring is not acceptable.

2.6 Where specified, an earth continuity conductor shall be provided in the armouring in accordance with SABS 150.

3. PVC-SHEATHED ALUMINIUM-COVERED CABLES

3.1 Aluminium-covered cables shall comprise PVC-insulated copper conductors protected by an aluminium foil tape screen and a PVC sheath.

3.2 Cable ends shall be made off with compression glands fitted with a neoprene ring to seal the end.

3.3 Aluminium sheathed cable shall be installed on surface only using matching saddles installed at suitable intervals to prevent sagging.

3.4 Where exposed to sunlight, the cable shall have a stabilised black outer sheath.

4. LENGTHS

Cable shall be manufactured and supplied in one length to the lengths specified unless these lengths exceed a standard drum length in which case a ruling shall be obtained from the Department.

5. TESTS

At the option of the Department, acceptance tests shall be carried out on production runs of the cable in accordance with SABS 150.

SECTION C5

GLANDS FOR PVC-INSULATED CABLES

1. Glands to be used for terminating PVC/PVC/SWA/PVC cables shall be of the adjustable type.
2. Glands shall be suitable for general purpose 600/1 000 V Grade cable with steel armouring.
3. The glands shall be made of nickel-plated cadmium plated or in coastal area bronze or brass.
4. The glands shall consist of a barrel carrying a cone bush screwed into one end and a nickel-plated brass nipple carrying a nickel-plated brass or a heavy galvanised steel locknut screwed into the other end. The galvanising shall comply with SABS 763.
5. Non-watertight glands must be easily converted to watertight glands by means of a waterproofing shroud and inner seal kit. On the cable entry side of the barrel a concave groove shall be provided to accommodate the top rim of the waterproofing shroud.
6. The shrouds shall be made of non-deteriorating neoprene or other synthetic rubber, and shall be resistant to water, oil and sunlight. The shrouds shall fit tightly around the glands and cable.
7. Glands shall be provided with ISO threads and shall be suitable for the specified cable sizes.
8. Flameproof glands shall comply with SABS 808, Groups 1, 2a and 2b.
9. Suitable accessories shall be provided with glands to be used on ECC armoured cables to facilitate a bolted lug connection of the earth continuity conductors. Grooves cut into the barrel or cone bush to accommodate the earth continuity conductors are not acceptable.
10. For unarmoured cables the cone bush and compression ring of the gland shall be replaced with a synthetic rubber compression bush and ring to provide the required grip on the outer sheath of the cable.

SECTION C6

CABLE TERMINATIONS AND JOINTS

1. HEAT-SHRINKABLE MATERIALS

1.1 General

1.1.1 Heat-shrinkable materials may only be used in exceptional circumstances with the written permission of the Department.

1.1.2 The complete kit shall be packed in a container that is marked for the type of cable insulation and construction as well as the voltage range for which the materials are suitable.

1.1.3 An illustrated set of instructions for the installation of the materials shall accompany every kit.

1.1.4 The joints and terminations shall make minimal, if any, use of insulating or stress relieving tapes. The use of electrical stress control and insulating tubing that is heat-shrunk onto the termination or joint, is preferred above other methods.

1.1.5 The materials shall comply with VDE 0278 and the supplier shall be called upon to confirm this aspect before acceptance of the materials or installation.

1.1.6 The heat-shrinkable and other materials used for the terminations and joints shall be of a high quality and shall retain their electrical and mechanical properties without deterioration.

1.2 Terminations with Heat-Shrinkable Materials

1.2.1 Terminations shall be made of a material that gives lasting protection against ultraviolet radiation.

1.2.2 The cores of all cables terminated outdoors and the cores of 3,3 kV and higher voltage cables terminated indoors, shall be completely covered with a shrunk-on protective layer against surface tracking, ultraviolet radiation and weathering.

1.2.3 Outdoor terminations shall be designed to prevent flashover under wet or contaminated conditions and to ensure additional mechanical strength. This shall be achieved with shrunk-on insulating spacers and rain shields.

1.3 Joints with Heat-Shrinkable Materials

1.3.1 The electrical continuity of all the conductors, screens and armouring shall not be impaired by the joints and the earth continuity shall be accomplished within the joints, i.e. no external earth continuity conductor that will be subject to corrosion, is acceptable. The joints shall be completely covered by a watertight sheath to prevent corrosion.

1.3.2 In the case of joints in cables with an outer PVC anti-electrolysis sheath, the joints shall be subject to the same electrical insulation test as the outer sheath of the cable.

2. RESIN FILLED JOINTS

2.1 The resin filled joint kit shall comprise a self sealing plastic mould of high mechanical strength having sufficient connector space.

2.2 The exact amount of cold hardening resin shall be provided in a two-compartment plastic bag.

2.3 The resin shall have absolute minimum shrinkage.

2.4 The mould and resin shall be completely waterproof and non-hygroscopic and shall be resistant to ultraviolet radiation.

2.5 Joint kits shall be of "SCOTCHCAST", "CELLPACK" or similar.

3. **CABLE JOINTS BOX**

- 3.1 Cable joint boxes shall be manufactured of die cast aluminium material for normal conditions or glass fibre reinforced thermosetting compound where exposed to corrosive conditions.
- 3.2 The lid shall provide an absolute moisture barrier.
- 3.3 Boxes shall contain 2, 3 or 4 entries as required.
- 3.4 Unused entries shall be sealed with watertight blanking plugs.
- 3.5 Earth continuity shall be maintained through the box by means of the material of the box in the case of aluminium boxes or by means of earth straps and studs in the case of glass fibre reinforced boxes.

SECTION C9

WIRING TERMINALS

1. Terminal bodies and screws shall be of non-corrosive metal, enclosed in fire resistant, moulded plastic insulating bodies. Terminal bodies or screws shall not project beyond the insulating material and shall afford suitable protection against accidental contact by personnel and against short circuits and tracking.
2. The construction of the terminal block and mounting rail shall be such as to ensure a firm and positive location of the terminal blocks. It shall be possible to add additional terminal blocks within the terminal sequence without having to disconnect or dismantle the terminal strip. The terminal blocks shall be held in position by means of standard end clamps.
3. It shall be possible to intermix terminals of various sizes, i.e. for different sizes of conductors, whilst utilising the same mounting rail. Where smaller terminal blocks occur adjacent to larger terminal blocks, suitable shielding barriers shall be inserted to cover the terminals that might otherwise be exposed.
4. The terminal bodies and clamping screws shall be so constructed as to ensure that conductors are not nicked or severed when the clamping screws are tightened. Screws shall not come in direct contact with the conductors.
5. Terminals shall be sized and rated to match the conductors that are connected to them.
6. Each terminal block shall have provision for clip-in numbering or labelling strips to be installed, together with protective, clear caps over the sheets.

SECTION C10

LIGHT SWITCHES

1. GENERAL

This section covers the requirements for switches for use in general installations under normal environmental conditions.

2. FLUSH AND SURFACE MOUNTED SWITCHES

- 2.1 All switches shall be suitable for mounting in 100 x 50 x 50mm boxes shall comply with SABS 163 and shall bear the SABS mark.
- 2.2 Switches shall be of tumbler operated microgap type rated at 16A, 220/250V.
- 2.3 Switches shall have protected terminals for safe wiring.
- 2.4 Contacts shall be of silver material.
- 2.5 On multi-lever switches, it shall be possible to individually change any of its switches.
- 2.6 The yoke strap shall be slotted to allow for easy alignment.
- 2.7 The covers of surface mounted switches shall have toggle protectors.
- 2.8 Where light switches are installed in partitions, they shall, where possible, be of the special narrow type intended for installation into the mullions.

3. WATERTIGHT SWITCHES

- 3.1 Watertight switches shall be of the microgap type suitable for surface mounting and shall bear the SABS mark.
- 3.2 The housing shall be of galvanised cast iron or die cast aluminium with watertight cover plate and toggle.
- 3.3 The switch shall have a porcelain base and a quick acting spring mechanism and shall be rated at 16A, 220/250V.
- 3.4 The ON/OFF position shall be clearly marked on the switch housing.

4. CEILING SWITCHES

- 4.1 Ceiling switches shall be rated at 10A, 220/250V and shall be suitable for ceiling mounting on a round conduit box.
- 4.2 The switch shall be made of high impact strength nylon material.
- 4.3 Adequate space shall be provided within the unit for ease of wiring.
- 4.4 The switch colour shall be white and shall be fitted with a nylon cord 1,25m long.

5. COVER PLATES

- 5.1 Cover plates shall be finished in ivory coloured baked enamel, anodised bronze or aluminium unless otherwise specified.
- 5.2 Cover plates shall overlap the outlet to cover wall imperfections.
- 5.3 Cover plates shall comply with SABS 1084.

SECTION C11

UNSWITCHED AND SWITCHED SOCKET-OUTLETS

1. GENERAL

This section covers the requirements for unswitched and switched socket-outlets for use in general installations under normal environmental conditions.

2. FLUSH AND SURFACE MOUNTED SWITCHED SOCKETS

- 2.1 All switched socket-outlets shall be suitable for mounting in 100 x 100 x 50mm or 100 x 50 x 50mm boxes, shall comply with SABS 164.
- 2.2 Switches shall be of the tumbler operated microgap type rated at 16A, 220/250V.
- 2.3 Terminals shall be enclosed for safe wiring.
- 2.4 Contacts shall be of silver material.
- 2.5 Safety shutters shall be provided on live and neutral openings.
- 2.6 The yoke strap shall be slotted to allow for easy alignment.
- 2.7 The covers of surface mounted switched socket shall have toggle protectors.
- 2.8 Miniature circuit-breakers shall be used in lieu of a switch where specified.
- 2.9 Where 13A flat pin switched socket-outlets are specified, these shall comply with BS 1363.

3. WATERTIGHT SWITCHED SOCKETS

- 3.1 The housing of watertight switched sockets shall be of galvanised cast iron or die cast aluminium with watertight machined joints.
- 3.2 The switch shall have a porcelain base and a quick-acting spring mechanism and shall be rated at 16A, 220/250V.
- 3.3 The ON/OFF positions shall be clearly marked on the switch housing.
- 3.4 The socket openings shall be rendered watertight by means of a gasketed cover plate which is screwed onto the body of the unit. The cover plate shall be secured to the body of the unit by means of a chain.

4. UNSWITCHED SOCKET-OUTLETS

- 4.1 Unswitched socket-outlets shall only be used in the case of 5A, 220/250V, 3-pin socket-outlets intended for the connection of recessed light fittings installed in false ceilings.
- 4.2 The socket-outlets shall have shuttered live and neutral openings.
- 4.3 The socket-outlets shall be suitable for installation in pre-punched wiring channels, deep round conduit boxes, 100 x 50 x 50mm or 100 x 100 x 50mm boxes.

5. THREE-PHASE SWITCHED SOCKET-OUTLETS

- 5.1 Three-phase switched socket-outlets shall have 5 pins, one for each phase, neutral and earth. The current rating shall be as specified in the Detail Technical Specification.
- 5.2 The units shall be interlocked to prevent switching on if the plug top is not installed.

- 5.3 The units shall be supplied complete with plug top.
- 5.4 The live terminals shall be shrouded and shall be completely safe when the plug top is removed.
- 5.5 Samples shall be submitted to the Department for approval prior to the installation.

6. SHAVER SOCKETS

- 6.1 Shaver sockets shall comprise a double wound isolating transformer rated at 20 VA.
- 6.2 A three hole system shall be provided to provide for 115 V or 230V systems and also to cater for various types of shaver plugs.
- 6.3 Insertion of a shaver plug shall automatically switch on the unit by energising the primary side of the isolating transformer. Removal shall switch it off.
- 6.4 The unit shall be protected against overload by a thermal overload device.
- 6.5 The unit shall comply with BS 3052.

SECTION C12.1

TUBULAR FLUORESCENT LAMP LUMINAIRES FOR INTERIOR APPLICATIONS

1. SCOPE

This specification covers the requirements for fluorescent luminaires using tubular fluorescent lamps for general indoor use. The types of luminaires covered are open-channel, industrial, decorative and recessed types and includes luminaires with one or more lamps with standard wattage ratings as specified in the project specification. Luminaires for use in special applications or atmospheres are not included in this specification.

2. GENERAL

- 2.1 To promote work creation in South Africa, the luminaire should preferably be manufactured within the Republic of South Africa and should have a local content of at least 50%.
- 2.2 If the luminaire offered is of foreign origin, full specifications on technical performance and quality must be submitted and full reasons shall be given why the unit had to be imported.
- 2.3 If the luminaire offered has not previously been approved by the Department, the Tenderer shall provide a sample with the tender for evaluation by the Department.
- 2.4 Luminaires, associated equipment and control gear shall be new and unused and shall be supplied complete with lamps, control gear, diffusers, mounting brackets, etc. and shall be delivered to site in a protective covering.
- 2.5 Lamps shall be delivered separately.

3. STANDARDS

The following standard specifications of the South-African Bureau of Standards shall apply to this luminaire specification:

- 3.1 SABS 1119: Interior luminaires for fluorescent lamps.
- 3.2 SABS 1250: Capacitors for use with fluorescent and other discharge lamp ballasts.
- 3.3 SABS 890: Ballast's for fluorescent lamps.
- 3.4 SABS 1464: Safety of luminaires.
- 3.5 SABS 1479: Glow starters for fluorescent lamps.
- 3.6 SABS IEC 400: Lamp holders for tubular fluorescent lamps.
- 3.7 SABS 1041: Tubular fluorescent lamps for general service.
- 3.8 SABS 1247: Coatings applied by the powder-coating process.
- 3.9 SABS 783: Baked enamels.
- 3.10 SABS 0142: The wiring of Premises
- 3.11 Any standard referred to in the above specifications.

4. PHYSICAL AND ENVIRONMENTAL REQUIREMENTS

- 4.1 AREAS OF APPLICATION: The luminaires are intended for standard indoor use in buildings under the control of the Department of Public Works.
- 4.2 FIXING: The luminaires shall be suitable for mounting in or against ceilings as described in the project specification.
- 4.3 ENVIRONMENTAL: Unless otherwise specified in the detail specification the luminaires shall be suitable for operation in ambient temperatures between -10°C and $+25^{\circ}\text{C}$.
- 4.4 SAFETY: The luminaire shall bear the SABS 1464 safety mark.
- 4.5 NOISE: Noisy ballasts will not be accepted and shall be replaced at no cost to the Department. All ballasts shall comply with the requirements of the latest edition of SABS 890, Part 1.
5. **GENERAL TECHNICAL REQUIREMENTS**
- 5.1 **GENERAL**
- 5.1.1 Tubular fluorescent lamp luminaires shall comply fully with SABS 1119 and all amendments as well as the additional requirements of this specification. Luminaires shall bear the SABS mark, or at least have a SABS Certificate of Compliance.
- 5.1.2 The Department reserves the right to have samples of luminaires offered tested by the SABS for compliance with SABS 1119. If a sample luminaire is found not to comply with SABS 1119 the cost of such tests shall be borne by the Tenderer.
- 5.2 **CONSTRUCTION**
- 5.2.1 A luminaire shall consist of a ventilated body manufactured of cold rolled sheet steel not less than 0,8mm thick, suitably braced or stiffened to prevent distortion. The body shall be of sufficient strength for the mounting of the entire luminaire.
- 5.2.2 The luminaire shall be designed to accommodate the control gear, wiring, lamp holders and, where applicable, the diffuser and reflectors. It shall be possible to reach the control gear without disconnecting wiring or removing the luminaire.
- 5.2.3 Except for mounting holes and/or slots and the required openings in air-return luminaires, the back of the body channel shall be closed over the full length of the luminaire.
- 5.2.4 Suitable knockouts shall be provided in the rear of the luminaire body for wire entry.
- 5.2.5 All components, including screws, bolts and nuts utilised in the construction of the luminaire or fixing of its components, shall be corrosion proof. Cadmium plated or stainless steel materials are preferred.
- 5.3 **INTERNAL WIRING**
- 5.3.1 Luminaires shall be completely wired internally. Conductors shall be protected with grommets where they pass through holes in the body.
- 5.3.2 The wiring shall be totally metal enclosed to prevent any possible contact with live components while changing lamps.
- 5.3.3 The conductor insulation shall be rated to withstand the temperature inside the luminaire body without deterioration.
- 5.3.4 The wiring shall terminate on a suitable terminal block having screw down plates bearing on the wires. Terminals where screws bear down directly on wires will not be acceptable.
- 5.3.5 An earth terminal, welded to the luminaire body, shall be provided. To ensure good earth continuity the earth terminal shall not be spray painted. The earth conductor shall be connected

to this terminal by means of a crimped lug.

5.4 LAMP HOLDERS

Lamp holders shall preferably be of the telescopic spring-loaded type. Where twist-lock type lamp holders are provided, the mounting of the holders shall be able to accommodate the tolerances experienced in the length of lamps and in the manufacture of luminaires.

5.5 CONTROL GEAR

5.5.1 The control gear, ballasts, capacitors and starters shall be designed and manufactured to suit the control circuitry adopted. All luminaires shall operate on a switch-start basis.

5.5.2 Ballasts shall comply with SABS 890 and SABS 891, suitable for operation on 220V to 250V, 50Hz supplies.

5.5.3 Ballasts shall further be suitable for the particular luminaire to ensure that the thermal limits specified in paragraph 3.5 of SABS 1119 are not exceeded.

5.5.4 Starters shall comply with SABS 1479 or with BS 3772 if it is not covered by SABS 1479. Starters with metal cans shall contain integral earthing facilities to earth the can upon insertion.

5.5.5 Starters shall be accessible from the outside of the luminaire, and the replacement of the starter shall not necessitate the removal of lamps.

5.6 CAPACITORS

Capacitors shall comply with SABS 1250. The power factor of each complete fitting shall be corrected to at least 0,85.

5.7 LAMPS

5.7.1 Fluorescent lamps shall be suitable for the control circuitry used. Lamps shall comply with SABS 1041.

5.7.2 If no colour is specified in the Detail Technical Specification, the light colour shall correspond to colour 2 (4 300K) of SABS 1041.

5.7.3 Lamps of the same colour shall be provided for an entire installation unless specified to the contrary.

5.7.4 There shall be no visible flicker in the lamps and lamps shall readily strike when switched on. Faulty lamps or ballasts shall be replaced at no cost to the Department.

6. PHOTOMETRIC DATA

Photometric data sheets of the luminaire as prepared by a laboratory that complies with SABS requirements, shall be submitted with the luminaire.

7. TECHNICAL INFORMATION

The Tenderer shall include full technical particulars regarding the luminaire offered with the tender.

8. CHANNEL LUMINAIRE

8.1 Channel luminaires shall consist of a ventilated, enclosed channel body with one or more lamps as specified in the project specification. The channel body shall house the ballast, capacitor, terminals and internal wiring.

- 8.2 Provision shall be made for the addition of reflector wings and/or diffusers.
- 8.3 Three sets of mounting slots and knock-outs suitable for mounting onto standard round conduit boxes and/or 20mm diameter conduit pendant rods, shall be provided in the rear of the channel, one in the centre and one approximately one sixth from each end.
- 8.4 A knockout suitable for a 20mm diameter conduit entry shall be provided at each end of the channel. The distance between the back of the luminaire and centre of the knockout shall be approximately 25mm.
- 8.5 The knockouts shall be positioned on the centre line of the channel.
- 8.6 The body channel shall incorporate a removable cover acting as a reflector, manufactured of cold rolled steel, not less than 0,8mm thick, designed and mounted to completely cover the interior of the body channel and its contents and extending over the full length of the luminaire up to the lamp holders.
- 8.7 The reflector shall be firmly held in position with a latching device consisting of knurled, coin slot, captive screws. Plastic, used as a spring mechanism, is not acceptable as a fixing device for reflectors. The action of the latching device shall not deteriorate due to use and/or ageing.

9. INDUSTRIAL LUMINAIRES

- 9.1 Industrial type luminaires shall consist of a basic channel luminaire fitted with detachable side reflectors.
- 9.2 The reflectors shall be manufactured of cold rolled steel, not less than 0,8mm thick.
- 9.3 The reflectors shall be designed to improve the downward light output ratio and decrease the upward light output ratio to a value of less than 2%.

10. DECORATIVE LUMINAIRES

- 10.1 Decorative luminaires shall incorporate an injection moulded prismatic acrylic diffuser or a high-grade optical reflector covering the entire reflecting surface of the luminaire.
- 10.2 The diffuser shall be hinged or easily removable for maintenance and lamp replacement. Optical reflectors shall be hinged.
- 10.3 Decorative luminaires with diffusers shall be constructed and so installed to prevent the ingress of dust and insects.
- 10.4 Highly polished reflectors shall be protected and carefully handled and to prevent fingerprints showing on the surface.
- 10.5 Surface mounted luminaires on suspended ceilings shall be arranged to suit the grid and shall fit tightly against the ceiling.

11. RECESSED LUMINAIRES

- 11.1 Recessed luminaires shall be suitable for mounting in the ceiling structure specified in the project specification.
- 11.2 The attachment of the prismatic diffuser or reflector shall be similar to that specified in paragraph 10 above.
- 11.3 The diffuser or reflector shall fit flush with the ceiling and the only visible portion shall be the reflector or diffuser.
- 11.4 Should the luminaire be so designed that a surrounding frame is visible, then this frame shall be

manufactured of anodised aluminium. The frame shall form a neat trim with the ceiling. The corners of the surrounding frame shall be mitred and reinforced.

12. LOW-BRIGHTNESS LUMINAIRES

- 12.1 The luminaire shall be provided with an aluminium louver with V-shaped longitudinal vanes and extruded stepped cross-shielding plates.
- 12.2 Louvers shall be constructed from high purity aluminium (99,98%), chemically brightened and anodised.
- 12.3 The total Light Output Ratio (LOR) shall be 62% or better. In the plane between 60 and 90(from the vertical), the LOR shall be below 3%.

13. LOW GLARE LUMINAIRES

- 13.1 The luminaire shall be provided with a die-formed, bright anodised high-purity aluminium (99,98%) louver with parabolic reflecting surfaces in both directions.
- 13.2 The total LOR shall be 62% or better. In the plane between 60 and 90 (from the vertical), the LOR shall be less than 1,3%

14. LUMINAIRES FOR USE IN AREAS WITH VISUAL DISPLAY TERMINALS

- 14.1 The luminaire shall have anodised specular louvers to provide the brightness control required for this type of application.
- 14.2 At angles between 60 and 90(from the vertical) the luminance shall not exceed 200cd/m2.
- 14.3 At the above angles the LOR shall be less than 0,6%. At angle between the vertical and 60 the LOR shall be 61% or better.

SECTION C12.3

BULKHEAD LUMINAIRES FOR USE WITH COMPACT FLUORESCENT OR TUNGSTEN FILAMENT LAMPS FOR INTERIOR AND EXTERIOR APPLICATIONS

1. SCOPE

This specification covers the requirements for bulkhead type luminaires, using compact fluorescent or tungsten filament lamps, for general indoor and outdoor use. The types of luminaires covered are decorative round, rectangular or square surface-mounted and recessed types and include luminaires with one or more lamps with standard wattage ratings as specified in the project specification. Luminaires for use in special applications or atmospheres are not included in this specification.

2. GENERAL

- 2.1 To promote work creation in South Africa, the luminaire should preferably be manufactured within the Republic of South Africa and should have a local content of at least 50%.
- 2.2 If the luminaire offered is of foreign origin, full specifications on technical performance and quality must be submitted and full reasons shall be given why the unit had to be imported.
- 2.3 If the luminaire offered has not previously been approved by the Department, the Tenderer shall provide a sample with the tender for evaluation by the Department.
- 2.4 Luminaires, associated equipment and control gear shall be new and unused and shall be supplied complete with lamps, control gear, diffusers, mounting brackets, etc. and shall be delivered to site in a protective covering.
- 2.5 Lamps shall be delivered separately.

3. STANDARDS

The following standard specifications of the South-African Bureau of Standards and the International Electrotechnical Commission shall apply to this luminaire specification:

- 3.1 SABS 1119: Interior luminaires for fluorescent lamps. Note: The latest Amendments whereby luminaires with compact fluorescent lamps are covered, shall apply.
- 3.2 SABS 1250: Capacitors for use with fluorescent and other discharge lamp ballasts.
- 3.3 SABS 890, IEC 920 and IEC 921 : Ballasts for fluorescent lamps.
- 3.4 SABS 1464: Safety of luminaires.
- 3.5 SABS 1479: Glow starters for fluorescent lamps.
- 3.6 SABS IEC 400: Lamp holders for tubular fluorescent lamps.
- 3.7 SABS 1041, IEC 81 and IEC 901 : Tubular fluorescent lamps for general service.
- 3.8 SABS 1247: Coatings applied by the powder-coating process.
- 3.9 SABS 783: Baked enamels.
- 3.10 SABS 0142: The wiring of Premises
- 3.11 SABS 56: Incandescent lamps

3.12 Any standard referred to in the above specifications.

4. PHYSICAL AND ENVIRONMENTAL REQUIREMENTS

4.1 AREAS OF APPLICATION: The luminaires are intended for standard indoor and exterior use in buildings under the control of the Department of Public Works.

4.2 FIXING: The luminaires shall be suitable for mounting against ceilings or walls as described in the project specification.

4.3 ENVIRONMENTAL: Unless otherwise specified in the detail specification the luminaires shall be suitable for operation in ambient temperatures between -10°C and +45°C.

4.4 SAFETY: The luminaire shall bear the SABS 1464 safety mark.

4.5 NOISE: Noisy ballasts will not be accepted and shall be replaced at no cost to the Department. All ballasts shall comply with the requirements of the latest edition of SABS 890, Part 1 or IEC 920 and 921.

5. GENERAL TECHNICAL REQUIREMENTS

5.1 General

5.1.1 Compact fluorescent lamp luminaires shall comply fully with SABS 1119 and all amendments as well as the additional requirements of this specification. Luminaires, which bear the SABS mark, are preferred. Luminaires shall at least have an SABS Certificate of Compliance.

5.1.2 The Department reserves the right to have samples of luminaires offered tested by the SABS for compliance with SABS 1119. If a sample luminaire is found not to comply with SABS 1119 the cost of such tests shall be borne by the Tenderer.

5.1.3 Luminaires for tungsten filament lamps shall not materially differ from those for compact fluorescent lamps, but shall be capable of dissipating the extra heat generated without deterioration in the luminaire materials.

5.2 Construction

5.2.1 A luminaire shall consist of a ventilated body manufactured from die-cast aluminium. The body shall be of sufficient strength for the mounting of the entire luminaire.

5.2.2 The luminaire shall be designed to accommodate the control gear, wiring, lamp holders, the diffuser and reflectors. It shall be possible to reach the control gear without disconnecting wiring or removing the luminaire.

5.2.3 Except for mounting holes and/or slots, the back of the body shall be closed over the full extent of the luminaire.

5.2.4 Suitable knockouts shall be provided in the rear of the luminaire body for wire entry.

5.2.5 All components, including screws, bolts and nuts utilised in the construction of the luminaire or fixing of its components, shall be corrosion proof. Cadmium plated or stainless steel materials are preferred.

5.2.6 The luminaire shall, as an option, be available with a high-pressure die-cast aluminium skirt, which shall be designed in such a way that it covers the base completely when mounted. The skirt shall be mounted onto the body by means of at least three screws.

5.3 Internal wiring

- 5.3.1 Luminaires shall be completely wired internally. Conductors shall be protected with grommets where they pass through holes in the body.
- 5.3.2 The wiring shall be totally metal enclosed to prevent any possible contact with live components while changing lamps.
- 5.3.3 The conductor insulation shall be rated to withstand the temperature inside the luminaire body without deterioration.
- 5.3.4 The wiring shall terminate on a suitable terminal block having screw down plates bearing on the wires. Terminals where screws bear down directly on wires will not be acceptable.
- 5.3.5 An earth terminal, welded to the luminaire body, shall be provided. To ensure good earth continuity the earth terminal shall not be spray painted. The earth conductor shall be connected to this terminal by means of a crimped lug.

5.4 Lamp holders

Lamp holders shall be of the type suitable for the relevant compact fluorescent or general lighting service lamp. The following standard lamps and lamp holders shall apply:

5.4.1	<u>LAMP</u>	<u>HOLDER</u>	<u>LAMP</u>	<u>HOLDER</u>
	7W PL	2G11	13W PLC	G24d-1
	9W PL	2G11	16W 2D	GR10q
	11W PL	2G11	18W PLC	G24d-2
	60/100W GLS	E27, porcelain		

5.5 Control gear

- 5.5.1 The control gear, ballasts, capacitors and starters shall be designed and manufactured to suit the control circuitry adopted. All fluorescent luminaires shall operate on a switch-start basis where external starters are employed.
- 5.5.2 Ballasts shall comply with SABS 890 and SABS 891, or IEC 920 and IEC 921 as applicable and shall be suitable for operation on 220V to 250V, 50Hz supplies.
- 5.5.3 Ballasts shall further be suitable for the particular luminaire to ensure that the thermal limits specified in paragraph 3.5 of SABS 1119 are not exceeded.
- 5.5.4 Starters shall comply with SABS 1479 or with BS 3772 if it is not covered by SABS 1479. Starters with metal cans shall contain integral earthing facilities to earth the can upon insertion.
- 5.5.5 Starters shall be accessible from the outside of the luminaire, and the replacement of the starter shall not necessitate the removal of lamps.
- 5.5.6 The luminaire reflector shall act as the gear/mounting tray and shall be manufactured from sheet steel at least 0,7mm thick. The gear tray shall preferably be white epoxy powder coated after all the cut-outs and holes have been made on the tray. The tray shall be mounted to the body of the luminaire by means of screws and the tray shall be provided with a hole through which the screw head can pass plus a slot of the same width as the screw thickness so that the tray can be removed without removing the screws completely.
- 5.5.7 The gear tray shall be equipped with the components suitable for the luminaires specified in the project specification.

5.6 Capacitors

Capacitors shall comply with SABS 1250. The power factor of each complete fitting shall be corrected to at least 0,85.

5.7 Lamps

5.7.1 Fluorescent lamps shall be suitable for the control circuitry used. Lamps shall comply with the applicable clauses of SABS 1041 and, where it does not apply, the lamps shall comply with IEC 81 or IEC 901.

5.7.2 If no colour is specified in the Detail Technical Specification, the light colour shall correspond to colour 2 (4 300K) of SABS 1041.

5.7.3 Lamps of the same colour shall be provided for an entire installation unless specified to the contrary.

5.7.4 There shall be no visible flicker in the lamps and lamps shall readily strike when switched on. Faulty lamps or ballasts shall be replaced at no cost to the Department.

5.7.5 The following standard lamps shall be used for the purposes of this specification:

PL lamps:	7W, 9W AND 11W
PLC Lamps:	13W
2D Lamps:	16W
GLS Lamps:	60 and 100W

5.8 Diffuser

5.8.1 The diffuser shall consist of a high-impact resistant ultra-violet stabilised acrylic moulding. The diffuser shall be either transparent or opaque as described in the project specification. Where transparent diffusers are required, these shall be moulded with internal prismatic refractors and the outer surface shall be smooth.

5.8.2 The diffuser shall be mounted to the body by means of an external mounting ring and at least three screws, which should preferably not pass through the diffuser body as well. A silicon sponge gasket which fits into a groove on the diffuser shall be used to allow breathing of the luminaire whilst prohibiting the ingress of insects.

6. PHOTOMETRIC DATA

Photometric data sheets of the luminaire as prepared by a laboratory that complies with SABS requirements, shall be submitted with the luminaire.

7. TECHNICAL INFORMATION

The Tenderer shall include full technical particulars regarding the luminaire offered with the tender.

SECTION 12.4

POST TOP LUMINAIRES FOR EXTERIOR APPLICATIONS

1. SCOPE

This specification covers the requirements for post top type luminaires, using tungsten filament, compact fluorescent, mercury vapour, sodium vapour or metal halide lamps, for general outdoor and indoor use. The luminaires covered are decorative types and include luminaires with one or more lamps with standard wattage ratings as specified in the project specification.

2. GENERAL

- 2.1 To promote work creation in South Africa, the luminaire should preferably be manufactured within the Republic of South Africa and should have a local content of at least 50%.
- 2.2 If the luminaire offered is of foreign origin, full specifications on technical performance and quality must be submitted and full reasons shall be given why the unit had to be imported.
- 2.3 If the luminaire offered has not previously been approved by the Department, the Tenderer shall provide a sample with the tender for evaluation by the Department.
- 2.4 Luminaires, associated equipment and control gear shall be new and unused and shall be supplied complete with lamps, control gear, diffusers, mounting brackets, etc. and shall be delivered to site in a protective covering.
- 2.5 Lamps shall be delivered separately.

3. STANDARDS

The following standard specifications of the South-African Bureau of Standards and the International Electrotechnical Commission shall apply to this luminaire specification:

- 3.1 SABS 1421: High-pressure mercury vapour lamps.
- 3.2 SABS IEC 662: High-pressure sodium vapour lamps
- 3.3 IEC 61167: Metal Halide lamps
- 3.4 SABS 56: Incandescent lamps
- 3.5 SABS 1250: Capacitors for use with fluorescent and other discharge lamp Ballasts.
- 3.6 SABS 1464: Safety of luminaires.
- 3.7 SABS IEC 922 and
SABS IEC 923: Ballasts for discharge lamps.
- 3.8 SABS IEC 926 and
SABS IEC 927: Starting devices (other than glow starters).
- 3.9 SABS 890, IEC 920
And IEC 921: Ballasts for fluorescent lamps
- 3.9 SABS IEC 400: Lamp holders for fluorescent lamps
- 3.10 SABS 1247: Coatings applied by the powder-coating process.
- 3.11 SABS 783: Baked enamels.

- 3.12 SABS 0142: The wiring of Premises
- 3.13 SABS 1507: Electric cables with extruded solid dielectric insulation for fixed installations.
- 3.14 SABS 165 and: Lamp holders
VC 8011
- 3.15 SABS 1277: Street lighting luminaires.
- 3.16 SABS 1088: Luminaire entries and spigots
- 3.17 Any standard referred to in the above specifications.

4. **PHYSICAL AND ENVIRONMENTAL REQUIREMENTS**

- 4.1 AREAS OF APPLICATION: The luminaires are intended for standard exterior use on premises under the control of the Department of Public Works.
- 4.2 FIXING: The luminaires shall be suitable for mounting on vertical poles. Spigot entries shall have an internal diameter of 76mm and shall be 75mm deep in accordance with SABS 1088 Table 1 (Type 2).
- 4.3 ENVIRONMENTAL: Unless otherwise specified in the detail specification the luminaires shall be suitable for operation in ambient temperatures between -10°C and +45°C. The luminaire shall have an ingress protection rating of IP55 in order to prevent air from entering the lamp compartment and this rating shall be certified by a SABS report.
- 4.4 SAFETY: The luminaire shall bear the SABS 1464 safety mark.
- 4.5 NOISE: Noisy ballasts will not be accepted and shall be replaced at no cost to the Department. All ballasts shall comply with the requirements of the latest edition of SABS IEC 920, 921, 922 and 923.

5. **GENERAL TECHNICAL REQUIREMENTS**

- 5.1 General
 - 5.1.1 The internal components of the luminaire shall be able to withstand internal temperatures of at least 45°C without resulting in any electrical or mechanical component exceeding its maximum rated operating temperature. Certified proof from an authorised testing facility shall be presented on request.
 - 5.1.2 The luminaire colour shall be as specified in the project specification.
 - 5.1.3 The luminaire shall bear the SABS 1277 mark.
- 5.2 Construction
 - 5.2.1 The luminaire shall consist of a spigot base manufactured from high-pressure die-cast aluminium, a lamp compartment with integral control gear as applicable, and a prismatic diffuser and top canopy. The base shall be of sufficient strength for the mounting of the entire luminaire.
 - 5.2.2 The luminaire shall be designed to accommodate the control gear, wiring, lamp holders, the diffuser and reflectors where applicable. It shall be possible to reach the control gear without disconnecting wiring or removing the luminaire.
 - 5.2.3 All components, including screws, bolts and nuts utilised in the construction of the luminaire or fixing of its components, shall be corrosion proof. Cadmium plated or stainless steel materials are preferred.
 - 5.2.4 The luminaire spigot shall be provided with at least three M8 stainless steel Allen grub screws for

mounting onto the pole.

5.3 Internal wiring

5.3.1 Luminaires shall be completely wired internally. Conductors shall be protected with grommets where they pass through holes in the body or control gear trays.

5.3.2 The wiring shall preferably be totally metal enclosed to prevent any possible contact with live components while changing lamps.

5.3.3 The conductor insulation shall be rated to withstand the temperature inside the luminaire body without deterioration.

5.3.4 The wiring shall terminate on a suitable terminal block having screw down plates bearing on the wires. Terminals where screws bear down directly on wires will not be acceptable.

5.3.5 An earth terminal, forming part of the luminaire body, shall be provided. To ensure good earth continuity the earth terminal shall not be spray painted. The earth conductor shall be connected to this terminal by means of a crimped lug.

5.4 Lamp holders

Lamp holders shall be of the type suitable for the relevant lamp used. Lamp holders shall not deteriorate as a result of normal operating temperatures in the luminaire.

5.5 Control gear

5.5.1 The control gear, ballasts, capacitors and starters shall be designed and manufactured to suit the control circuitry adopted

5.5.2 Ballasts shall comply with SABS IEC 920, 921, 922 and 923 as applicable and shall be suitable for operation on 220V to 250V, 50Hz supplies.

5.5.3 Ballasts shall further be suitable for the particular luminaire to ensure that the thermal limits specified in Clause 5.1.1 above are not exceeded.

5.5.4 The luminaire control gear shall be mounted onto a control gear mounting assembly which also contains the lamp holder. The assembly shall be mounted on the spigot base and the whole assembly shall be removable as a unit without dismantling the luminaire as such.

5.5.5 The luminaire body shall be equipped with the components suitable for the luminaires and lamps specified in the project specification.

5.5.6 In those applications where ignitors are used, these shall be of the superposed pulse type.

5.5.7 The reflector, if specified in the project specification, shall be mounted on a white epoxy powder coated steel mounting plate at least 0,7mm thick, which shall be mounted to the spigot body. The reflector shall be made from highly polished anodised aluminium plate and shall be manufactured to give optimum performance with the prismatic diffuser.

5.6 Capacitors

Capacitors shall comply with SABS 1250. The power factor of each complete fitting shall be corrected to at least 0,85.

5.7 Lamps

5.7.1 The following standard lamps shall be used for the purposes of this specification:

<u>Lamp</u>	<u>Lamp holder</u>
-------------	--------------------

Mercury Vapour
50W, 80W and 125W

E27

<u>Lamp</u>	<u>Lamp holder</u>
-------------	--------------------

Sodium Vapour
50W and 70W
100W and 150W

E27

E40

All lamps shall be of the elliptical coated type.

Metal halide lamps

70W and 150W (tubular)
100W (elliptical)

RX7s

E27

Fluorescent lamps

PL 24W
PL C 18W
PL C 26W

2G11

G24d-2

G24d-3

Incandescent lamps

100W

E27

5.7.2 The lamps shall be prevented from loosening in the holders as a result of vibrations under normal working conditions.

5.8 Diffuser

5.8.1 The diffuser shall consist of a high-impact resistant ultra-violet stabilised acrylic moulding with internal prismatic refractors and the outer surface shall be smooth. The prisms shall be designed to work in conjunction with the reflectors to provide the optimum light output.

5.8.2 The diffuser shall be mounted to the body by means of a round ring surface at the bottom which fits onto the spigot base with a neoprene gasket. A drip ridge shall be provided at the bottom edge to prevent direct contact by rainwater with the gasket. The diffuser top shall be formed in such a manner that the top canopy-cover fits over the diffuser.

5.8.3 The top canopy cover shall be manufactured from a robust material that is highly resistant to weather, hail, corrosion and vandalism. The inside of the canopy shall be provided with ribbed struts, formed as part of the moulding, to provide additional strength to the canopy. The canopy shall be provided with an internal groove into which the diffuser top edge shall fit and this shall be sealed by means of a neoprene gasket. The cover shall be bolted down onto the body by means of a single central nut on top of the cover.

6. **PHOTOMETRIC DATA**

Photometric data sheets of the luminaire as prepared by a laboratory that complies with SABS requirements, shall be submitted with the luminaire.

7. **TECHNICAL INFORMATION**

The Tenderer shall include full technical particulars regarding the luminaire offered with the tender.

SECTION C16

EARTHING ELECTRODES

1. GENERAL

This section covers uncoated, coated and metal clad circular rod electrodes intended to provide an earth in soil for electrical and lightning arrestor systems.

2. CATEGORY AND TYPE

2.1 Only the following type of earth rods shall be used:

- | | | | |
|---|-----|---|--|
| 1 | (a) | - | Solid copper. |
| | (b) | - | Solid stainless steel. |
| 2 | (a) | - | Solid steel with bonded copper protection. |
| | (b) | - | Solid steel with plated copper protection. |
| | (c) | - | Solid steel with a shrunk-on copper jacket. |
| 3 | | - | Solid steel with a shrunk-on stainless steel jacket. |
| 4 | | - | Galvanised steel. |

2.2 Bare aluminium is not acceptable as an electrode material.

2.3 All rods shall be solid and of circular cross section with length as specified in the Detail Technical Specification.

2.4 The nominal diameter of the earthing rods shall not be less than 16mm unless the rods are specified for placing in pre-drilled holes in which event the minimum nominal diameter shall not be less than 12 mm.

3. COUPLINGS AND CONDUCTOR CLAMPS

3.1 Earthing electrodes shall be provided with $(n-1)$ couplings where n = number of rods supplied.

3.2 Rods designed for coupling by means of external sleeves shall be provided with an adequate quantity of hydrocarbon or silicon grease to be applied to the coupling before the joint is made.

3.3 Rods designed for coupling by means of internal pins or splines shall be provided with thin-walled tubes and hydrocarbon or silicon grease to seal the joint.

3.4 Conductor clamps shall be provided to suit the type and size of rods provided and the type and size of conductor specified in the Detail Technical Specification.

3.5 The material of the clamps shall be electrolytically compatible with the rod and conductor materials.

3.6 Where brazed or welded connections are specified, the supplier of the rods shall stipulate at least two types of metals which are compatible with the rod and conductor materials.

3.7 An adequate number of driving caps or bolts shall be supplied with the rods to protect the ends of the earthing rods whilst being driven into hard soil.

SECTION C17

SWITCHBOARDS (Up to 1 kV)

1. GENERAL

1.1 Scope

This section covers the manufacturing and testing of flush mounted, surface mounted and floor standing switchboards for general installations in normal environmental conditions and for system voltages up to 1 kV.

1.2 Size

All switchboards shall be of ample size to accommodate the specified switchgear and provide space for future switchgear. For every 4 (or part of 4) 5kA circuit-breakers on a switchboard, space for an additional 5kA circuit breaker shall be allowed unless future space requirements are clearly specified. For circuit breakers above 5kA, this factor shall be 15 %. The clearance between adjoining switchgear openings shall be as specified in par. 6.2.

1.3 External Dimensions

The maximum allowable height of free standing switchboards is 2,2 m. Cubicle type boards may be up to 2,4 m high if they can be fully dismantled into individual cubicles. Where, due to space restrictions, a board exceeds 2,4m in height, equipment not normally requiring access, shall be installed in the top section, enabling equipment normally requiring access to be installed lower down in the board. All other specified external dimensions for switchboards shall be strictly adhered to. If the clearances specified in par. 6.2 cannot be adhered to as a result of restricting external dimensions, the Contractor shall obtain the approval of the Department before manufacturing the switchboards.

1.4 Moisture and Vermin

All switchboards shall be rendered moisture proof and vermin proof and shall be adequately ventilated. Refer to par. 4.10 and 4.11.

1.5 Load Balance

The load shall be balanced as equally as possible across multiphase supplies.

2. CONSTRUCTION OF FLUSH MOUNTED SWITCHBOARDS

2.1 Standard

Flush mounted switchboards shall comply fully with SABS 1180, part I. Unless the depths of the switchboards are specified, the depths shall be determined in accordance with par. 6.

2.2 Expanded Metal

Where switchboards are to be built into 115 mm thick walls, expanded metal shall be spot-welded to the rear of the bonding trays. The expanded metal shall protrude at least 75 mm on each tray side to prevent plaster from cracking.

2.3 Knock-outs

Knock-outs shall be provided in the top and bottom ends of each switchboard tray to allow for the installation of conduits for the specified and future circuits. Knock-outs shall be provided for an equal number of 20 mm and 25 mm dia. conduits.

2.4 Panel

Front panels shall have machine punched slots for housing the specified and future flush mounted switchgear. The distance between the inside of the closed doors and the panel shall not be less than 20 mm. No equipment may be mounted on the panel unless the panel is permanently hinged to the switchboard frame.

2.5 Fixing of Front Panels

The front panel shall be secured to the architrave frame by means of 6mm studs and chromium-plated hexagonal domed nuts, hank nuts or captive fasteners. Alternatively the panel may be secured to the architrave frame by means of two pins at the bottom and a latch or lock at the top of the panel. Self-tapping screws will not be allowed. All front panels shall be provided with a minimum of one chrome plated handle.

2.6 Door Handles and Catches

Switchboard doors shall be equipped with handles and catches. Locks shall only be provided when specified. In all cases where lockable doors are required and in all cases where the switchboard doors are higher or wider than 450 mm, handles consisting of a push-button-and-handle combination with spring loaded catch or rotary handle-and-catch combination shall be installed. Switchboard doors smaller than 450 mm in height and width may be equipped with spring loaded flush mounted ring type latches. Square key operated catches are not acceptable unless specified.

3. CONSTRUCTION OF SURFACE MOUNTED SWITCHBOARDS

3.1 Standard

Surface mounted switchboards shall comply with SABS 1180, Part II.

3.2 Switchboard Tray

Surface mounted switchboards shall be equipped with a 1,6mm minimum sheet steel reinforced tray, suitably braced and stiffened to carry the chassis, door and equipment. Lugs to secure the switchboard to a vertical surface shall be provided.

3.3 Construction

All joints shall be welded or securely bolted. The tray shall be square and neatly finished without protrusions. The front tray sides shall be rounded with an edge of at least 20mm to accommodate flush doors.

3.4 Chassis

A sheet steel chassis for the mounting of equipment shall be bolted to the tray and shall comply with the requirements of par. 6.1 and 6.3.

3.5 Front Panel and Door

The front panel and door shall comply with par. 2.4 to 2.6 above. Doors shall fit flush in the tray when closed.

3.6 Dimensions

Unless the depth of the switchboards is specified, the dimensions shall be determined in accordance with the requirements of par. 6.2 and 6.3.

4. CONSTRUCTION OF FREE STANDING SWITCH BOARDS

4.1 Framework

A metal framework for free standing switchboards shall be manufactured from angle iron, channel iron or 2mm minimum folded metal. A solid U-channel base frame, sufficiently braced to support all equipment and span floor trenches and access holes shall be provided. Switchboards shall be of cubicle design with 2mm side panels forming divisions between cubicles. The maximum allowable cubicle width is 1,5m. (Refer also to par. 4.7). Joints shall be non-continuously butt-welded. Welds shall be ground smooth and the joint wiped with plumber's metal in order to provide a smooth finish. Switchboards wider than 2m shall be fitted with screwed eye-bolts attached to the framework to facilitate loading and transportation of the board.

4.2 Rear and Side Panels

The rear panels shall be removable and shall be manufactured from 2mm minimum sheet steel. The panels shall have returned edges which are recessed in the frame or which fit over lips on the switchboard frame. The panels shall be secured to the frame by means of studs and chromium-plated hexagonal domed brass nuts or hank nuts or captive fasteners equal or similar to "DZUS" or "CAMLOC". Where switchboards are intended for installation in vertical building ducts or against walls, the rear and side panels may consist of a single folded sheet which is either bolted or welded to the frame or which forms part of the folded metal frame.

4.3 Front Panels

4.3.1 The front panels of floor standing switchboards shall preferably be hinged except where flush mounted equipment prevents this. Alternatively, panels shall be secured by means of the methods described in par. 2.5. The panels shall be arranged in multi-tiered fashion to allow for the logical grouping of equipment in accordance with par. 6.

4.3.2 The hinged front panels shall have a dished appearance with 20mm upturns which fit over a lip on the switchboard frame. Alternatively the hinged panels shall have folded edges and shall be fitted flush or slightly recessed in the switchboard frame. The latter method shall be used where doors are required. (Also refer to par. 4.6). Corners shall be welded and smoothed.

4.3.3 The panels shall be of 2mm minimum sheet steel with machine punched slots to allow for the flush mounting of instrumentation, switchgear toggles and operating handles. A minimum clearance of 50mm shall be maintained between the rear of equipment mounted on the panels (taking into account terminals or other projections) and the frame and chassis of the switchboard. Separate panels shall preferably be provided for the mounting of instrumentation and for covering flush mounted switchgear. Enclosed switchgear with front panels e.g. combination fuse-switch units, may be flush mounted in the board in lieu of separate hinged panels.

4.3.4 Hinged panels shall be suitably braced and stiffened to carry the weight of flush mounted equipment and to prevent warping.

4.3.5 Hinged panels with flush mounted equipment and panels higher than 600mm shall be supported by hinges of adequate strength to ensure smooth and reliable operation. 16mm pedestal or similar heavy duty hinges with single fixing bolts may be used on panels smaller than 600mm. On the larger panels long pedestal type hinges with two fixing bolts per hinge are preferred. Piano hinges are not acceptable for this application.

4.3.6 A tubular chromium-plated handle shall be fitted on each panel. The handle may be omitted if "DZUS" or "CAMLOC" fasteners are used.

4.3.7 Blanking plates shall be fitted over slots intended for future equipment. These plates shall be fixed in a manner which does not require the drilling of holes through the front panel. Dummy circuit-breakers may be fitted where applicable.

4.3.8 Front panels containing live equipment such as instrumentation or control switches, shall be bonded to the switchboard frame with a braided copper earth trap with an equivalent cross-sectional area of at least 4mm².

4.4 Securing of Front Panels

Hinged panels shall be secured in position by means of square key operated non-ferrous fasteners designed to draw the panels closed or similar quick-release fasteners. Self-tapping screws are not acceptable. Where non-hinged removable panels are specified, they shall be secured in position by means of 6mm studs and hexagonal chromed brass dome nuts and washers or hank nuts. Non-hinged removable panels may alternatively be secured in position by means of two pins at the bottom and a latch or lock at the top.

4.5 Chassis

A suitably braced chassis for the mounting of switchgear and equipment shall be firmly secured to the frame of the switchboard. The chassis shall be designed so that the switchgear can be installed in accordance with par. 6. Circuit-breakers and isolating switches which are not of the moulded-case air-break type and the insulators of busbars for ratings of 200 A and more may be secured directly to the framework. (Refer to par. 6.1).

4.6 Doors

- (a) Doors need only be provided when specified. Doors shall be arranged in multi-tiered fashion to allow for the logical grouping of equipment in accordance with par. 6.
- (b) Doors shall have a dished appearance with a minimum of 20 mm upturns which fit over a lip on the switchboard frame or shall fit flush in the switchboard frame. Corners shall be welded and smoothed.
- (c) Doors shall be of aluminium sheet steel with machine punched slots to allow for the flush mounting of instrumentation, control and protection equipment. Switchgear shall be flush mounted in the front panels behind the doors unless specified to the contrary. A minimum clearance of 50mm shall be allowed between the rear of equipment mounted on doors (including terminals and projections) and the frame, front panel and chassis.
- (d) Doors shall be suitably braced and stiffened to carry the weight of the equipment and to prevent warping.
- (e) Hinges for doors shall be provided as described in par. 4.3.5. At least three hinges shall be provided on doors higher than 1,2m.
- (f) Doors shall be fitted with handles consisting of a pushbutton-and-handle combination with springloaded catch or a rotary handle-and-catch combination. Flush mounted ring type handles or square key operated latches are not acceptable. The same key shall fit all locks on the switchboard in cases where locks are required.
- (g) Doors shall be fitted with hypalon or neoprene seals.
- (h) Doors containing any electrical equipment shall be bonded to the switchboard frame with a braided copper earth wire with an equivalent cross-sectional area of at least 4mm².

4.7 Sections

For ease of transportation and to facilitate access to the allocated accommodation, switchboards may be dismantled into cubicles or sections. Each section shall be rigidly manufactured to ensure that damage to the switchgear will not occur during transportation and handling. Where required, switchboards shall have temporary wood or steel bracing to protect switchgear and facilitate handling.

4.8 Grouping of Switchgear

The switchgear shall be logically arranged and grouped as described in par. 6. Depending upon the number and size of components, a common front panel may be installed over one or more groups of equipment. All equipment shall be installed in accordance with the requirements of par. 6.

4.9 Cable Gland Plate

A cable gland plate shall be installed across the full width of each power cubicle at a minimum height of 300mm above the bottom of the switchboard to house the cable glands. A Steel cable channel or other approved support shall be provided to carry the weight of the cable and remove mechanical stress from the cable glands. A minimum distance as required by the bending radius of outgoing cables shall be provided between the lowest terminals of major equipment and the gland plate.

4.10 Ventilation

Switchboards shall be properly ventilated, especially cubicles containing contactors, transformers, motor starters, lighting dimmers and other heat producing equipment. Louvres shall be fitted to provide adequate upward or cross ventilation. All louvres shall be vermin proofed with 1,5mm brass mesh or perforated steel plate internally spot welded over the louvres. The internal ambient temperature shall not exceed 40 C.

4.11 Vermin Proofing

Free standing boards shall be protected against vermin, especially from below- Where cables have to pass through the gland plate, rubber grommets shall be provided and enough non-hardening compound shall be delivered with the board so that these holes can be sealed properly after installation of the cables.

5. CONSTRUCTION OF MAIN LOW TENSION SWITCHBOARDS

Main low tension switchboards and sub-main low tension switchboards heavily equipped shall comply with par. 4.1 to 4.11 as well as the following exceptions or additions:

- (a) These boards shall be fully extensible with removable busbar cover plates in the side panels.
- (b) Doors shall not be supplied unless specifically called for.
- (c) Switchgear and equipment shall be installed in accordance with the requirements of par. 6.
- (d) Provision for metering equipment shall be made in accordance with requirements of local authorities where applicable.

6. MOUNTING OF EQUIPMENT

- 6.1 The mounting of equipment shall comply with SABS 1180 where applicable. Equipment to be mounted on the chassis shall be mounted by bolts, washers and nuts or by bolts screwed into tapped holes in the chassis plate. In the latter case the minimum thickness of the chassis plate shall be 2,5 mm. The latter method shall not be used where boards will be subject to vibration or mechanical shocks. Self-tapping screws will not be accepted.

6.2 Space Requirements

In designing the switchboards the following requirements shall be strictly adhered to:-

- (a) A minimum of 50 mm between any piece of equipment and the frame or internal partitioning. This minimum space is required on all sides of the equipment. In the case of a single row of single-pole circuit-breakers the spacing on one side of the row may be reduced to 25 mm if the incoming side of the circuit-breakers is busbar connected.
- (b) A minimum of 75 mm between horizontal rows of equipment. The maximum outside dimensions of equipment shall be considered.
- (c) Circuit-breakers up to a fault rating of 10 kA may be installed adjacent to each other. For higher ratings a minimum of 40 mm shall be allowed between circuit-breakers or isolators.
- (d) Sufficient space shall be provided for wiring allowing for the appropriate bending radius.
- (e) Space for future equipment shall be allowed as described in par. 1.2.

6.3 Mounting of Chassis

The chassis of flush mounted and smaller surface mounted boards shall be mounted in accordance with SABS 1180. For all free standing switchboards and surface mounted switchboards where the main switch rating exceeds 100 A (triple-pole), space for wiring shall be provided between the chassis and tray. This space shall be adequate to install the supply cable behind the chassis and terminate on the main switch without sharp bends in the cable cores.

6.4 Grouping of equipment

6.4.1 Equipment shall be arranged and grouped in logical fashion as follows:

- (a) Main switch - to be installed either at the top or bottom of the board.
- (b) Short circuit protection equipment - fuse gear or fuse-switches.
- (c) Change-over contactors or other contactors controlling the supply.
- (d) Motor supplies.
- (e) Fuse-switches for outgoing circuits.
- (f) Other circuits and equipment.

6.4.2 Where a portion of the equipment on the switchboard is supplied from a standby power source, the change-over contactor and the associated equipment shall be grouped in a separate compartment.

6.4.3 Where earth leakage units are required, the associated circuit-breakers shall be installed adjacent to the unit.

6.5 Mounting of Circuit-Breakers

All moulded-case circuit-breakers shall be flush mounted with only the toggles protruding. Miniature circuit-breakers may be installed in clip-in trays mounted on the frame. All other circuit-breakers shall be bolted to the chassis. Special provision shall be made for large main switches when designing the framework. Care shall be exercised that the rear studs of circuit-breakers are properly insulated from the steel chassis. Where necessary, insulating material shall be installed between the rear studs and the chassis. Circuit-breakers shall be installed so that the toggles are in the up position when "ON" and down when "OFF".

6.6 Instrumentation

All metering instruments shall be flush mounted in the front panel or door. The rear terminals of instruments mounted on doors shall be covered with an insulating material to prevent accidental

contact. Current transformers for metering shall be mounted so that the rating plate is clearly visible. Fuses for instrumentation shall be mounted in an easily accessible position and clearly marked.

6.7 Mounting of Fuses

6.7.1 Fuse holders shall be mounted semi-recessed in the front panel so that fuses can readily be changed without removing the front panel. Busbar mounted fuses for instrumentation shall be used as far as possible.

6.7.2 Where equipment requiring fuses is specified on a board (fuse switches etc), a ruling shall be obtained from the Department on the quantity of spare fuses to be provided.

6.8 Equipment in Main Boards

Equipment in main low tension switchboards and sub-main boards shall be grouped in individual compartments. Equipment shall be installed as follows:

6.8.1 Rack-out type air circuit-breakers shall be mounted in the bottom section, flush behind the panel with the handle only protruding. If this is not possible, the panel shall be omitted and the air circuit-breakers installed behind a door.

6.8.2 If the main switch is a moulded-case circuit-breaker or isolator it shall be flush mounted.

6.8.3 Contactors controlling the supply shall be installed behind separate front panels.

6.8.4 All metering, protection and indicating equipment shall be clearly visible from the front of the board. Current transformer ratios and multiplication factors shall be clearly marked. Where doors are specified the equipment shall be installed flush in the doors and covered as described in par. 6.6.

6.8.5 All circuit-breakers and fuses (with the exception of fuse-switches) may be grouped together behind one or more panels as described in par. 4.8.

6.8.6 Fuses or fuse-switches providing back-up protection for circuit breakers, shall be grouped with the associated circuit-breakers. Exposed surfaces of fuse-switches shall be of the same finish and colour as the rest of the board where practical.

6.9 Standby Supplies

6.9.1 Where standby power from a diesel-generator set or other sources is available and has to be connected to some of the equipment on a switchboard, the switchboard shall be divided into separate sections with sheet metal divisions to isolate standby power and mains power sections.

6.9.2 Standby and normal supply shall each have its own incoming isolator or circuit-breaker.

6.9.3 The two sections of the switchboard shall be labelled "ESSENTIAL" and "NON-ESSENTIAL" respectively.

6.9.4 The front panels of standby and no-break supply sections shall be painted in distinctive colours as follows:

- | | |
|---------------------|---|
| (a) Normal supply | □LIGHT ORANGE□, colour B26 of SABS 1091 |
| (b) Standby power | "SIGNAL RED", colour All of SABS 1091 |
| (c) No-break supply | "DARK VIOLET", colour F06 or "OLIVE GREEN", colour H05 of SABS 1091 |

7. BUSBARS IN SWITCHBOARDS

7.1 Application

7.1.1 Busbars shall be manufactured of solid drawn high conductivity copper with a rectangular cross-section in accordance with SABS 784, SABS 1195 and BS 159 and BS 1433, where applicable.

7.1.2 Although SABS 784 refers only to overhead or rising busbars, busbars in switchboards shall comply with applicable sections of this specification especially as far as insulation and clearance values, creepage distance, joints, insulation resistance, dielectric strength, deflection test, absorption resistance and rated short time withstand current are concerned.

7.1.3 Busbars shall be supplied for the following applications :

- (a) Distribution of supply voltage.
- (b) Connection of equipment with ratings exceeding the current rating of 70mm² conductors (par. 8.6).
- (c) Connection of outgoing circuits with current ratings in excess of that allowed for 70mm² conductors (par. 7.8).
- (d) Collector bars for parallel cables (par. 8.1).
- (e) Connection bars for neutral conductors (par. 7.9).
- (f) Earth busbars (par. 7.10).
- (g) Connections to miniature circuit-breakers (par. 8.6).

7.2 See Part C15 for further details.

8. WIRING

8.1 Cabling

Cables connected to incoming or outgoing circuits shall be terminated on the gland plate supplied for this purpose. (Refer to par. 4.9). Power cables up to and including 70 mm² may terminate on clamp type terminals where the clamping screws are not in direct contact with the conductor. Connection to the equipment can then be made with cables that are similarly connected to the clamp terminal. All power cables larger than 70mm² terminate on busbars that are connected to the associated equipment. Parallel incoming or outgoing cables shall be connected to a collector busbar without crossing the conductors.

8.2 Terminal Strips

External wiring for low voltage, control, interlocking, alarm, measuring and DC circuits shall terminate on numbered wiring terminals complying with the Department's standard specification for "WIRING TERMINALS", Section C9. The correct terminal size as recommended by the manufacturer for each conductor to be connected shall be used throughout. The terminal numbers shall appear on the wiring diagrams of the switchboard. Terminals for power wiring shall be separated from other terminals. Terminals for internal wiring shall not be interposed with terminals for external circuits. All connections to terminals shall be identified as described in par. 8.8. Where switchboards consist of separate sections, the control wiring passing between sections shall be terminated on strips in each section so that control wiring can be readily re-instated when reassembling the board.

8.3 Current Ratings

The current rating of conductors for the internal wiring shall be sufficient for the maximum continuous current that can occur in the circuit. This value shall be determined from the circuit-breaker or fuse protection of the circuit.

TABLE 17.3

CURRENT RATING FOR INTERNAL WIRING

Nominal cross-section mm ²	CONDUCTOR RATING (A)				
	Number of conductors in bunch				
	1	2 - 3	4 - 5	6 - 9	20 and more
2,5	28	25	22	19	16
4	37	33	30	26	22
6	47	42	38	33	28
10	64	54	51	44	38
16	85	76	68	59	51
25	112	101	89	78	67
35	138	124	110	96	88
50	172	154	137	120	103
70	213	191	170	149	127

The above table shall be applied for ambient temperatures up to 30 C. (Refer to table 41.2 in VDE 0100). For higher ambient temperatures the values shall be derated as prescribed by SABS 0142, Table 10.

8.4 Internal Wiring

- (a) Standard 600/1 000 V grade PVC-insulated stranded annealed copper conductors to SABS 150 shall be employed for the internal power wiring of switchboards. The smallest conductor size to be used for power wiring in switchboards shall be 2,5mm². Flexible cord of minimum size 1,0mm² may be used for control wiring.
- (b) Where heat generating equipment is present and the internal temperature of the board is likely to exceed 50 C, silicon-rubber insulated stranded conductors shall be used.
- (c) Wiring shall be arranged in horizontal and vertical rows and shall be bound with suitable plastic straps or installed in PVC wiring channels. Under no circumstances may PVC adhesive tape be used for the bunching of conductors or for the colour identification of conductors.
- (d) Bunched conductors shall be neatly formed to present a uniform appearance without twisting or crossing the conductors. Conductors leaving the harnesses shall be so arranged that they are adjacent to the chassis.
- (e) Conductors to hinged panels and doors shall be secured on both the door and the frame and shall be looped between the two points. The loop shall be arranged to produce a twisting motion when the door is opened or closed. A flexible protection sleeve shall be installed over the conductors.
- (f) Where wiring channels are used, they shall be installed horizontally and vertically. Under no circumstances may power and control circuit wiring be installed in the same wiring channels. Channel shall not be more than 40% full.
- (g) All wiring between different Panels within the same switchboard shall be installed in wiring channels.
- (h) Grommets shall be installed in each hole in the metalwork through which conductors pass.
- (i) All wiring shall be installed away from terminals, clamps or other current carrying parts. Wiring shall also be kept away from exposed metal edges or shall be protected where they cross metal edges.

- (j) Conductors may be jointed at equipment terminals or numbered terminal strips only. No other connections are allowed.
- (k) Where conductors change direction, smooth bends shall be formed with a radius of at least 5 times the outside diameter of the conductor or harness.
- (l) Where screened cables are specified, the screening shall be earthed in the switchboard or control board only unless clearly specified to the contrary. Screened cables entering control boxes through pressed knock-outs, shall terminate in compression glands. Conductors shall as far as possible remain inside the screening at terminations. Where conductors have to separate from the screen, the braiding shall be separated and the conductors drawn through the braid without damaging the braiding. The conductors shall then be connected to their respective terminals and the screening smoothed and connected to the earth terminal.
- (m) Where neutral connections are looped between the terminals of instruments, it is essential that the two conductor ends be inserted into a common lug or ferrule and are crimped or soldered together in order that the neutral connection is not broken when the conductors are removed from one of the instruments.
- (n) Wiring should as far as possible be confined to the front portions of switchboards for ease of access. This requirement is important for wiring between smaller circuit-breakers and the associated main circuit-breaker as well as the wiring from circuit-breakers to lighting and socket-outlet circuits.
- (o) A maximum of two conductors will be allowed per equipment terminal. Where more conductors must be connected to the same equipment terminal (e.g. a main circuit-breaker feeding other circuit-breakers), stub busbars shall be provided for the various conductors. Refer also to par. 8.6.

8.5 Load End Connections

The supply end connections to all equipment shall under all circumstances be at the top and the load end connections at the bottom.

8.6 Wiring to Circuit-breakers

Equipment with a rating exceeding the current rating of 70mm² conductors shall be connected by means of busbars to the main busbars. Looped connections may only be installed for a maximum of two outgoing circuits. Where there are more than two outgoing circuits, busbars shall be used and equipment connected individually to the busbars. Where miniature circuit-breakers are mounted in continuous rows and supplied by busbars connected to each MCB, each busbar shall be supplied by a separate conductor. This conductor shall be connected to the busbar by means of a separate lug and not via an MCB terminal.

8.7 Conductor Terminations

Conductors connected to terminals complying with the Department's standard specification for "WIRING TERMINALS", Section C9, need not be soldered or ferruled. Connections to circuit-breakers, isolators or contactors shall be made by one of the following methods:

- (a) A ferrule of the correct size,
- (b) soldering the end of the conductor, or
- (c) winding a conductor strand tightly around the end to totally cover the end.

All conductors terminating on meters, fuse holders and other equipment with screwed terminals shall be fitted with lugs. The lugs shall be soldered or crimped to the end of the conductor. The correct amount of insulation shall be stripped from the end to fit into the terminal. Strands may not be cut from the end of the conductor.

8.8 Identification

- 8.8.1 The colour of the conductors for all 220/250 V circuits shall correspond to the colour of the supply phase for that circuit. Neutral conductors shall be black.
- 8.8.2 All other conductors in the board, supplying control circuits, etc. shall be coded in colours other than those specified above. A colour code shall be devised for each board and the colour code shall be shown on the wiring diagrams.
- 8.8.3 All conductors that terminate at wiring terminals and all conductors used for the internal wiring of the switchboard, shall further be identified at both ends by means of durable cable marking ferrules. PVC or other tape is not acceptable.
- 8.8.4 The numbers on the markers shall be shown on the wiring diagrams.

9. PAINT FINISH

Metal components of the framework, panels and chassis shall be painted in accordance with the Department's "STANDARD PAINT SPECIFICATION", Section C39.

10. LABELLING

- 10.1 Care shall be taken to ensure that all equipment is fully labelled and that accurate descriptions and safety warning notices appear in both official languages.

10.2 Material

Engraved plastic or ivory sandwiched strips shall be used throughout. The strips shall bear white lettering on a black background for normal labels and red letters on a white or yellow background for danger notices.

10.3 Main Switchboards

Main switchboards and sub-main switchboards shall be supplied with the following bilingual labels:

- (a) Number and allocation of switchboard.
Example:

CONTROL BOARD A4
BEHEERBORD A4

Lettering: at least 10 mm high. prominent position. Label on the outside in a prominent position.

- (b) Designation of busbar sections.
Example:

BUSBAR SECTION 2
GELEISTAMSEKSIE 2

Lettering: at least 10mm high. Label on the outside in a prominent position.

- (c) Designation of all switchgear including circuit-breakers, isolators, contactors, etc. If the current rating of circuit-breakers is not clearly marked on the equipment, the value shall be indicated on the engraved label.

Example:

SUPPLY TO BOARD C3
TOEVOER NA BORD C3

**PUMP SUPPLY
POMPTOEVOER**

Letters at least 5mm high. Label on the outside of the switchboard.

- (d) All other equipment including meters, instruments, indicator lights, switches, push-buttons, circuit-breakers, fuses, contactors, control relays, protection relays, etc. shall be identified. The function of the equipment and circuits shall be clearly indicated. The main switch shall be labelled as such and designated :

"SWITCH OFF IN CASE OF EMERGENCY"
"SKAKEL AF IN NOODGEVAL"

Flush mounted equipment within doors or front panels shall be identified with labels fixed to the doors or front panels respectively. The labels for equipment installed behind panels, shall be fixed to the chassis close to the equipment. If this equipment is positioned too close together to accommodate descriptive engraved labels, the equipment may be identified by a code or number on an engraved label which shall be fixed close to the equipment. The code number shall be identified on a legend card which shall be installed on the switchboard behind a plastic or other protective cover.

10.4 Other Switchboards

All equipment on switchboards shall be identified with the necessary bilingual labels. The circuit numbers shall appear at grouped single-pole circuit-breakers. The circuit numbers shall correspond to the circuit numbers on the final installation drawings. The above-mentioned circuits shall be identified on a legend card, which shall be installed on the inside of the switchboard door, or in any other position where it can conveniently be observed. All fuses, including instrument fuses, shall have labels stating function, fuse rating and duty or type where applicable. All other equipment shall be identified separately and their functions shall be clearly indicated.

10.5 Fixing of Labels

10.5.1 Labels shall not be fixed to components or trunking but to doors, panels, chassis or other permanent structures of the switchboard.

10.5.2 Engraved strips shall be secured to facilitate a neat alteration of the designation of the labels. Sufficient fixing points shall be provided to prevent labels from warping. Labels in slotted holders shall be secured in position to prevent unauthorised removal. Labels may be secured by the use of brass bolts and nuts, self-tapping screws, slotted label holders or pop-rivets.

11. TESTS

11.1 The Department shall be notified when the mechanical construction of the switchboard, i.e. frame, panels and base frame, is complete in order that it may be inspected at the factory.

11.2 Function tests of all equipment, control and interlocking circuits shall be conducted to the satisfaction of the Department. Testing equipment and facilities including instruments, dummy loads and additional switchgear and cables shall be provided by the Contractor at no extra cost. The Department shall be notified in writing two weeks in advance of any test to be conducted, to allow its representative to be present at such tests. A complete report on the tests shall be handed to the Department.

12. DRAWINGS

12.1 Drawings for Approval

A set of three prints of the shop drawings for the switchboards shall be submitted to the Department for approval before the boards are manufactured. The following information shall be presented:

- (a) A complete wiring diagram of the equipment on the boards.
- (b) A complete layout of the arrangement of the switchboards indicating all equipment dimensions and the construction of the boards. The positions and method of fixing and sizes of busbars shall be shown.
- (c) All labelling information in both the official languages on a separate sheet.
- (d) The make, catalogue number and capacity of all equipment such as isolators, circuit-breakers, fuses, contactors, etc.

The approval of drawings shall not relieve the Contractor of his responsibility to the Department to supply the switchboards according to the requirements of this Specification.

12.2 Final Drawings

A complete set of "as-built" transparent drawings of all switchboards shall be submitted to the Department within two weeks after delivery of the boards. The following information shall be presented:

- (a) Item (a) to (d) of the previous paragraph.
- (b) Terminal strip numbers, numbers and colours of conductors connected to the terminal strips and numbers and colours of the conductors utilised for the internal wiring.
- (c) A separate schedule of all equipment.

12.3 Manuals

Three sets of manuals for all specified main and sub-main switchboards shall be supplied to the Department at no extra cost. These manuals shall include the following information :

- (a) Complete information on the operation of the equipment.
- (b) Complete information for maintenance of the equipment.
- (c) Brochures and ordering information.
- (d) A complete equipment list indicating quantities and relevant catalogue numbers.

12.4 Completion

The supply contract shall be regarded as incomplete until all tests have been conducted successfully and all drawings and manuals have been handed to the Department

SECTION C18

LOW VOLTAGE DISTRIBUTION CUBICLES (KIOSKS)

1. GENERAL

This specification covers the manufacture of distribution kiosks for general reticulation and distribution systems in normal environmental conditions for three-phase, four-wire, 400/231V, 50 Hz systems.

2. SIZE

Kiosks shall be of ample size to accommodate the specified equipment and provide space for future requirements as specified.

3. MOISTURE AND VERMIN

3.1 Kiosks shall be weatherproof. To prevent the ingress of water onto live equipment, the door entry surrounds shall have a channel shape, at least 12mm deep, to accommodate the door edge.

3.2 The roof shall be constructed with an overhang above non continuous panelling and shall be provided with a drip-edge.

4. VENTILATION

4.1 Two ventilation grilles or slots, approximately 150 x 125mm, vermin proofed and insect proofed by means of 1,5mm brass mesh or perforated steel plate spot-welded on the inside, shall be provided on the top and bottom of both side panels.

4.2 The construction of the grilles shall prevent the ingress of rain or water.

5. FIBREGLASS CANOPIES

5.1 Application

Where specified and for all kiosks to be installed within 50 km of the coast and in corrosive industrial atmospheres, the canopy and doors shall be manufactured of fibreglass.

5.2 Construction

5.2.1 The laminate shall be constructed to SABS 141.

5.2.2 An outer isophalec resin gelcoat with a minimum thickness of 0,4mm and ultraviolet absorption properties to prevent degradation of the surface from exposure to the sun shall be provided.

5.2.3 The gelcoat shall be backed by multiple layers of chopped strand mat glass rendering not less than 1,2 kg/m². The strength shall be increased to 1,35 kg/m² on kiosks with panelling larger than 500 x 500mm.

5.2.4 The fibreglass shall be thoroughly impregnated with polyester resin. The resin should preferably be clear.

5.2.5 The resin to fibreglass ratio shall not be less than 2,5 : 1 and not more than 3,0 : 1.

5.2.6 Air entrapped between the glass mat layers shall be thoroughly worked out. The laminate must be free of air bubbles and voids.

5.2.7 All edges shall be reinforced with an additional 700 g/m² of fibreglass.

5.2.8 All large surfaces, wider than 300 mm, shall be reinforced or panelled to improve stiffness and rigidity.

- 5.2.9 A resin coat shall be applied to the inside of the kiosk to cover the fibre pattern.
- 5.2.10 Brass or steel backing plates shall be laminated into the fibreglass at hinge points, locking mechanism catch support areas, door restraint fixing points and all other points which will be subjected to mechanical stresses.
- 5.2.11 Doors shall be adequately braced, reinforced, ribbed or double laminated with an air gap between the two layers of laminate to ensure rigidity.
- 5.2.12 The fibreglass canopy shall be fixed to the internal equipment support frame with bolts accessible through the door only.

5.3 Finish and Colour of Fibreglass Kiosks

- 5.3.1 The outside surface of the kiosk shall have a glossy, smooth finish to ensure good weathering. To obtain this the manufacturer shall ensure that the mould is smooth, free of voids, hairline cracks, pores or other defects.
- 5.3.2 Compound rubbing or sanding of the outside surface will not be permitted.
- 5.3.3 Pigments shall be added to the outer gelcoat to obtain a matching colour to SABS 1091 "AVOCADO GREEN" colour C12 or "LIGHT STONE", colour C37.
- 5.3.4 Fibreglass kiosks shall not be painted.

6. SHEET STEEL CANOPIES

- 6.1 Where specified the canopy and doors shall be manufactured of either mild steel as 3Cr12 stainless steel to the following requirements:
- 6.1.1 A metal framework shall be manufactured from solid angle iron, channel iron or 2,5mm minimum folded sheet steel.
- 6.1.2 Joints shall be non-continuously butt welded. Welds shall be ground smooth and the joint wiped with plumber's metal in order to provide a smooth finish.
- 6.1.3 Side panels, doors and the roof shall be manufactured from 2 mm minimum sheet steel. The panels shall have upturned edges which are recessed in the frame or which fit over lips on the frame. The side panels may be either bolted or welded to the frame or form part of the folded metal frame.
- 6.1.4 The roof of the cubicle shall be removable and shall be fitted by means of bolts which shall be accessible from inside the cubicle only.
- 6.1.5 All panels and doors shall be suitably braced and stiffened to ensure rigidity and to prevent warping.
- 6.1.6 The steel canopy and framework shall be fixed to the base frame by four M16 high tensile steel bolts.
- 6.2 Finish and Colour of Sheet Steel Kiosks
- 6.2.1 Metal components of the framework, panels and doors shall be painted in accordance with the Department's "STANDARD PAINTING SPECIFICATION", Section C39.
- 6.2.2 The colour shall be "AVOCADO GREEN", colour C12 or "LIGHT STONE", colour C37 of SABS 1091. A tin of matching touch-up paint (not smaller than 500 ml) shall be provided with each consignment.

7. CAST IRON KIOSKS

7.1 Where specified the cubicle panels and doors shall be manufactured from cast iron to the following requirements :

7.1.1 A metal framework shall be manufactured from solid angle iron or channel iron.

7.1.2 Cast iron panels shall be bolted to the frame work and shall be replaceable with standard cast iron panels.

7.1.3 The panels shall be bolted to the frame from the inside of the cubicle. Bolts or nuts on the outside of the cubicle are not acceptable.

7.1.4 The roof of the cubicle shall be one casting and shall be bolted in position from inside the cubicle.

7.1.5 The minimum thickness of the cast iron panels and doors shall be 6 mm.

7.1.6 All cast iron panels and doors shall be fettled prior to painting.

7.2 Finish and Colour of Cast Iron Kiosk :

7.2.1 Metal components of the framework, panels and doors shall be painted in accordance with the Department's "STANDARD PAINTING SPECIFICATION", Section C39.

7.2.2 The colour shall be "AVOCADO GREEN", colour C12 or "LIGHT STONE", colour C37 of SABS 1091. A tin of matching touch-up paint (not smaller than 500 ml) shall be provided with each consignment.

8. DOORS

8.1 Doors shall be fitted to the front and to the rear of each cubicle. The doors shall provide free access to equipment which has to be operated and shall provide a full view of all meters. Cubicles wider than 700mm shall be provided with double doors.

8.2 Doors shall have well returning edges to fit into the channel of the door entry surrounds. Refer to par. 3.1 and 6.1.3.

8.3 Doors shall swivel through 135 .

8.4 Brass hinges shall be used to hang the doors. The hinges shall be bolted to the canopy with brass bolts and nuts. Bolt heads or nuts shall not protrude beyond the outer surface of the kiosk. Nylon, aluminium or piano hinges are not acceptable.

8.5 Doors shall be fitted with lever locks with a 135° movement. The locking mechanism shall have a catch on the rear which catches behind the frame or door entry surround. The locking mechanism as well as the catch support area shall be backed with brass or galvanised steel plates. The locking mechanism shall be lockable by padlocks. Padlocks will be provided by the Department.

8.6 The locking mechanism shall be made of brass or stainless steel.

8.7 Door restraints shall be provided. Cloth or canvas straps are not acceptable. The fixing points of the restraint at both the door and canopy shall be reinforced.

8.8 At least three hinges shall be supplied on steel doors higher than 1,2 m.

8.9 Doors shall be fitted with neoprene or equivalent seals.

8.10 Metal doors shall be earth bonded to the frame by means of a copper braided strap, tooth washers, bolts and nuts.

9. EQUIPMENT SUPPORT FRAME

- 9.1 A free standing, angle iron or similar type rigid support framework shall be provided.
- 9.2 The frame shall be bolted down on the base by four M16 high tensile steel bolts. The holding-down bolts shall be accessible from the inside of the cubicle only. The frame of sheet steel canopies may be bolted to the canopy framework.
- 9.3 A galvanised steel cable gland plate shall be bolted to the bottom of the frame across the full width of the cubicle to cover the cable entry opening in the base.
- 9.4 The gland plate shall be suitably punched to accept the number and size of cables specified.
- 9.5 All steelwork shall be hot-dip galvanised in accordance with SABS 763.
- 9.6 A panel of resin bound synthetic wood or other suitable dielectric material shall be provided for the mounting of all equipment and busbars. Impregnated hardboard, other treated or untreated wood products are not acceptable.
- 9.7 Alternatively, all equipment and busbars shall be flush mounted within a purpose-made sheet metal frame enclosed by a machine punched removable front panel through which the operating handles of the equipment protrude. Care shall be exercised that the rear studs of circuit-breakers are properly insulated from the steel chassis. Miniature circuit-breakers may be installed in clip-in trays mounted on the frame.

10. CONCRETE BASES AND BASE FRAMES

- 10.1 To ensure stability of the kiosk after installation, it shall be mounted on a base frame which, in turn, shall be bolted to a concrete base cast into the bottom of the cable trench.
- 10.2 The base frame shall be constructed of angle iron, at least 50 x 4 mm thick and shall be of welded construction hot-dip galvanised and coated with epoxy resin tar.
- 10.3 The vertical height of the box frame shall be at least 900 mm and the construction shall be such as to provide a rigid support for the kiosk.
- 10.4 The base frame shall protrude to a maximum height of 200mm above ground level. Provision shall be made for the protection and concealing of the cables entering the kiosk and to prevent access of animals and vermin.
- 10.5 The base frame shall be secured by at least four M16 bolts to the support frame of the kiosk and four M16 anchor bolts and nuts to the concrete base. The bolts, nuts and washers shall be galvanised and supplied with the kiosk.
- 10.6 All galvanising shall be to SABS 763.
- 10.7 The kiosk manufacturer shall supply a detailed drawing of the base frame and the concrete base required.
- 10.8 Alternative designs and materials for the base (or root) of the kiosk will be considered but full details must be submitted for approval by the Department.

11. BUSBARS

See Section C15 for details.

12. WIRING

See Section 17.8 for details

13. MOUNTING OF EQUIPMENT

- 13.1 The mounting of equipment shall comply with SABS 1180 where applicable. Equipment shall be fixed to the support panel with bolts, nuts, washers and spring washers or self locking nuts with washers. Self-tapping screws are not acceptable.
- 13.2 Equipment shall be arranged and grouped in a logical fashion.
- 13.3 All equipment shall be flush mounted behind panels with only circuit-breaker and isolator toggles and meter faces protruding. The front panels shall be secured in position by 6mm studs and hexagonal chromed brass dome nuts and washers or hank nuts fasteners. Self-tapping or similar screws are not acceptable.
- 13.4 Blanking plates shall be fitted over slots intended for future equipment. These plates shall be fixed so that fixing holes do not need to be drilled through the front panel.

14. ACCESS

All equipment, busbars and wiring shall be completely accessible with the door open and the back door and front panel removed. In the case of fibreglass kiosks, the complete canopy shall be removable.

15. LABELLING

- 15.1 All equipment shall be fully labelled and accurate descriptions shall be given in both official languages.
- 15.2 Engraved brass shall be used for labels. The labels shall be riveted to the kiosks.
- 15.3 The following labels shall be supplied as a minimum requirement:
- 15.3.1 Number and allocation of kiosk, e.g. KIOSK B26
(Lettering: At least 10mm high. Label on the outside in a prominent position).
- 15.3.2 Designation of circuit i.e. circuit-breaker, isolator, meter, etc. e.g.
HOUSE 473
HUIS 473

PUMP SUPPLY
POMPTOEVOER

(Lettering: At least 5mm high. One label installed directly below each item of equipment pertaining to the particular circuit shall be provided).
- 15.3.3 The main switch shall be marked in accordance with the regulations.
- 15.3.4 The function and circuits of all other equipment shall be clearly identified. Flush mounted equipment within the front panel shall be identified by labels fixed to the front panel. The labels for all equipment installed behind panels shall be fixed to the support panel close to the equipment.
- 15.3.5 The labels shall be secured by means of rivets. Self-tapping screws are not acceptable. Labels shall not be glued to their mounting positions. Sufficient rivets shall be provided to prevent labels from warping.
- 15.3.6 All label designations shall be confirmed with the Department before manufactured.

16. **NOTICES**

At least one with the words "DANGER/INGOZI/GEVAAR" shall be mounted outside on the front of the kiosk. This notice shall be riveted to the steel or cast iron door so that it cannot easily be removed. Brass rivets shall be used. The notice shall be laminated into the fibreglass door in the case of fibreglass kiosks.

17. **INSPECTION**

The Department shall be notified at least two weeks in advance of the completion of the kiosks in order that an inspection may be carried out before delivery.

18. **DRAWINGS**

18.1 Drawings for Approval

18.1.1 A set of three prints of the shop drawings of the cubicles shall be submitted to the Department for approval before the cubicles are manufactured. The following information shall be presented :

- (a) Schematic and wiring diagrams of the cubicles.
- (b) A complete layout of the arrangement of the cubicles showing all equipment dimensions and constructional details. The positions and method of fixing of busbars shall be shown.
- (c) All labelling information in both the official languages on a separate sheet.
- (d) The makes, catalogue numbers and capacities of all equipment.
- (e) A detail drawing of the concrete plinth, showing concrete mixes, dimensions, opening sizes, steel reinforcing details and holding-down bolt fixing details.

18.1.2 The approval of drawing shall not relieve the Contractor of his responsibility to the Department to supply the cubicles according to the requirements of this Specification.

18.2 Final Drawings

A complete set of "as built" drawings of the cubicles shall be submitted to the Department within two weeks after delivery of the kiosks. The information contained in par.18.1.1 shall be provided.

18.3 Completion

The supply contract shall be regarded as incomplete until all drawings have been handed to the Department.

SECTION C20

MOULDED-CASE CIRCUIT-BREAKERS

1. This section covers single or multi pole moulded case circuit breakers for use in power distribution systems, suitable for panel mounting, for ratings up to 1 000 A, 600 V, 50 Hz.
2. The circuit breakers shall comply with SABS 156.
3. The continuous current rating, trip rating and rupturing capacity shall be as specified.
4. The contacts shall be silver alloy and shall close with a high pressure wiping action.
5. Where specified, the circuit breaker shall be capable of accommodating factory fitted shunt trip or auxiliary contact units or similar equipment.
6. The operating handle shall provide clear indication of "ON", "OFF" and "TRIP" positions.
7. The mechanism shall be of the TRIP-FREE type preventing the unit from being held in the ON position under overload conditions.
8. All moulded case circuit breakers in a particular installation shall as far as is practical be supplied by a single manufacturer.
9. The incoming terminals of single pole miniature circuit breakers shall be suitable for connection to a common busbar.
10. The circuit breaker shall have a rating plate indicating the current rating, voltage rating and breaking capacity.
11. Extension type operating handles shall be provided for units of 600 A rating and above.

SECTION C23

DIRECT ACTING INDICATING INSTRUMENTS

This section covers direct acting indicating instruments suitable for flush mounting in switchboards or instrument panels.

1. GENERAL REQUIREMENTS

- 1.1 Instruments shall be suitably rated for the supply voltage and frequency to be applied, which shall be 400/230 V, 50 Hz unless specified to the contrary.
- 1.2 All the instruments used for a particular application or a specific project shall be from the range of a single reputable supplier and shall have the same face dimensions. The face dimensions shall be square and not less than 96 x 96 mm.
- 1.3 All instruments shall comply with BS 89 and/or IEC 51.
- 1.4 Instruments shall be screened against magnetic interference and shall have anti static, impact-resistant glass faces.
- 1.5 Preference will be given to locally manufactured instruments.
- 1.6 Instruments shall be insulated to achieve a 2 kV insulation resistance to earth.
- 1.7 All instruments shall be splash proof and dustproof unless more stringent requirements are specified for hazardous locations.
- 1.8 Instruments shall be sufficiently resistant to vibration that may be encountered in the specific application.
- 1.9 For normal environmental and supply conditions, instruments shall be suitable for use inside the limits specified in Tables III and VI of IEC 51.
- 1.10 All instruments shall be capable of withstanding overloads of continuous or short duration in accordance with section 8.3 of IEC 51.
- 1.11 Instruments shall be provided with studs for rear connection. Shrouds shall be provided to prevent accidental contact where instruments are to be installed in hinged panels of switchboards.

2. VOLTMETERS AND VOLTMETER SELECTOR SWITCHES

- 2.1 Unless specified to the contrary, voltmeters shall be scaled from 0 - 250V in the case of LV applications.
- 2.2 Voltmeters shall be of the moving iron type with class 1,5 accuracy as specified in IEC 51.
- 2.3 A zero adjustment screw shall be provided.
- 2.4 Unless specified to the contrary, a single voltmeter and selector switch shall be provided. The voltmeter switch shall have an "OFF" and three metering positions to indicate readings between neutral and each of the three phases.
- 2.5 The markings shall be indicated clearly on the face plate of the selector switch and the handle position shall be accurate in relation to the markings on the face plate.
- 2.6 The selector switch shall be of the cam-actuated or wiping air break type with two breaks per pole.

3. **AMMETERS**

- 3.1 Ammeters shall have a moving coil element to indicate instantaneous values.
- 3.2 Direct reading ammeters up to a maximum rating of 60 A may be used. Current transformer operated ammeters shall be 5 A full scale, calibrated to read actual primary circuit currents. The current transformer ratio shall be indicated on the face plate.
- 3.3 A zero adjustment screw shall be provided.
- 3.4 Where combined maximum demand and indicating ammeters are specified, a bimetallic spiral element shall be provided in the same housing to indicate mean value over a 15 minute period.
- 3.5 The bimetal element shall drive a residual pointer to indicate maximum mean current between resettings. This pointer shall operate on the main scale and shall be of a distinctive colour. The pointer shall be resettable from the face of the meter.
- 3.6 The bimetal element shall be designed to compensate for limits of ambient temperature between -20 C and 70 C.
- 3.7 Full load or rated current shall be clearly indicated, preferably with a red line. Unless specified to the contrary, a 100 % condensed over scale shall be provided for instantaneous reading instruments and no over scale for combined maximum demand ammeters.
- 3.8 The intrinsic error, expressed in terms of the fiducial value in accordance with IEC 51, shall be class 1,5 for the instantaneous readings and class 2,5 for the mean maxima.
- 3.9 Where saturation current transformers are required, these shall form an integral part of the meter. Separate saturation current transformers are unacceptable to the Department.

4. **KILOWATT-HOUR METERS**

- 4.1 Unless specified to the contrary, kilowatt-hour meters shall be suitable for operation on 220/250 V, 50 Hz systems.
- 4.2 Meter elements shall be of the inductor disc type and designed to carry the rated current continuously.
- 4.3 Kilowatt-hour meters shall comply with the relevant parts of BS 37 and BS 5685.
- 4.4 The integrating period on maximum demand meters shall be 30 minutes unless specified to the contrary.
- 4.5 The registering mechanism shall be of the cyclometer type, providing a six digit readout with the sixth digit indicating one-tenth of a unit.
- 4.6 Unless specified to the contrary, the meters shall conform to accuracy Class 1 as specified in IEC 51.
- 4.7 Kilowatt-hour meters shall be graded and calibrated for the specific application to avoid the application of multiplication factors where possible. Where multiplication factors are unavoidable this shall be clearly indicated in unit form and not as a combination of several factors. Current transformer ratios shall be incorporated in the factor.
- 4.8 The kilowatt-hour meter shall preferably be provided with a magnetic type of bearing for the disc spindle.
- 4.9 Facilities for a security seal shall be provided on the fixing screws of the cover.

5. **FREQUENCY METERS**

- 5.1 Frequency meters may be of the vibrating reed type or the direct indicating type consisting of a moving coil milli-ammeter and a current/frequency transducer.
- 5.2 Unless specified to the contrary, the indicating range shall be 45 HZ - 55 Hz.
- 5.3 The accuracy class shall be class 0,5 in accordance with IEC 51 unless otherwise specified.
- 5.4 Where required an adjustable speed alarm contact shall be provided, adjustable over the complete scale length.

6. **RUNNING HOUR-METERS**

- 6.1 Running hour-meters shall be of the electrically operated cyclometer type, suitable for flush mounting.
- 6.2 Numerals shall be clearly defined white on a black background.
- 6.3 The range of hour-meters shall be five digits, the fifth digit indicating one-tenth of an hour, i.e. from 0 to 9999,9 hours.
- 6.4 The accuracy class shall be class 1 in accordance with IEC 51 unless otherwise specified.

SECTION C24

EARTH LEAKAGE RELAYS

1. Earth leakage relays shall be single or three-phase units with a sensitivity of 30mA, with associated circuit breaker or on-load switch for use on 220/250V single phase or 380/433 V three phase, 50 Hz, supplies.
2. The units shall be suitable for installation in switchboards in clip-in trays or bolted to the chassis.
3. The earth leakage relay shall function on the current balance principle and shall comply with SABS 767 as amended, and shall bear the SABS mark. Integral test facilities shall be incorporated in the unit.
4. Circuit breakers with trip coils used integrally with earth leakage units (two pole for single phase units and three pole for three phase units) shall comply with SABS 156.
5. On-load switches used integrally with earth leakage units (two pole for single-phase units and three pole for three phase units) shall comply with SABS 152.
6. The fault current rating of the unit shall be 2,5kA or 5kA as required, when tested in accordance with SABS 156.

SECTION C26

CURRENT TRANSFORMERS

1. GENERAL

Current transformers shall comply with the requirements of BS 3938 and IEC 185 with the exception of the required impulse test level, par.6 below.

2. RATINGS

2.1 Current transformers shall be suitable for the primary currents listed hereunder and their decimal multiples:

10, 12.5, 15, 20, 25, 30, 40, 50, 60 and 75.

The preferred values are:

10, 15, 20, 30, 50 and 75.

2.2 Current transformers shall have secondary ratings of 1, 2 and 5A, with 5A being preferred.

2.3 Current transformers shall have standard outputs of 2, 5, 5, 10, 15 or 30 VA as applicable in terms of the burden of the instruments and interconnecting wiring. The current transformer output shall match the actual instrument burden as closely as possible in order not to introduce unnecessary errors.

3. ACCURACY CLASS

3.1 For metering applications, accuracy classes of 0.1, 0.2, 0.5, 1, 3 or 5 are applicable. Where no accuracy class has been specified, the following table may be used as a guide:

Application	Primary Current	Suggested Class
Indicating Instruments	All	5
Metering Applications	Up to 200	1
Metering Applications	250 to 600A	0.5
Metering Applications	800 A and above	0.2

3.2 Where ring type current transformers are specified, the aperture shall not be unnecessarily large as accuracy is thereby reduced.

3.3 The classes for protection are 5P, 10P, 15P, 20P or 30P with 5P and 10P being standard. Turns compensation shall not be employed on protection current transformers for ratios greater than 150/5.

3.4 Class X current transformers shall be used in differential protection systems.

3.5 Manufacturers shall supply the magnetisation curve details and saturation factors for each different transformer ratio.

4. **MARKINGS**

All current transformers shall come complete with a label on which the following information is indelibly stamped:

Manufacturer.

Serial No. or Type.

Rated primary and secondary current.

Rated frequency.

Rated output and accuracy class.

Highest system voltage.

Rated insulation level.

5. **FAULT CURRENT**

Current transformers shall be capable of withstanding the dynamic forces resulting from the maximum through-fault current which may be encountered at the point where they are installed. The short time current rating of current transformers shall be at least equal to that of the associated circuit breaker.

6. **IMPULSE LEVEL**

Current transformers used in system voltages in excess of 660 V shall withstand an impulse test level of 95 kV. Impulse levels for current transformers used in system voltages up to 660 V shall comply with BS 3938.

7. **TESTS**

7.1 One protection current transformer of each type used in a contract shall be tested to confirm the estimated characteristics. The following results shall be submitted:

- (a) Magnetisation Curve
- (b) Secondary resistance
- (c) Secondary leakage reactance, if not negligible or if required by the Department.

7.2 The power frequency, secondary to earth and over voltage inter-turn tests in accordance with BS 3938 shall be conducted on all current transformers. Impulse tests shall be conducted on all current transformers intended for use in system voltages in excess of 660 V.

SECTION C28

TRIPLE POLE ON-LOAD ISOLATORS

1. This section covers switches suitable for panel mounting for use in power distribution systems up to 600 V, 50 Hz. Switches for motor isolation are included.
2. The switches shall be of the triple pole, hand operated type complying with SABS 152.
3. The switches shall have a high speed closing and opening feature.
4. The switches shall be suitably rated for the continuous carrying, making and breaking of the rated current specified as well as the through-fault current capacity as specified.
5. To distinguish the switches from circuit breakers the operating handles shall have a distinctive colour and/or the switch shall be clearly and indelibly labelled "ISOLATOR".

SECTION C30

TIME SWITCHES AND PHOTOCELLS

TIME SWITCHES

1. Time switches shall be of single-pole type, suitable for 220/250 V systems, with contacts rated for the duty to be performed with a minimum rating of 15A. Contacts shall be of high quality material, e.g. silver-plated or solid silver.
2. The clock shall be driven by a self-starting, hysteresis synchronous motor, keeping accurate mains time. All clocks shall be controlled by an electrically wound escapement providing the main spring with a minimum of 15 hours reserve in case of a power failure. The main spring shall be kept fully wound without the use of slipping clutch devices that may wear and fall out of adjustment.
3. The main spring shall have a minimum of 15 hours reserve under full load and if fully discharged, shall be completely rewound within 15 minutes of the restoration of power.
4. An external manual bypass switch shall be provided to permit the circuit to be switched "ON" or "OFF" manually without affecting the operation of the time switch.
5. The time switch shall have a 24 hour dial, with day and night indication, that can be set to switch in 30 minute steps. The dial shall be fitted with 48 tappets corresponding to 48 change-over operations in a 24 hour period.
6. The time switch shall be fitted with a day omission dial comprising a total of 14 tappets which can be set to switch in 12 hour steps.
7. The time switch shall be housed in a dust-tight moulded plastic or metal case, consisting of a plastic clip-on front cover and a moulded plastic or metal base. Time switches to be used for surface mounting on walls shall be provided with a suitably positioned 20mm conduit knock-out.

PHOTOCELLS

1. GENERAL

- 1.1 The switches shall be used for the control of street lights and shall be provided with switch contacts able to carry at least A. The current during no-load conditions may not exceed 50mA.
- 1.2 The units shall be suitable for 240 V, 50Hz, single-phase alternating current

2. CONSTRUCTION

- 2.1 The units shall be weather and vibration resistant as they are to be mounted on top of streetlight luminaires. The design shall be of such a nature that the units will be able to withstand both hail damage and damage by stone-throwers. If the units do not meet these requirements, separate wire screens shall be provided for this purpose.
- 2.2 The units shall be provided with a standard NEMA plug and socket. The socket shall have a bracket for mounting on a pole.
- 2.3 All components shall be treated to be corrosion resistant.

3. OPERATING CONDITIONS

The units shall be suitable for operating under dusty conditions between temperatures of -5 CE and 55 EC.

4. **TECHNICAL REQUIREMENTS**

- 4.1 The units shall switch on when the light intensity drops to 15 lux + 20% and shall switch off when the light intensity again reaches 40 lux + 20%.
- 4.2 When the unit is in the "on" position there must be a delay of one minute if it were to switch off in the case of a sudden increase in the light intensity.

SECTION C31

CONTACTORS

1. Contactors shall be of the open or totally enclosed, triple- or double-pole, electromechanically operated, air-break type suitable for 380/433 V or 220/250 V supplies and shall comply with SABS 1092.
2. Contactors shall have the following characteristics:
 - (a) Enclosed coil easily replaceable.
 - (b) A permanent air gap in the magnetic circuit to prevent sticky operation.
 - (c) Provision for quick and simple inspection of contacts.
 - (d) Clearly marked main and auxiliary terminals.
3. All parts shall be accessible from the front.
4. Contactors which are not located in switchboards shall be housed in enclosures which comply with IP 54 of IEC 144.
5. The current rating of the contactor shall be as specified for the circuit with a switching duty in accordance with the SABS 1092 or IEC 158-1, utilisation category AC1 for lighting and power circuits and utilisation category AC3 for motor starting.
6. In addition to the required current carrying capacity and switching duty of a contactor, the contactor chosen for a particular application shall be rated for the maximum through fault current allowed by the back-up protection devices at the point where the contactor is installed. Careful co-ordination of short circuit devices shall take place.
7. All laminations of the magnetic system of the contactor shall be tightly clamped. Noisy contactors will not be accepted.
8. Non-current-carrying metallic parts shall be solidly interconnected and a common screwed earth terminal shall be provided. The contactor shall be earthed to the switchboard earth bar.
9. Latched contactors shall be provided with a trip coil and a closing coil. The contactor shall remain closed after de-energising the closing coil and shall only trip on energising the trip coil.
10. Contactor operating coils shall have a voltage rating as required by the control circuitry and shall have limits of operation and temperature rise as specified in Clause 7.5 and Table IV of IEC 158-1. Latched contactors shall be capable of being tripped at 50 % of the rated coil voltage.
11. Contactors for normal/standby changeover circuits shall be electrically and mechanically interlocked. Contactors in star-delta starters shall be electrically interlocked.
12. Contactors with provision to add auxiliary contacts and convert auxiliary contacts on site are preferred. Contactors with permanently fixed auxiliary contacts shall have at least 1 x N/O and 1 x N/C spare auxiliary contacts in addition to the contacts specified for control purposes and in addition to contacts required for self-holding operations or economy resistances. Where the number of auxiliary contacts required is greater than the number of contacts that can be accommodated on the contactor, an auxiliary relay or additional contactor shall be provided to supply the additional contacts.
13. It shall be possible to replace main contacts without disconnecting wiring.
14. Auxiliary contacts shall be capable of making, carrying continuously and breaking 6A at 230V AC, unity power factor for contactors used on 380-433/220-250 V systems.

15. Auxiliary contact functions required e.g. "lazy" contacts, late-make, late-break, make-before-break, etc. shall be inherent in the contact design. Under no circumstances may these functions be improvised by bending contacts, loading contacts, etc. These functions shall be available in all contactors.
16. Spare auxiliary contacts shall be wired to numbered terminal strips in the switchboard and shall appear on the switchboard drawings.
17. All contactors on a specific project shall be from a standard range of one single manufacturer, unless specified to the contrary.

SECTION C32

INDOOR SURGE ARRESTORS

1. Surge arrestors shall comply with the requirements of SABS 171 or VDE 0675.
2. Surge arrestors shall be suitable for installation at altitudes of up to 1800m above sea level.
3. The unit shall be contained within a thermoplastic or cast resin housing and all internal components shall be fully sealed in.
4. The unit shall be supplied complete with a galvanised steel mounting bracket for convenient mounting onto the metalwork or tray of a switchboard.
5. Alternatively, the unit shall be of the type which can be mounted into the clip-tray of a switchboard.
6. Surge arrestors shall be provided in all cases where a switchboard is supplied directly from an overhead line.
7. In other cases, surge arrestors, if required, will be specified in the Detail Technical Specification.

SECTION C33

STANDARD PAINT SPECIFICATION

1. FINISH REQUIRED

Metalwork of electrical equipment such as switchboards, equipment enclosures, sheet steel luminaire components, purpose-made boxes, etc. shall be finished with a high quality paint applied according to the best available method. Baked enamel, electrostatically applied powder coating or similar proven methods shall be used.

2. CORROSION RESISTANCE

Painted metal shall be corrosion resistant for a period of at least 168 hours when tested in accordance with SABS Method 155.

3. EDGES

Care shall be taken to ensure that all edges and corners are properly covered.

4. SURFACE PREPARATION

Surface preparation shall comply with SABS 064. Prior to painting, all metal parts shall be thoroughly cleaned of rust, mill scale, grease and foreign matter to a continuous metallic finish. Sand or shot blasting or acid pickling and washing shall be employed for this purpose.

5. BAKED ENAMEL FINISH

5.1 Immediately after cleaning all surfaces shall be covered by a rust inhibiting, tough, unbroken metal-phosphate film and then thoroughly dried.

5.2 Within forty eight (48) hours after phosphatising, a passivating layer consisting of a high quality zinc chromate primer shall be applied, followed by two coats of high quality alkyd-based baked enamel.

5.3 The enamel finish on metal luminaire components shall comply with SABS 783, Type III.

5.4 Other metal parts e.g. switchboard panels, etc., shall comply with SABS 783, Type IV with a minimum paint thickness after painting of 0,06mm. In coastal areas, the dry film thickness shall be increased to at least 0,1mm.

5.5 The paint shall have an impact resistance of 5,65 J on cold-rolled steel plate and a scratch resistance of 2 kg.

6. POWDER COATED FINISH (NOT TO BE USED LESS THAN 50km FROM SEASIDE)

6.1 Immediately after cleaning the metal parts shall be pre-heated and then covered by a microstructure paint powder applied electrostatically.

6.2 The paint shall be baked on and shall harden within 10 minutes at a temperature of 190 C.

6.3 The minimum paint thickness after baking shall be 0,05 mm. The dry film thickness shall be increased in coastal areas. The paint cover shall have an impact resistance of 5,65 J on cold-rolled steel plate and a scratch resistance of 2kg.

7. TOUCH-UP PAINT

In the case of switchboards and larger equipment enclosures, a tin of matching touch-up paint not

smaller than 1 litre shall be provided.

8. COLOURS

- 8.1 The colour of HV switchboards and HV switchgear enclosures shall be "DARK ADMIRALTY GREY", colour G12 of SABS 1091.
- 8.2 The colour of LV switchboards and equipment enclosures in buildings shall be "LIGHT ORANGE", colour B26 of SABS 1091 as recommended in SABS 0140, Part II unless specified to the contrary.
- 8.3 The colour of LV distribution kiosks and miniature substations shall be "AVOCADO GREEN", colour C17 or "LIGHT STONE", colour C37 of SABS 1091.
- 8.4 The standby power section of LV switchboards in buildings shall be coloured "SIGNAL RED", colour All of SABS 1091.
- 8.5 Switchboards for No-Break Power Supplies or sections of switchboards containing No-break power supplies, shall be coloured "DARK VIOLET", colour FO6 or "OLIVE GREEN", colour HO5 of SABS 1091.

SECTION C34

C.34 GALVANISED STEEL LIGHTING POLES

1. GENERAL

All poles supplied must be absolutely straight, have the same shape and shall be as described in this specification. The poles must have a well-finished appearance and must not be twisted in any way due to manufactured or as result of handling. The pole must be of sufficient strength that it will not undergo any permanent shape change as a result of normal of normal transportation, handling or erection.

The pole as a whole, including all fittings shall be galvanised on the inside as well as on the outside in accordance with SANS 32&121. The welding work on the pole shall be smooth and neat. No splatter, slag or air bubbles shall be visible. The galvanising process shall be done after all welding and machine work have been done.

The pole diameter shall decrease gradually or in steps from the pole's base to the pole top and the pole shall be as slender as possible with an outer diameter of $145 \pm 5\text{mm}$ at the bottom. The minimum material thickness of the pole shall be 4,5mm. The pole shall be absolutely round.

The manufactures shall provide acceptable ventilation holes in the pole to prevent condensation of moisture in the pole. The pole shall also be rain and bee-proof

A rectangular access hole shall be provided at the bottom end of the pole $\pm 0,9$ above finished ground level.

The opening shall be provided with a rain proof cover plate with the same profile as the pole. The cover plate may only be removed by using special tools. The cover plate shall undergo the same galvanising process after forming, cutting and drilling. The thickness of the cover plate shall not be less than 4mm.

A back plate suitable for the mounting of equipment shall be bolted in the pole. A clip-tray suitable for mounting two circuit breaker's shall be provided on the mounting plate as well as a Din track for terminal blocks of the clip on type and a 6mm earth stud with nut, washer and spring washer.

The poles shall be provided with foot plates of size of 350mm and thickness of 6mm attached to the pole with a least two hook bolts of sufficient strength.

The foot plate shall not be welded onto the pole and the same rust protection that is used on the pole shall be applicable on the foot plate and hook bolts. The thread of the hook bolts shall be cleaned after been galvanised.

Each pole shall be provided with a cable entry at the bottom end of the pole. When planted $\pm 600\text{m}$ below finished ground level.

The cable entry shall be manufactured in such a way the cables will not be damaged by the sides of the hole. The minimum dimensions of the hole are 100mm x 60mm. The cable entry shall be at the back of the pole.

Pole extension and pole stubs shall comply with this specification.

A pamphlet furnishing full details of the pole's extensions and stubs offered shall be submitted with the tender.

2. STANDARDS

- 2.1 The poles to be provided in accordance with this specification shall comply fully with all the requirements of this specification. Any deviations from this specification shall be clearly

indicated.

- 2.2 The poles to be provided in accordance with this specification shall comply with the relevant subdivisions of the following standard specification:

- 2.2.1 SANS 62 - Steel pipes and pipefittings with a nominal bore of 150mm, suitable to be screwed to ISO R7 - pipe thread.
- 2.2.2 SANS 657 - Steel tubes for general engineering purposes.
- 2.2.3 SANS 32&121 - Hot-dip (galvanised) zinc coatings.
(Other than on continuously zinc-coated sheet and wire.)
- 2.2.4 SANS 10160 - General procedures and loading to be adopted for the design of buildings.
- 2.2.5 BS 4360 - Weldable structural steel.

3. ENVIRONMENTAL CONDITIONS

- 3.1 The poles to be provided in accordance with this specification shall be suitable for outdoor use in the varied weather conditions prevailing in the Pretoria area during the various seasons. The following conditions are of special import:

- 3.1.1 Attitude above sea-level 1 530m
- 3.1.2 Maximum environmental temperature 40 EC
- 3.1.3 Minimum environmental temperature -5 EC
- 3.1.4 Wind velocity 40m/s

4. DESIGN REQUIREMENTS

4.1 GENERAL

- 4.1.1 The poles shall be manufactured in accordance with the attached drawing:

SLP-1 Streetlight pole for Townships.

SLP-2 Streetlight pole (Double bracket).

SLP-3 Streetlight pole (Single bracket).

- 4.1.2 The poles can take on any of the following shapes:

- a) Round, tubular (pole diameter decreases step by step from pole base to pole end).
- b) Round, tapered.
- c) Octagonal, tapered.

- 4.1.3 The poles shall be properly finished and shall not be skew in any respect because of the manufacturing process or the handling thereof.

- 4.1.4 The poles shall be strong enough in order that no permanent deformation shall take place as a result of normal transportation, handling or erection or after the luminaire has been mounted and during the life span of the pole.

- 4.1.5 The poles shall be provided complete with mounting plate for the terminal blocks, clip plate for a miniature circuit breaker, pole base plate, cable access hole, inspection hole and lantern-mounting piece.

- 4.1.6 The Tenderer shall provide a complete design, including all calculations and drawings. This design shall be approved and certified by a registered professional

mechanical engineer as being suitable to the proposed operating conditions.

4.2 MEASUREMENTS

4.2.1 Every pole shall be manufactured in accordance with the measurements indicated on the applicable drawing.

4.2.2 The following measurements are of special import and may not be altered:

- a) Mounting height and overhang.
- b) Minimum inside diameter at access opening.
- c) Outside diameter at end of pole.
- d) Position and size of holes in flange.
- e) Mounting pieces (see paragraph 4.7.4).

4.3 CABLE INLET

4.3.1 Each pole shall be provided with a cable inlet of 100mm x 60mm at the bottom end of the pole, as indicated on the applicable drawing.

4.3.2 The cable inlet shall be manufactured in such a manner that the sides of the opening will not damage the cable.

4.4 POLE BASE PLATE

4.4.1 Each pole shall be provided with a square steel base plate with a diameter of 350mm and shall be at least 4mm thick.

4.4.2 The pole base plate shall be welded to the base of the pole.

4.5 PROVISION FOR CONTROL EQUIPMENT

4.5.1 A rectangular access opening shall be provided at the bottom end of the pole, as indicated on the drawing. The opening shall be covered by a rainproof cover plate with the same profile as the pole and shall be kept in position by means of one heptagonal 10mm brass nut. The cover plate shall be manufactured from the same material as the pole and shall endure the same galvanising process after it has been shaped, cut and drilled. The thickness of the cover plate shall be at least the thickness of the pole.

4.5.2 A mounting plate suitable for the mounting of equipment shall be welded into the pole. Two dip-on mounting rails for Heinemann circuit breakers, as well as a rail for a Klippon terminal block shall be provided on the mounting plate. The clip plate shall be mounted after the pole has been galvanised.

4.5.3 Two rectangular holes shall be made next to the opening and each one shall be provided with a galvanised or plated 8mm x 25mm coach bolt.

4.5.4 Full particulars shall be provided if the Tenderers should offer an alternative with regard to the access opening and the cover plate of the control equipment.

4.6 FLANGE

4.6.1 Poles with flanges shall be delivered complete with bolts and nuts as indicated on the drawings. The strength of the flanges and the quality of the welding shall be such that the pole will show no signs of deterioration in its structure.

4.7 STREET-LIGHT BRACKETS AND MOUNTING PIECES

4.7.1 The streetlight brackets shall be manufactured according to the attached drawings:

4.7.2 The streetlight bracket shall not be welded to the pole. Special care shall be taken to ensure that the bracket(s) will not rotate.

4.7.3 Provision shall be made at the end of the bracket(s) for the mounting of a streetlight luminaire.

4.7.4 The ends of the mounting pieces to which the luminaire will be secured shall be round, with a outside diameter of 42,5 (+0,-1mm) and a length of 125mm.

4.8 VENTILATION

4.8.1 The manufacturer shall provide ventilation holes in the pole in an acceptable manner so that no condensation of moisture will take place inside the pole. The pole shall also be rain- and insect-proof.

4.9 STREET-LIGHT LUMINAIRE

4.9.1 The following requirements are applicable to poles manufactured in accordance with drawings

4.9.1.1 Each pole shall be used to carry a street luminaire with a mass of 20kg.

4.9.1.2 The projected lateral area of the luminaire shall be 0,1m⁵.

4.9.2 The following requirements are applicable to poles manufactured according to drawing

4.9.2.1 Each pole shall be used to carry a streetlight luminaire with a mass of 10kg.

4.9.2.2 The projected lateral area of the luminaire shall be 0,025m⁵.

4.10 INTERCHANGEABILITY

Spares for poles manufactured according to the drawings shall be interchangeable, whether for a single- or a double-bracket pole.

5. FINISHING

5.1 WELDING

5.1.1 Welding work on the poles shall be smooth and neat. There may be no spatters, slag or air bubbles.

5.2 GALVANISING

5.2.1 The galvanising process shall take place after all welding and machining have been completed.

5.2.2 The poles, including all fittings, but excluding the circuit-breaker dip-on rail, shall be hot-dip galvanised inside as well as outside, in accordance with the latest edition of SANS 32&121.

6. TESTS

6.1 The manufacturer shall personally and in the presence of a representative Engineer execute the following tests on five poles and shall make the results of such tests available for submission to the Engineer.

6.2 TESTING OF STREET-LAMP POLES

In order to ensure that the actual situation is simulated, the vertical gravitational forces and horizontal wind forces (simulated) shall simultaneously act upon the lamp pole. The following testing methods shall be followed in order to simulate the combined loads, viz.:

- (i) Place the lamp pole in the vertical position, as it would be mounted under normal circumstances.
- (ii) Determine the position of the end of the bracket (unloaded condition) to the nearest one millimetre from the pole base as reference A (see figure 1). This may be done by attaching a plumb to the end of the bracket. The method shall be sufficiently accurate for the purposes of the test provided that the tests take place in fine weather conditions.
- (iii) The resultant loading and angle of application obtained from the combined horizontal and vertical loading shall be applied by means of a nylon rope (minimum breaking force 500kg) put up from the top end of the lamp pole. The loading may be applied in various ways, for example by attaching weights to the rope, or by placing a turnbuckle or ratchet tensioner and spring scale in line with the rope.
- (iv) The loading shall be applied in increments of 4 kg. After each loading the momentary deformation of the lamp pole shall be measured ($x_1, x_2 \dots x_n$) and be plotted against the loading. A linear course of momentary deformation is considered to be normal, whilst a non-linear course will be an indication of a deterioration in the structure.
- (v) After the lamp pole has been loaded to the maximum, the loading shall be removed and the position of the plumb shall be measured (X_d permanent deformation).
- (vi) Steps (iii), (iv) and (v) shall be repeated three (3) times in order to determine an average value for the permanent deformation (X_d).
- (vii) The following table indicates the loading and application angle to be applied for each individual lamp pole. Details of calculations appear in paragraph 6.4.

Note that amp-pole numbers refer to drawings in accordance with Council Specifications.

Lamp-pole number	Loading (N)	Equivalent load (kg)	Angle of application	Length of rope (m)
	224,7	24	40 E	10,9
	409,4	43	45 E	15,1
	383,3	40	49 E	12,2

- (viii) By comparing the unloaded condition (X_o) to the average of the conditions obtained after loading (X_d), the percentage permanent deformation can be determined by means of the following formula:

$$\text{Def \%} = (X_d - X_o) / X_d \times 100.$$

If this permanent deformation exceeds the proposed 15%, the pole does not comply with the specification and does not pass the test.

The above mentioned test is based on the principles of SANS 10160 viz, the general procedures and loading to be adopted for the design of buildings.

6.4 DETAILED CALCULATIONS OF LOADING

All formulae refer to SANS 10160.

The wind pressure on the element. $F_n = C_f q_z A_e$ [refer SANS 10160 - p39 5 (c)]

C_f = pressure coefficient

= 1,1 [refer SANS 101601 - p68, Table 15]

q_z = free current wind pressure at height z (N/m⁵)

= $k_p V_z^5$ [refer SANS 10160 - p49, 5(d)]

k_p = constants with a view to allowance for altitude above sea-level

[refer SANS 10160-p49]

V_z = characteristic wind velocity at altitude Z

Take a site category 3 with a design wind velocity of 20m/s [refer SANS 10160 - p123. Table D-1].

$q_z = k_p V_z^5 = 0.5 (20)^5 = 200$ N/m⁵

$C_f q_z = 1.1 (200) = 220$

A_e = Total effective frontal area

Lamp pole number	Total frontal area A_e (m ⁵)
	(0,14 x 1,3) (0,09 x 6,7) = 0,785 (0,1651 x 2) (0,114 3 x 8,7) =1,325 (0,1651 x 2) (0,114 3 x 7,2) =1,153

The following represents the resultant force with the angle at which it shall be applied:

Lamp-pole number	Vertical loading (N) F_v	Horizontal loading (N) F_n	Resultant Loading (N) F_r	Application angle θ	Rope (m)
	143,7	172,7	224,7	40 E	10,9
	287,4	291,5	409,4	45 E	15,1
	287,4	253,7	383,3	49 E	12,2

(Gravitational force = 9,58 for the PWV.)

NB: The vertical loading provides for the mass of the light luminaire with a safety factor of 1,5.

6.5 The Tenderer shall include in his tender all measurements and results of tests in the form of a table for submission to the Department of Public Works.

7. DELIVERY

7.1 The successful Tenderer shall timeously notify the Engineer in writing before the delivery of the poles in order that they may be inspected upon receipt. No payment shall be made for poles, which have not been inspected or certified by the Engineer as being in order.

PART 2

PROJECT TECHNICAL SPECIFICATION

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PART 2

PROJECT TECHNICAL SPECIFICATION

1. GENERAL INFORMATION FOR THE SUB-CONTRACTOR

1.1 SCOPE OF THE SUB-CONTRACT

This contract covers the supply, delivery to site, storage on site when required, installation and maintenance, of all material and equipment required for the general electrical installation of the New Residences (including Renovations to Existing Hall) at Limpopo Traffic Training College, as detailed in the Specification and the accompanying drawings.

The installation shall consist of the following:

- a. Low voltage cable network for the new buildings.
- b. Distribution boards and draw boxes.
- c. Earthing and lightning protection of the buildings.
- d. General electrical installation for the new buildings.
- e. Telephone and data distribution boards, draw boxes and sleeve pipes.
- f. Specialists installations in new buildings.

Abovementioned is just a brief description of the project. For a detailed description of the project the contractor must refer to the Specification, drawings and Bills of Quantities for electrical work.

1.2 ELECTRICAL CONNECTION

A 400V, 50Hz, 3 phase supply must be obtained from the existing power supply. The contractor must allow to terminate the new supply cable for the new facilities at the existing power supply.

1.3 TECHNICAL REQUIREMENTS OF THE INSTALLATION

Over and above the equipment specified in this Specification the Contractor must supply and install equipment and auxiliary equipment which he may consider necessary for the proper operation of the complete Electrical Installation to fully comply with the requirements of this Specification.

1.4 QUALITY CONTROL

The Contractor must maintain adequate and effective quality control standards while manufacturing the specified equipment. The Engineer will have the prerogative of inspecting the equipment in the Contractor's factory at any reasonable time to ensure accuracy of dimensions, completeness, configuration, quality of workmanship, correct identification, proper use of and type of materials, equipment used and finishes to equipment.

If required the Contractor must provide the Engineer with equipment and facilities to examine the equipment and if necessary test this equipment to preclude malfunctions of the equipment.

test plan scheduling the test procedure in the factory and on the site.

The test must demonstrate that the equipment fully complies with all functional electrical and mechanical requirements of this Specifications.
Copies of test results of tests conducted in the factory and on site capable of Xerox reproduction must be submitted to the Engineer.

2. TEST EQUIPMENT

Properly calibrated standard test equipment must be utilized at the factory of the Contractor and on site to complete the tests to comply with the final acceptance test plan.

The Contractor must supply all the necessary temporary cables and interconnecting wires in the factory for completing the test plan in the factory.

Testing on site must be conducted after the installation has been completed.

1.8 TERMINOLOGY

The function of and positions to which equipment is connected must be indicated on the boards. All equipment must be fitted with identification labels similar to the type specified in Part 4. Terminology shall be in "ENGLISH".

1.9 AS BUILT DRAWINGS

On completion the Electrical Contractor must provide the Engineer with one complete set of as built drawings. These drawings must show the exact installation as finally completed.

"As built" drawings must be done on a CAD system according to the latest drawing office practice. The contractor must use the same List of Symbols, etc., used by the Engineer.

2. CABLES

2.1 GENERAL

Supply and install all the necessary cables with earth conductors as specified in the Cable Schedule of this Specification. The Contractor is responsible for the making off and connecting of all cables, including the supply and installation of the cable glands. The cables shall be installed in accordance with the requirements of the General Specification.

Cable routes are indicated on the site reticulation drawing.

2.2 LOW VOLTAGE CABLES

Low voltage cables must be manufactured in accordance with SABS 150 and must bear the SABS mark.

2.7.4 Installation

HV cable must be installed in accordance with Part C1 of this specification.

2.7.5 Tests

Acceptance Test Plan

Each Tenderer must submit a draft of a recommended acceptance test plan for the equipment two months before the final completion of the installation.

The Engineer will review the acceptance test plan and submit to the Sub-Contractor any alternative test procedure and/or testing methods and plans. Such a revised test plan must be incorporated by the Sub-Contractor in the final acceptance test plan scheduling the test procedure in the factory and on the site.

The tests must demonstrate that the equipment fully complies with all functional electrical and mechanical requirements of the Specification.

Copies of test results of tests conducted in the factory and on site capable of Xerox reproduction must be submitted to the Engineer.

Test Equipment

Properly calibrated standard test equipment must be utilized at the factory of the Sub-Contractor and on site to complete the tests to comply with the final acceptance test plan.

The Sub-Contractor must supply all the necessary temporary cables and interconnecting wires in the factory for completing the test plan in the factory.

Testing on site must be conducted after the installation has been completed.

3. DISTRIBUTION BOARDS

3.1 GENERAL

Supply and install all the distribution boards as specified in the positions shown on the drawings. The construction and wiring of the boards shall be in accordance with the General Specification.

Additional space for future extensions must be allowed in all distribution boards as indicated on the schematic diagrams, but in any case not less than 30% of the equipment space required. The Contractor must ensure that the distribution boards dimensions are such that they fit in the space provided.

The boards must have a baked enamel finish with white on the inside and the colour specified on the schematic diagrams on the outside.

The manufacturer must obtain the method of labelling and marking of DB's from the Engineer.

Each DB must be provided with a legend card. Where a DB consists of a normal, emergency and UPS section, a legend card for each section must be provided.

3.2 BUSBARS

All three phase distribution boards must be provided with four copper busbars installed horizontal at the top of the board, with the broad side of the busbar fixed vertical on insulators and clearly marked red, blue, yellow for the three phases in accordance the

4. EARTHING OF BUILDING

4.1 GENERAL

The earthing of the installation shall be done in accordance with SANS 10142 latest edition, as revised and the Standard Specification.

4.2 NETWORK EARTH

4.2.1 Install an earth mat as detailed under the base of the miniature substation and connect it to the neutral of the transformer and to the miniature substation earth busbar.

4.2.2 Install earth conductors as detailed in the cable schedule with all cables.

5. LIGHTNING PROTECTION

The Lightning Protection must be done in accordance with SANS 10313.

The tenderer must employ an approved lightning protection specialist to do the lightning protection of the buildings. Approval of the lightning protection specialist must be obtained before tender closing from the Engineer. After completion of the installation, the lightning protection specialist must test the installation and must issue the Engineer with a SANS compliance certificate for the installation. No surface mounted down conductors will be accepted.

6. WIRING OF CIRCUITS

6.1 GENERAL

A neutral equal in size to the phase conductors and earth wire one size smaller than the phase conductors must be installed to each three phase outlet.
Cable lugs must be used at all terminations of conductors. The lugs must be soldered or crimped to the end of the conductor with the correct amount of insulation removed to fit the lug. Strands may not be cut from the conductor.

6.2 CONDUCTOR SIZES AND EARTH WIRE SIZES

Refer to schematic diagrams for the distribution boards.

7. LIGHTING

7.1 GENERAL

Allow for the supply and installation of all the light fittings including the specified lamps.

One sample of each light fitting must be submitted to the Engineer for his approval prior to the ordering of these light fittings. These samples will remain at the Engineer's office until the contract is completed.

7.2 OUTSIDE LIGHTING

Light fittings on the outside of the building must be installed on the outside walls (at the heights specified) as shown on the drawings or mounted on poles.

These light fitting must be controlled by means of photo cell units installed in the positions shown on the drawings.

9. SOCKET OUTLETS

9.1 NORMAL SOCKET OUTLETS

Socket outlets must be of the 15A, 3-pin switched socket outlets of approved manufacture with cover plates.

9.2 DEDICATED SOCKET OUTLETS

Dedicated socket outlets must of the 15A, 3 pin switched socket outlets of approved manufacture with shaved earth pin.

10. LIGHT SWITCHES

10.1 NORMAL LIGHT SWITCHES

The light switches must be of the 16A type of approved manufacture with a cover plate.

10.2 ROTARY SWITCHES

Separately switched tubes in light fittings must be controlled by means of a rotary switch where indicated on the drawings.

The rotary switches must operate as follows:

10.2.1 TWO-LAMP LIGHT FITTINGS

A three position rotary switch rated at 16A must be used for the following:

Position 1	-	Off
Position 2	-	50% of lamps on.
Position 3	-	100% of lamps on.

The transition from position 2 to position 3 and vice versa must happen without the lamps on position 2 being switched off.

10.2.2 THREE LAMP LIGHT FITTINGS

A four position rotary switch rated at 16A must be used for the following:

Position 1	-	Off
Position 2	-	33% of lamps on.
Position 3	-	66% of lamps on.
Position 4	-	100% of lamps on.

The transition from position 2 to position 3 and position 3 to position 4 and vice versa must happen without the lamps on the lower position/s being switched off.

11. TELEPHONE CONDUIT INSTALLATION

All conduits, draw boxes and powerskirting outlets for this installation must be supplied and installed in the positions shown on the drawings. All conduits must be fitted with 2,0 mm diameter galvanized draw wires.

12. DATA AND INTERCOM CONDUIT INSTALLATION

All conduits, draw boxes, power skirtings and outlets for this installation must be supplied and installed in the positions shown on the drawings. All conduits must be fitted with 2mm diameter galvanised draw wires.

ITEM	SYMBOL	DESCRIPTION	REMARKS
15.4	D	21W 4000K LED bulkhead complete with power supply according to the "Standard Specification for LED type Luminaires for Exterior Applications" of the Department of Public Works. Life time : L70B10 50 000hrs Luminaire dimensions : 290mm dia x 67mm high	Colour according to Architects requirements. Electronic control gear (ECG) required. Luminaire shall bear the SABS mark of approval. IP65 rating required.
15.5	E	Same as Type A but luminaire to be equipped with emergency mode (battery backup)	Emergency mode required. Electronic control gear (ECG) required. Luminaire shall bear the SABS mark of approval. Battery standby time as per SANS 10400
15.6	F	Emergency Exit LED bulkhead type light fitting complete with power supply and signage as per SABS requirements.	Emergency mode required. Luminaire signage shall indicate the man running arrow down arrangement. Electronic control gear (ECG) required. Luminaire shall bear the SABS mark of approval. Battery standby time as per SANS 10400
15.7	G	43W 4000K LED Post top high pressure die-cast aluminium with high impact acrylic diffuser luminaire complete according to the "Standard Specification for LED Post Top Luminaires" of the Department of Public Works. Life time : L70B10 100 000hrs	Colour according to Architects requirements. Luminaire shall bear the SABS mark of approval. IP66 rating required.
15.8	H	45W 4000K 5ft vapour proof LED luminaire complete with power supply according to the "Standard Specification for LED type Luminaires for Exterior Applications" of the Department of Public Works. Life time : L70 50 000hrs	Luminaire shall bear the SABS mark of approval. Electronic control gear (ECG) required. IP65 rating required.
15.9	I	6W 4000K 543mm long LED undercabinet luminaire complete with internal power supply and switch, connector, cable and plug top. Life time : L70 30 000hrs	Luminaire shall bear the SABS mark of approval. Electronic control gear (ECG) required.
15.10	J	Same as Type A but luminaire to be equipped with dimmable control gear.	Luminaire shall be supplied complete with 5A plug top and 3m cable. Electronic control gear (ECG) required. Luminaire shall bear the SABS mark of approval.

18. POWER SKIRTING AND ACCESSORIES

18.1 GENERAL

Power skirting and accessories must have 3 compartments and a separate cover for each compartment.

18.2 POWER SKIRTING

Power skirting and accessories must be manufactured from 0,8mm thick pre-galvanised mild steel and must be finished in a structured epoxy powder-coated finish in a colour specified by the Architect. The colour of the powder coating will be chosen from the standard colour range for the specified power skirting and this will be given at a later date.

18.3 POWER SKIRTING OUTLETS

a. Power Outlet

Each power skirting power outlet must consist of 1 x 15A switched socket outlet with a joggled cover.

b. Computer Power Outlet/Dedicated Power Outlet

The computer power outlet must consist of 1 x 15 A dedicated switched socket outlet with shaved earth with a joggled cover.

c. Isolator outlets

The isolator outlet must consist of a 20A double pole isolator and cordgrip mounted on one unit with a joggled cover plate.

d. Data Outlet

The data outlet must consist of a blank joggled cover plate of 300mm length.

e. Telephone Outlet

The telephone outlet must consist of a blank joggled cover plate of 300mm length.

18.4 POWER SKIRTING THROUGH WALLS

Where the power skirting passes through brick walls or dry walls blank joggled covers of 300mm length must be installed to allow removal of adjacent power skirting covers after finishing of walls have been completed.

19. WIRING CHANNEL

19.1 GENERAL

Wiring channel and covers must be manufactured from pre-galvanised sheet steel of 0,8mm thickness.

19.2 WIRING CHANNEL ACCESSORIES

Accessories for wiring channel like elbows, joints, T-pieces, bends etc. must be factory made. No on-site manufactured accessories will be accepted.

be done after all welding and machine work have been done.

The pole diameter shall decrease gradually or in steps from the pole's base to the pole top and the pole shall be as slender as possible with an outer diameter of 145 ± 5 mm at the bottom. The minimum material thickness of the pole shall be 4,5mm. The pole shall be absolutely round.

The manufactures shall provide acceptable ventilation holes in the pole to prevent condensation of moisture in the pole. The pole shall also be rain and bee-proof.

A rectangular access hole shall be provided at the bottom end of the pole $\pm 0,9$ above finished ground level.

The opening shall be provided with a rain proof cover plate with the same profile as the pole. The cover plate may only be removed by using special tools. The cover plate shall undergo the same galvanizing process after forming, cutting and drilling. The thickness of the cover plate shall not be less than 4mm.

A back plate suitable for the mounting of equipment shall be bolted in the pole. A clip-tray suitable for mounting two circuit breakers shall be provided on the mounting plate as well as a Din track for terminal blocks of the "Clippon" type and a 6mm earth stud with nut, washer and spring washer.

The poles shall be provided with round foot plates with a diameter of 350mm and thickness of 6mm attached to the pole with at least two hook bolts of sufficient strength.

The foot plate shall not be welded onto the pole and the same rust protection that is used on the pole shall be applicable on the foot plate and hook bolts. The thread of the hook bolts shall be cleaned after being galvanised.

Each pole shall be provided with a cable entry at the bottom end of the pole. When planted ± 600 mm below finished ground level.

The cable entry shall be manufactured in such a way the cables will not be damaged by the sides of the hole. The minimum dimensions of the hole are 100mm x 60mm. The cable entry shall be at the back of the pole.

Pole extension and pole stubs shall comply to this specification.

A pamphlet furnishing full details of the poles extensions and stubs offered, shall be submitted with the tender.

24. OCCUPANCY SENSORS

- 24.1 The occupancy sensor must be of approved and acceptable standard as per the requirements of the Department of Public Works.
- 24.2 The occupancy sensor shall operate through infrared and ultrasonic motion detection.
- 24.3 The occupancy sensor must be complete with control gear and 3m extension cord to ensure that the control gear can be mounted against a wire channel, roof truss or concrete slab and must not lay on the ceiling.

PART 3

SCHEDULES OF INFORMATION

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PART 3

SCHEDULE

These schedules must be completed by the tenderer, where applicable. Failure to do so may disqualify his tender.

1. SCHEDULE OF EQUIPMENT

ITEM	MANUFACTURE/TYPE
1. PVC insulated conductors
2. PVC/PVC/SWA/PVC copper cable
3. Conduit and Equipment
4. Photo Cells
5. Fuse-switches
6. Isolators
7. Circuit Breakers
8. Contactors
9. Earth Leakage Units
10. Voltmeter
11. High Mast Lights
12. Lightning Arrestors
13. Distribution Boards
14. Single Phase Isolators
15. Three Phase Isolators
16. Light Switches
17. Socket Outlets
18. Sleeve Pipes
19. Hand driers

ITEM	MANUFACTURE/TYPE	
20.	Light fittings	
	20.1	Type A
	20.2	Type B
	20.3	Type C
	20.4	Type D
	20.5	Type E
	20.6	Type F
	20.7	Type G
	20.8	Type H
	20.9	Type I
	20.10	Type J
21.	Galvanised light poles	
22.	Stoves	

2. SCHEDULE OF RATES

These rates shall be used to determine the cost of material and labour not covered by any item in the Bills of Quantities for any variations that might become necessary.

ITEM	DESCRIPTION	UNIT	RATE
1	Labour charge for foreman	hour	
2	Labour charge for electrician	hour	
3	Labour charge for labourer	hour	
4	Percentage profit on additional material not included in the Bills of Quantities	%	
5	Private car		
6	Truck not exceeding 1 ton, including driver		
7	Truck not exceeding 5 ton, including driver		
8	Back actor	hour	

SIGNATURE OF BIDDER : _____

DATE : _____

/dp part.3.schedules

PART 4

ELECTRICAL BILL OF QUANTITIES

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PART 4

ELECTRICAL BILL OF QUANTITIES

GENERAL NOTES

1. The Bills of Quantities form part of and must be read in conjunction with the Specification which document contains the full descriptions of the work to be done and material and equipment to be used and unless otherwise described in the Bills of Quantities, reference should be made to the Specification for the full meaning of descriptions of work to be done and materials and equipment to be used in this service.
2. The responsibility for the accuracy of the quantities written into the Electrical Bill remains with the person who prepared the Electrical Bill. The Tenderer shall be relieved of responsibility of measuring quantities at the tender stage, and the tender sum submitted shall be in respect of the quantities set out in the Electrical Bill, although he will be required to make his assessment of the items such as brackets, fixings, draw boxes, etc., from details stated in the Electrical Bill and shall include in the item prices for such small additions for installation materials as are required for the complete installation in accordance with the Specifications.
3. All outlet boxes up to 100 x 100 are measured as item regardless of the number of entries.

Conduit boxes shall always include the fixing to the conduit with lock and bush units as specified.
4. Industrial switch and plug units shall include the fixing to conduit as specified.
5. Only draw boxes specifically indicated on drawings are measured in the Bill of Quantities. Other draw boxes necessary for the ordinary installation of conduit shall be included in the rates for conduit installation. All draw boxes shall be complete with cover plates and screws.
6. Light switches, switch plugs, dimmer units, etc., shall include screws, cover plates and other equipment specified.
7. All fittings and accessories always include the connections thereto. All light fittings shall be complete with lamps and tubes, unless otherwise stated in the Electrical Bill.
8. 300mm Additional length per conductor has been measured for conductors drawn into conduit,, per termination point. Tenderers must allow in their rate for any conductor lengths required for his own purpose, in addition to the 300 mm measured.
9. All money provisions shall be expended as directed by the Engineer and any balance remaining shall be deducted from the amount of the contract sum.

/dp part4.bq

LIMPOPO TRAFFIC TRAINING COLLEGE : NEW RESIDENCE (INCLUDING RENOVATIONS TO EXISTING HALL) : ELECTRICAL INSTALLATION

SECTION NO. 1 : PRELIMINARIES

ITEM	DESCRIPTION	UNIT	QTY LENGTH	UNIT	AMOUNT (R)
Part 1	<p>Preliminaries for the Project should be priced with Bill no 1, Preliminaries. If in the event of the electrical contractor being a sub-contract.</p> <p>made with this section for the pricing of the preliminaries applicable to this portion of the contract.</p> <p>It should however be noted that the amount for preliminaries priced in this section will be a fixed amount and will under no circumstances be adjusted.</p> <p>1.1 Allow for site establishment and all other general responsibilities and obligations for the electrical contractor</p>	LOT	TOTAL		
	1.2 "As built" drawings	LOT	TOTAL		
	1.3 Certificate of Compliance	LOT	TOTAL		
TOTAL CARRIED FORWARD TO SUMMARY OF BID PRICE					

LIMPOPO TRAFFIC TRAINING COLLEGE : NEW RESIDENCE (INCLUDING RENOVATIONS TO EXISTING HALL) : ELECTRICAL INSTALLATION

SECTION NO. 2 : SITE RETICULATION, WALKWAY LIGHTS AND SITE LIGHTING

ITEM	DESCRIPTION	UNIT	QTY LENGTH	SUPPLY & DELIVERY		INSTALLATION	
				RATE	TOTAL	RATE	TOTAL
2.1	600/1000V PVC SWA PVC cable with copper conductors installed in cable sleeves, cable trenches or on cable ladder						
	2.1.1 70mm ² 4 core	m	500				
	2.1.2 35mm ² 4 core	m	120				
	2.1.3 16mm ² 4 core	m	120				
	2.1.4 2,5mm ² 3 core	m	10				
2.2	Bare copper earth wire						
	2.2.1 35mm ²	m	500				
	2.2.2 25mm ²	m	100				
	2.2.3 10mm ²	m	10				
2.3	Cable terminations (600/1000V PVC SWA PVC including earth wire termination)						
	2.3.1 70mm ² 4 core	Each	8				
	2.3.2 35mm ² 4 core	Each	2				
	2.3.3 16mm ² 4 core	Each	2				
	2.3.4 2,5mm ² 3 core	Each	2				
2.4	Excavation including bedding, selected backfilling and compacting after backfilling						
	2.4.1 Pickable soil	cub.m	200				
	2.4.2 Soft rock	cub.m	30				
	2.4.3 Hard rock	cub.m	30				
	TOTAL CARRIED FORWARD						

ITEM	DESCRIPTION	UNIT	QTY LENGTH	SUPPLY & DELIVERY		INSTALLATION		
				RATE	TOTAL	RATE	TOTAL	
2.5	BROUGHT FORWARD Cable sleeve pipes including long radius bends							
	2.5.1 110mm diameter	m	100					
	2.5.2 75 mm diameter	m	50					
	2.5.3 50mm diameter	m	50					
2.6	Cable Marking Tape	m	500					
2.7	Distribution Kiosk complete as specified							
	2.7.1 New Main Kiosk	Each	1					
	2.7.2 Kiosk K2	Each	1					
2.8	Plinth for distribution kiosks	Each	2					
2.9	Concrete cable markers	Each	10					
2.10	Site lighting							
	2.10.1 Type G post top light fitting with 3,5m MH galvanised steel pole complete as specified	Each	1					
	2.10.2 Type H light fitting complete as specified	Each	1					
	2.10.3 20mm diameter galvanised conduit complete with fixing materials and round conduit boxes	m	50					
	2.10.4 2.5mm ² PVC insulated copper conductors	m	50					
	2.10.5 2.5mm ² bare copper earth wire	m	50					
2.11	Any other item necessary to complete the specified installation. Furnish details:							
	2.11.1							
	2.11.2							
	2.11.3							
	TOTAL CARRIED FORWARD TO SUMMARY OF BID PRICE							

LIMPOPO TRAFFIC TRAINING COLLEGE : NEW RESIDENCE (INCLUDING RENOVATIONS TO EXISTING HALL) : ELECTRICAL INSTALLATION

SECTION NO. 3 : TELEPHONE AND DATA SLEEVE PIPE INSTALLATION

ITEM	DESCRIPTION	UNIT	QTY LENGTH	SUPPLY & DELIVERY		INSTALLATION	
				RATE	TOTAL	RATE	TOTAL
3.1	PVC sleeve pipes including couplings and long radius bends	m					
	3.1.1 110mm diameter		300				
	3.1.2 75mm diameter		50				
	3.1.3 50mm diameter		200				
	3.1.4 32mm diameter		10				
3.2	2mm diameter draw wire	m	600				
3.3	450mm x 450mm Data DB flush mounted with architrave frame and door	Each	1				
	600mm x 600mm Telephone DB flush mounted with architrave frame and door	Each	1				
	TOTAL CARRIED FORWARD						

ITEM	DESCRIPTION	UNIT	QTY LENGTH	SUPPLY & DELIVERY		INSTALLATION	
				RATE	TOTAL	RATE	TOTAL
3.5	BROUGHT FORWARD Excavation including bedding, selected back-filling and compacting after backfilling	cub.m	200				
	3.5.1 Pickable soil		10				
	3.5.2 Soft rock		10				
	3.5.3 Hard rock						
3.6	Co-ordination with TELKOM during installation of telephone cables	LOT	TOTAL				
3.7	Manhole according to detail	Each	4				
3.8	Any other item necessary to complete the specified installation. Furnish details:						
	3.8.1						
	3.8.2						
	3.8.3						
	3.8.4						
	3.8.5						
TOTAL CARRIED FORWARD TO SUMMARY OF BID PRICE							

LIMPOPO TRAFFIC TRAINING COLLEGE : NEW RESIDENCE (INCLUDING RENOVATIONS TO EXISTING HALL) : ELECTRICAL INSTALLATION

SECTION NO. 4 : INSTALLATION IN NEW BUILDINGS - RESIDENCE

ITEM	DESCRIPTION	UNIT	SUPPLY & DELIVERY		INSTALLATION	
			RATE	TOTAL	RATE	TOTAL
4.1	Distribution boards including connection to conduit and wiring					
	4.1.1 DB-H1	Each	2			
4.2	Light fittings including conduit outlet box and connections to conduit and wiring:	Each				
	4.2.1 Type A		16			
	4.2.2 Type B		6			
	4.2.3 Type C		5			
	4.2.4 Type D		100			
	4.2.5 Type E		10			
	4.2.6 Type F		0			
	4.2.6 Type I		37			
4.3	Extra-over for items 4.2 for connection of fluorescent light fitting mounted on suspended ceiling including 5A switched socket outlet, 5A plug, 3m cable, PVC compression gland and connections to wiring	Each	10			
4.4	Conduits and accessories, cast into concrete, built into brickwork, chased into brickwork, mounted in roof space, installed in ground or surface mounted including small installation materials	m				
	4.4.1 Black enameled					
	a. 20mm diameter		10			
	b. 25mm diameter		10			
	c. 32mm diameter		10			
	d. 40mm diameter		10			
	e. 50mm diameter		10			
	TOTAL CARRIED FORWARD					

ITEM	DESCRIPTION	UNIT	SUPPLY & DELIVERY		INSTALLATION	
			RATE	TOTAL	RATE	TOTAL
	BROUGHT FORWARD					
	4.4.2 Galvanised					
	a. 20mm diameter		10			
	b. 25mm diameter		10			
	c. 32mm diameter		10			
	d. 40mm diameter		10			
	e. 50mm diameter		10			
	4.4.3 PVC					
	a. 20mm diameter		500			
	b. 25mm diameter		350			
	c. 32mm diameter		120			
	d. 40mm diameter		10			
	e. 50mm diameter		10			
4.5	Conduit terminations for PVC conduit 32mm and larger	Each				
	4.5.1 32mm diameter		2			
	4.5.2 40mm diameter		2			
	4.5.3 50mm diameter		2			
4.6	Conduit set bends for PVC conduit 32mm and larger	Each				
	4.6.1 32mm diameter		2			
	4.6.2 40mm diameter		2			
	4.6.3 50mm diameter		2			
	TOTAL CARRIED FORWARD					

ITEM	DESCRIPTION	UNIT	SUPPLY & DELIVERY		INSTALLATION	
			RATE	TOTAL	RATE	TOTAL
4.7	BROUGHT FORWARD Light switches including outlet box, cover plate and all connections to conduit and wiring (16A)	Each				
	4.7.1 1 way 1 lever		40			
	4.7.2 2 way 1 lever		8			
	4.7.3 1 way splashproof		1			
	4.7.4 1 lever 1 way 500W dimmer unit		0			
4.8	Switched socket outlets (15A) including outlet box, cover plate and all connections to conduit and wiring	Each				
	4.8.1 Single		50			
	4.8.2 Double		50			
	4.8.3 Single dedicated		40			
	4.8.4 Single (with splash proof box with sliding lid)		1			
4.9	5Amp Unswitched socket outlet including outlet box and connection to conduit and wiring	Each	50			
4.10	Isolator outlets including outlet box, cover plate and all connections to conduit and wiring	Each				
	4.10.1 30A Double pole		6			
	4.10.2 30A Triple pole		1			
	4.10.3 60A Triple pole		1			
	4.10.4 30A Double pole mounted in water tight box with sliding lid		4			
	4.10.5 30A Triple pole mounted in water tight box with sliding lid		1			
	TOTAL CARRIED FORWARD					

ITEM	DESCRIPTION	UNIT		SUPPLY & DELIVERY		INSTALLATION	
				RATE	TOTAL	RATE	TOTAL
	BROUGHT FORWARD						
	4.10.6 60A Double pole mounted in water tight box with sliding lid		1				
	4.10.7 60A Triple pole mounted in water tight box with sliding lid		1				
4.11	Service outlets including outlet box, cover plate and connections to conduit	Each					
	4.11.1 TV		4				
	4.11.2 Telephone		45				
	4.11.3 Data		45				
	4.11.4 Intercom		2				
4.12	Draw boxes including cover plate and all connections to conduit (boxes indicated on drawings only)	Each					
	4.12.1 100 x 100 x 50mm deep		15				
	4.12.2 100 x 50 x 50mm deep		15				
	4.12.3 Round conduit box		15				
	4.12.4 300mm x 300mm x 100mm deep		1				
	4.12.5 150mm x 150mm x 100mm deep		1				
4.13	Extension boxes/rings including connections to draw box	Each					
	4.13.1 100 x 100 mm		5				
	4.13.2 100 x 50mm		2				
	4.13.3 Round conduit box		2				
	TOTAL CARRIED FORWARD						

ITEM	DESCRIPTION	UNIT		SUPPLY & DELIVERY		INSTALLATION	
				RATE	TOTAL	RATE	TOTAL
	BROUGHT FORWARD						
4.14	Draw wires 2mm diameter	m	500				
4.15	PVC insulated copper conductors installed in conduit	m					
	4.15.1 2,5mm ²		1000				
	4.15.2 4mm ²		1000				
	4.15.3 6mm ²		100				
	4.15.4 10mm ²		0				
	4.15.5 16mm ²		50				
	4.15.6 25mm ²		0				
4.16	Earth wire installed in conduit	m					
	4.16.1 2,5mm ²		1500				
	4.16.2 4mm ²		50				
	4.16.3 6mm ²		0				
	4.16.4 10mm ²		50				
	4.16.5 16mm ²		0				
4.17	Earthing of building						
	4.17.1 Residence	LOT	TOTAL				
4.18	Lightning protection installation complete as specified						
	4.18.1 Residence	LOT	TOTAL				
	TOTAL CARRIED FORWARD						

ITEM	DESCRIPTION	UNIT		SUPPLY & DELIVERY		INSTALLATION	
				RATE	TOTAL	RATE	TOTAL
4.19	BROUGHT FORWARD Connection of equipment to outlets including all flexible conduit, connectors, compression glands, etc.	Each					
	4.19.1 Stove		4				
	4.19.2 Air conditioner single phase		0				
	4.19.3 Air conditioner three phase		0				
	4.19.4 Fan three phase		1				
	4.19.5 Fan single phase		1				
	4.19.6 Calorifier 27kW		1				
	4.19.7 Geyser single phase 3kW		1				
4.20	Stove as specified	Each	4				
4.21	Labelling of all power outlets with engraved labels glued to outlet cover plate with silicone sealant	Each outlet	70				
4.22	Sealing with silicone sealant around wall mounted DB's (per meter length of sealed joint)	m	11				
4.23	Installation of switchgear in existing distribution board including connections and wiring						
	4.23.1 Circuit breakers (5kA single pole)	Each	2				
	a. 10A to 20A		2				
	b. 25A to 60A		2				
	c. 70A to 80A		0				
	TOTAL CARRIED FORWARD						

ITEM	DESCRIPTION	UNIT	SUPPLY & DELIVERY		INSTALLATION	
			RATE	TOTAL	RATE	TOTAL
	BROUGHT FORWARD					
4.23.2	Circuit breakers (5kA triple pole):	Each				
	a. 10A to 20A		1			
	b. 25A to 60A		1			
	c. 70A to 80A		0			
	d. 100A		0			
4.23.3	Earth leakage isolators (5kA)					
	a. 60A single phase		1			
	b. 100A single phase		0			
4.23.4	Neutral bars for earth leakage circuits		1			
4.23.5	Dummy circuit breakers (5kA)		10			
4.24	Photo cell complete as specified	Each	1			
4.25	100mm wide medium duty welded wire mesh cable tray (galvanized) complete including all accessories	m	50			
4.26	Occupany sensors complete as specified	Each	37			
4.27	Any other item necessary to complete the specified installation. Furnish details:					
	4.27.1					
	4.27.2					
	4.27.3					
	4.27.4					
	4.27.5					
TOTAL CARRIED FORWARD TO SUMMARY OF BID PRICE						

LIMPOPO TRAFFIC TRAINING COLLEGE : NEW RESIDENCE (INCLUDING RENOVATIONS TO EXISTING HALL) : ELECTRICAL INSTALLATION

SECTION NO. 5 : RENOVATIONS OF EXISTING HALL

ITEM	DESCRIPTION	UNIT	QTY LENGTH	SUPPLY & DELIVERY		INSTALLATION	
				RATE	TOTAL	RATE	TOTAL
5.1	Distribution boards including connection to conduit and wiring	Each	1				
5.2	5.1.1 DB-H Light fittings including conduit outlet box and connections to conduit and wiring:						
	5.2.1 Type A (1200 x 600 recessed LED panel)	Each	12				
	5.2.2 Type B (1200 vapourproof LED)	Each	2				
	5.2.3 Type C (LED downlighter)	Each	23				
	5.2.4 Type D (LED bulkhead)	Each	15				
	5.2.5 Type J (Type A EMG)	Each	12				
	5.2.6 Type F (LED emergency EXIT)	Each	5				
	5.2.7 Type J (1200 x 600 recessed LED panel dimmable)	Each	35				
5.3	Extra-over for items 4.2 for connection of fluorescent light fitting mounted on suspended ceiling including 5A switched socket outlet, 5A plug, 3m cable, PVC compression gland and connections to wiring						
5.4	Conduits and accessories, cast into concrete, built into brickwork, chased into brickwork, mounted in roof space, installed in ground or surface mounted including small installation materials	Each	10				
	5.4.1 Black enameled						
	a. 20mm diameter	m	600				
	b. 25mm diameter	m	100				
	c. 32mm diameter	m	10				
	d. 40mm diameter	m	10				
	e. 50mm diameter	m	10				
	TOTAL CARRIED FORWARD						

ITEM	DESCRIPTION	UNIT	QTY LENGTH	SUPPLY & DELIVERY		INSTALLATION	
				RATE	TOTAL	RATE	TOTAL
	BROUGHT FORWARD						
5.4.2	Galvanised						
	a. 20mm diameter	m	10				
	b. 25mm diameter	m	10				
	c. 32mm diameter	m	10				
	d. 40mm diameter	m	10				
	e. 50mm diameter	m	10				
5.4.3	PVC						
	a. 20mm diameter	m	10				
	b. 25mm diameter	m	10				
	c. 32mm diameter	m	10				
	d. 40mm diameter	m	10				
	e. 50mm diameter	m	10				
5.5	Conduit terminations for PVC conduit 32mm and larger						
	5.5.1 32mm diameter	Each	2				
	5.5.2 40mm diameter	Each	2				
	5.5.3 50mm diameter	Each	2				
5.6	Conduit set bends for PVC conduit 32mm and larger						
	5.6.1 32mm diameter	Each	2				
	5.6.2 40mm diameter	Each	2				
	5.6.3 50mm diameter	Each	2				
	TOTAL CARRIED FORWARD						

ITEM	DESCRIPTION	UNIT	QTY LENGTH	SUPPLY & DELIVERY		INSTALLATION	
				RATE	TOTAL	RATE	TOTAL
5.7	BROUGHT FORWARD						
	Light switches including outlet box, cover plate and all connections to conduit and wiring (16A)						
	5.7.1 1 way 1 lever	Each	10				
	5.7.2 2 way 1 lever	Each	1				
	5.7.3 1 way splashproof	Each	1				
5.7.4 1 lever 1 way 500W dimmer unit	Each	0					
5.8	Switched socket outlets (15A) including outlet box, cover plate and all connections to conduit and wiring						
	5.8.1 Single	Each	10				
	5.8.2 Double	Each	25				
	5.8.3 Single dedicated	Each	5				
5.8.4 Single (with splash proof box with sliding lid)	Each	5					
5.9	5Amp Unswitched socket outlet including outlet box and connection to conduit and wiring	Each	100				
5.10	Isolator outlets including outlet box, cover plate and all connections to conduit and wiring						
	5.10.1 30A Double pole	Each	10				
	5.10.2 30A Triple pole	Each	10				
	5.10.3 60A Triple pole	Each	1				
	5.10.4 30A Double pole mounted in water tight box with sliding lid	Each	1				
5.10.5 30A Triple pole mounted in water tight box with sliding lid	Each	1					
TOTAL CARRIED FORWARD							

ITEM	DESCRIPTION	UNIT	QTY LENGTH	SUPPLY & DELIVERY		INSTALLATION	
				RATE	TOTAL	RATE	TOTAL
	BROUGHT FORWARD						
	5.10.6 60A Double pole mounted in water tight box with sliding lid	Each	1				
	5.10.7 60A Triple pole mounted in water tight box with sliding lid	Each	1				
5.11	Service outlets including outlet box, cover plate and connections to conduit						
	5.11.1 TV	Each	1				
	5.11.2 Telephone	Each	20				
	5.11.3 Data	Each	10				
	5.11.4 Intercom	Each	1				
5.12	Draw boxes including cover plate and all connections to conduit (boxes indicated on drawings only)						
	5.12.1 100 x 100 x 50mm deep	Each	15				
	5.12.2 100 x 50 x 50mm deep	Each	15				
	5.12.3 Round conduit box	Each	15				
	5.12.4 300mm x 300mm x 100mm deep	Each	1				
	5.12.5 150mm x 150mm x 100mm deep	Each	1				
5.13	Extension boxes/rings including connections to draw box						
	5.13.1 100 x 100 mm	Each	20				
	5.13.2 100 x 50mm	Each	20				
	5.13.3 Round conduit box	Each	10				
	TOTAL CARRIED FORWARD						

ITEM	DESCRIPTION	UNIT	QTY LENGTH	SUPPLY & DELIVERY		INSTALLATION	
				RATE	TOTAL	RATE	TOTAL
	BROUGHT FORWARD						
5.14	Draw wires 2mm diameter	m	300				
5.15	PVC insulated copper conductors installed in conduit						
	5.15.1 2.5mm ²	m	3000				
	5.15.2 4mm ²	m	4000				
	5.15.3 6mm ²	m	2500				
	5.15.4 10mm ²	m	10				
	5.15.5 16mm ²	m	10				
	5.15.6 25mm ²	m	10				
5.16	Earth wire installed in conduit						
	5.16.1 2.5mm ²	m	4000				
	5.16.2 4mm ²	m	1000				
	5.16.3 6mm ²	m	10				
	5.16.4 10mm ²	m	10				
	5.16.5 16mm ²	m	10				
5.17	Earthing of building						
	5.17.1 Existing Hall	LOT	1				
5.18	Lightning protection installation complete as specified						
	5.18.1 Existing Hall	LOT	1				
	TOTAL CARRIED FORWARD						

ITEM	DESCRIPTION	UNIT	QTY LENGTH	SUPPLY & DELIVERY		INSTALLATION	
				RATE	TOTAL	RATE	TOTAL
5.19	BROUGHT FORWARD Connection of equipment to outlets including all flexible conduit, connectors, compression glands, etc.						
	5.19.1 Stove	Each	0				
	5.19.2 Air conditioner single phase	Each	5				
	5.19.3 Air conditioner three phase	Each	8				
	5.19.4 Fan three phase	Each	2				
	5.19.5 Fan single phase	Each	1				
	5.19.6 Calorifier 27kW	Each	0				
	5.19.7 Geyser single phase 3kW	Each	1				
	Stove as specified	Each	0				
5.20	Labelling of all power outlets with engraved labels glued to outlet cover plate with silicone sealant	Each outlet	70				
5.22	Sealing with silicone sealant around wall mounted DB's (per meter length of sealed joint)	m	12				
5.23	Installation of switchgear in existing distribution board including connections and wiring						
	5.23.1 Circuit breakers (5kA single pole)						
	a. 10A to 20A	Each	2				
	b. 25A to 60A	Each	2				
	c. 70A to 80A	Each	1				
	TOTAL CARRIED FORWARD						

ITEM	DESCRIPTION	UNIT	QTY LENGTH	SUPPLY & DELIVERY		INSTALLATION	
				RATE	TOTAL	RATE	TOTAL
	BROUGHT FORWARD						
	5.23.2 Circuit breakers (5kA triple pole):	Each					
	a. 10A to 20A		1				
	b. 25A to 60A		1				
	c. 70A to 80A		1				
	d. 100A		1				
	5.23.3 Earth leakage isolators (5kA)						
	a. 60A single phase		1				
	b. 100A single phase		1				
	5.23.4 Neutral bars for earth leakage circuits		1				
	5.23.5 Dummy circuit breakers (5kA)		10				
5.24	Three tier power skirting & accessories for power skirting as specified including fixing materials, covers, etc.						
	5.24.1 Three tier power skirting	m	270				
	5.24.2 90° Horizontal Corner	Each	0				
	5.24.3 End Cap	Each	68				
	5.24.4 15A switched socket outlet	Each	480				
	5.24.5 Telephone outlet	Each	0				
	5.24.6 Data outlet	Each	480				
	5.24.7 30A double pole isolator	Each	0				
	5.24.8 15A switched socket outlet dedicated	Each	480				
	5.24.9 Blank joggled cover plate	Each	0				
	TOTAL CARRIED FORWARD						

ITEM	DESCRIPTION	UNIT	QTY LENGTH	SUPPLY & DELIVERY		INSTALLATION	
				RATE	TOTAL	RATE	TOTAL
	BROUGHT FORWARD						
5.25	Photo cell complete as specified	Each	1				
5.26	Welding plugs as specified	Each	1				
5.27	Occupancy sensors as specified	Each	10				
5.28	Strip and remove complete existing/redundant electrical installation	SUM	1				
5.29	76mm x 76mm wiring channel (galvanized) and accessories:						
5.29.1	Wiring channel complete with covers, hangers and support brackets	m	200				
5.29.2	Vertical elbow including cover	m	1				
5.29.3	Radiused T-piece including cover	Each	8				
5.29.4	Radiused cross piece including cover	Each	4				
5.29.5	Reducer from 127mm x 76mm to 76mm x 76mm including cover	Each	0				
5.29.6	Radiused horizontal elbow including cover	Each	4				
5.29.7	End cap	Each	4				
5.30	Medium duty welded wire mesh cable tray 300mm wide and accessories						
5.30.1	300mm wide cable tray	m	120				
5.30.2	External dropper/internal riser	Each	2				
5.30.3	T-piece	Each	2				
5.30.4	90° horizontal elbow	Each	2				
5.30.5	4 Way	Each	2				
5.30.6	Reducer 300mm wide to 100mm wide	Each	0				
5.31	Hand dryers as specified	Each	4				
5.32	Any other item necessary to complete the specified installation. Furnish details:						
5.32.1							
5.32.2							
5.32.3							
5.32.4							
5.32.5							
TOTAL CARRIED FORWARD TO SUMMARY OF BID PRICE							

LIMPOPO TRAFFIC TRAINING COLLEGE : NEW RESIDENCE (INCLUDING RENOVATIONS TO EXISTING HALL) : ELECTRICAL INSTALLATION

SECTION NO. 6: SUMMARY OF BID PRICE PART B

SECTION NO.	DESCRIPTION	A SUPPLY & DELIVERY	+	B INSTALLATION	=	C TOTAL
1.	Preliminaries	R _____		R _____		R _____
2.	Site Retiulation, Walkway Lights and Site Lighting	R _____		R _____		R _____
3.	Telephone and data sleeve pipe installation	R _____		R _____		R _____
4.	Electrical Installation in new building : Residence	R _____		R _____		R _____
5.	Renovations to Existing Hall	R _____		R _____		R _____
6.	Sub-Total					R _____
7.	Contingency amount (only to be expended on instruction by Client or Engineer)					R 50 000.00
8.	Provisional amounts					R 250 000.00
	Heat Pump installation to Residence					R 250 000.00
	Smoke Detection Installation to Residence & Existing Hall					R 500 000.00
	HVAC Installation to Existing Hall					R 300 000.00
	Stage Lighting to Existing Hall					R 300 000.00
	Audio Visual Installation to Existing Hall					R 300 000.00
9.	TOTAL AMOUNT FOR ELECTRICAL INSTALLATION CARRIED FORWARD TO FINAL SUMMARY OF PART A OF BID					R _____

Note: The amount in column A and B shall be added to arrive at the amount in column C.

PART 5

SCHEMATIC DIAGRAMS

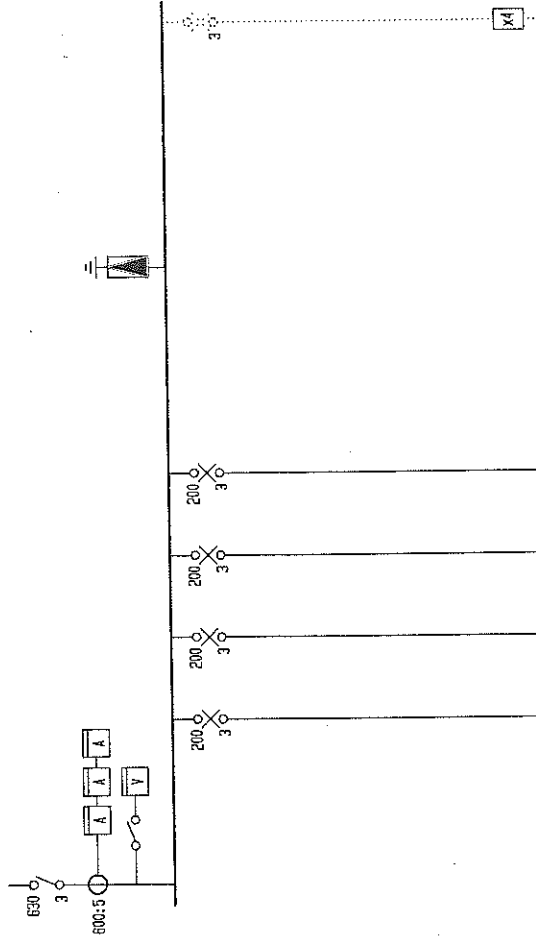
INDEX

ITEM	DESCRIPTION	PAGE
1.	DB-H1	1
2.	MAIN KIOSK	2
3.	DB-H	3
4.	KIOSK-K2	4

/dp part.5.ind

EQUIPMENT QUANTITIES		SCHEMATIC DIAGRAM OF : MAIN KIOSK		TYPE: PLINTH MOUNTED		DOORS: YES		LOCKS ON DOORS: YES		FACIA PANELS: YES		LOCKABLE FACIA PANEL: YES	
PROJECT : LIMPOPO TRAFFIC TRAINING COLLEGE		EXTERNAL COLOUR :		COLOUR OF NORMAL FACIA PANEL: ELECTRIC ORANGE		COLOUR OF EMERGENCY FACIA PANEL: N/A		COLOUR OF EMERGENCY FACIA PANEL: N/A		COLOUR OF EMERGENCY FACIA PANEL: N/A		COLOUR OF UPS FACIA PANEL: N/A	
ISOLATORS:		BUSBAR RATING = 630A		TO ARCHITECTS REQUIREMENTS									
630A 3 POLE : 1		FAULT LEVEL = 25KA											
CIRCUIT BREAKERS:													
200A 3 POLE : 4													
MAXIMUM DEMAND													
AMMETERS : 3													
CURRENT TRANSFORMERS:													
600:5 CLASS 1 : 3													
VOLTMETERS : 1													
VOLTMETERS													
SELECTOR SWITCH : 1													
SURGE ARRESTORS:													
3 PHASE + N : 1 SET													

NORMAL SECTION



CSI C/B REF.	CIRCUIT NO.	IDENTIFICATION	Cable Size & no. of Cores	CONDUIT DIA	No. & Size Conductors	EARTHWARE
KON		MAIN	REFER TO CABLE SCHEDULE			
FD		KIOSK K1	REFER TO CABLE SCHEDULE			
FD		EXISTING OHL A	REFER TO CABLE SCHEDULE			
FD		EXISTING OHL B	REFER TO CABLE SCHEDULE			
FD		KIOSK K2	REFER TO CABLE SCHEDULE			
FD		SPARE				

PART 6

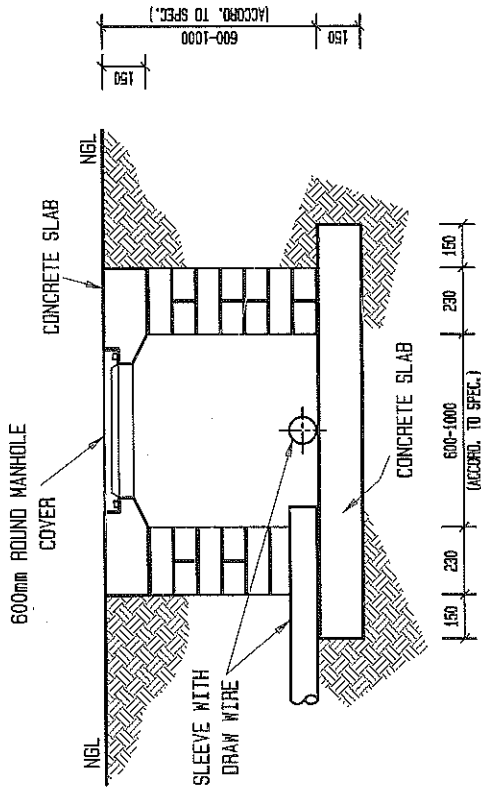
DRAWINGS

INDEX

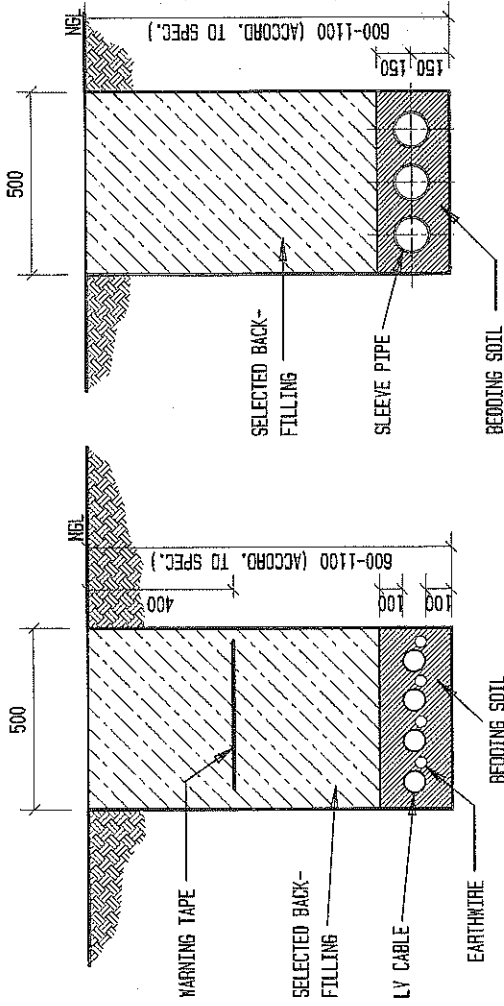
DRAWING NO.	DESCRIPTION	PAGE
Attached please find A3 reduced scale drawing for the following:		
1.	B1409-01-01 C : Site Plan: Electrical & Telecommunication Reticulation	1
2.	B1409-100-07 : Student Residence: Block C: Ground Floor: Electrical Installation	2
3.	B1409-100-08 : Student Residence: Block C: First Floor: Electrical Installation	3
4.	B1409-100-09 : Student Residence: Second floor & Roof Plan: Electrical Installation	4
5.	B1409-200-05 : Student Residence: Block C: Ground & First Floor: Electrical Installation-Smoke Detection	5
6.	B1409-200-06 : Student Residence: Block C: Second & Roof Plan: Electrical Installation Smoke Detection	6
7.	B1409-300-01 : Existing Hall Renovations : Ground Floor : Electrical Installation : Light Layout	7
8.	B1409-300-02 : Existing Hall Renovations : Ground Floor : Electrical Installation : Power Layout	8
9.	Detail of manhole, LV cable trench & sleeve pipe trench	9
10.	Detail of kiosk foundation	10

NOTE: Full scale drawings are obtainable from Pienaar & Erwee Engineers if required by the Bidder.

/dp part-6



SECTION THROUGH MANHOLE



SECTION THROUGH LV CABLE TRENCH

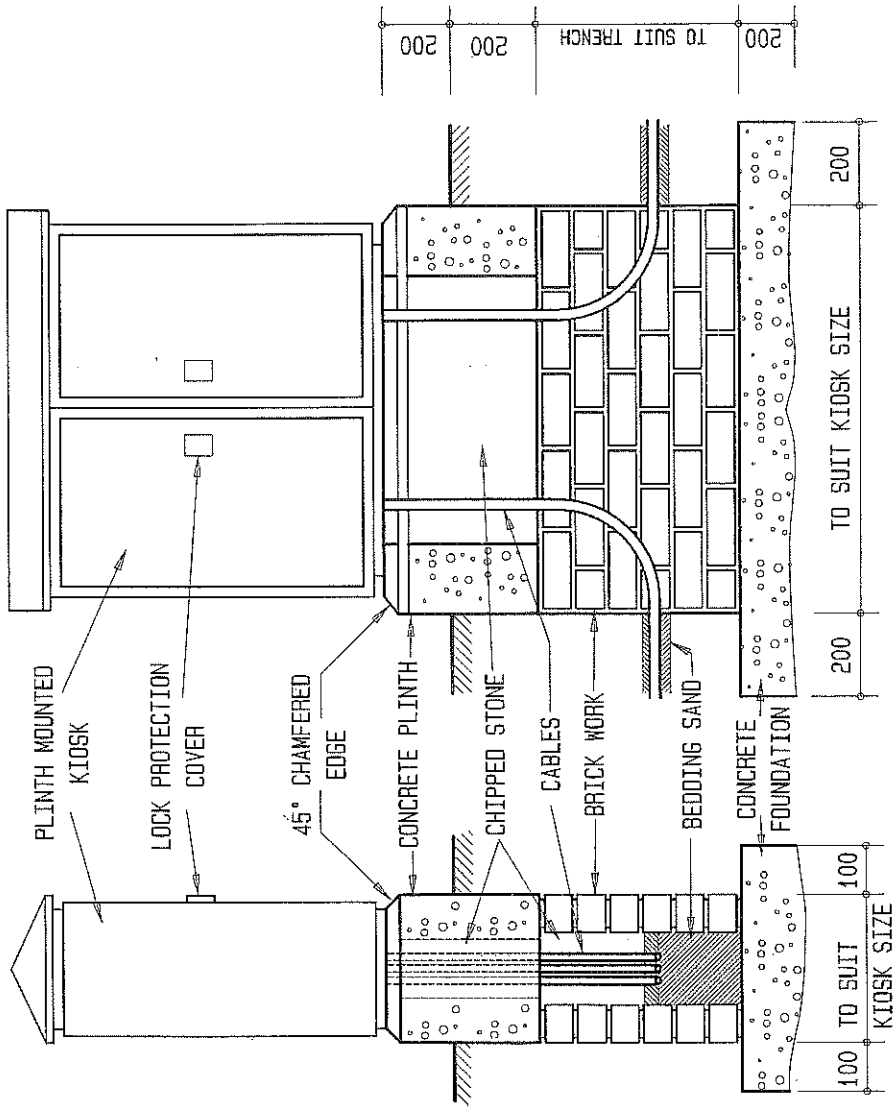
SECTION THROUGH SLEEVE PIPE TRENCH

NOTES:
* QTY OF SLEEVES DETERMINED BY SITE CONNECTIONS

DETAIL OF MANHOLE, LV CABLE TRENCH & SLEEVE PIPE TRENCH

(nts)

NOTE:
REFER TO DETAIL
OF PROTECTION COVER
OVER LOCKING DEVICE.



TYPICAL SECTION

SIDE ELEVATION

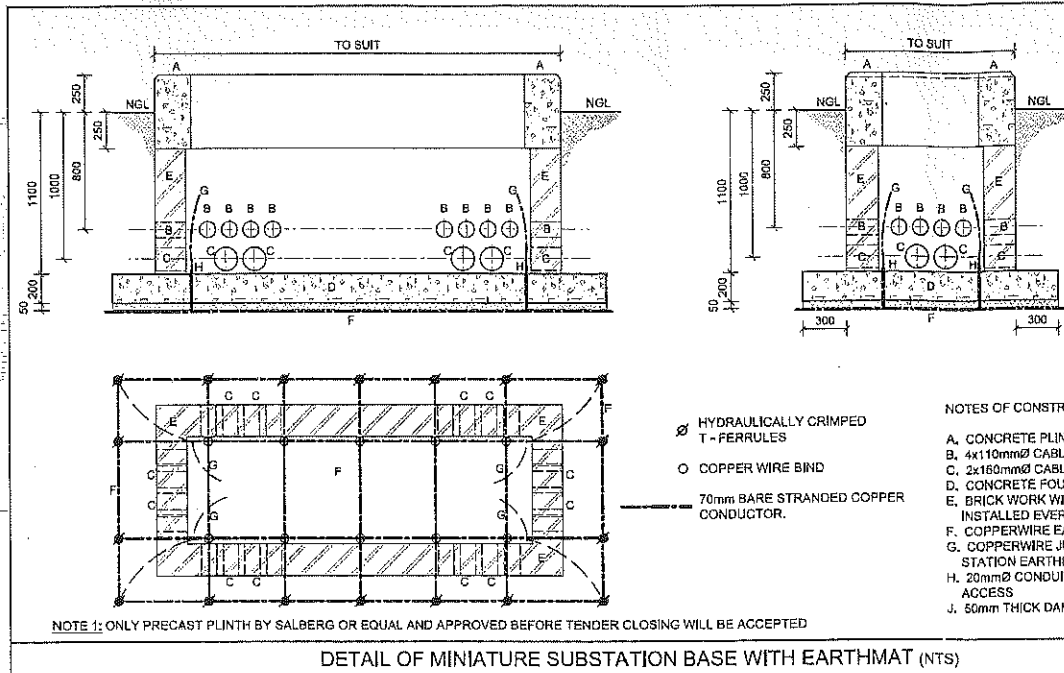
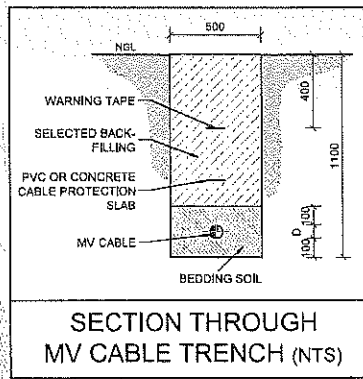
DETAIL OF KIOSK FOUNDATION

(nts)

DRAWINGS



CUBIC
PROFESSIONAL CONSULTANTS

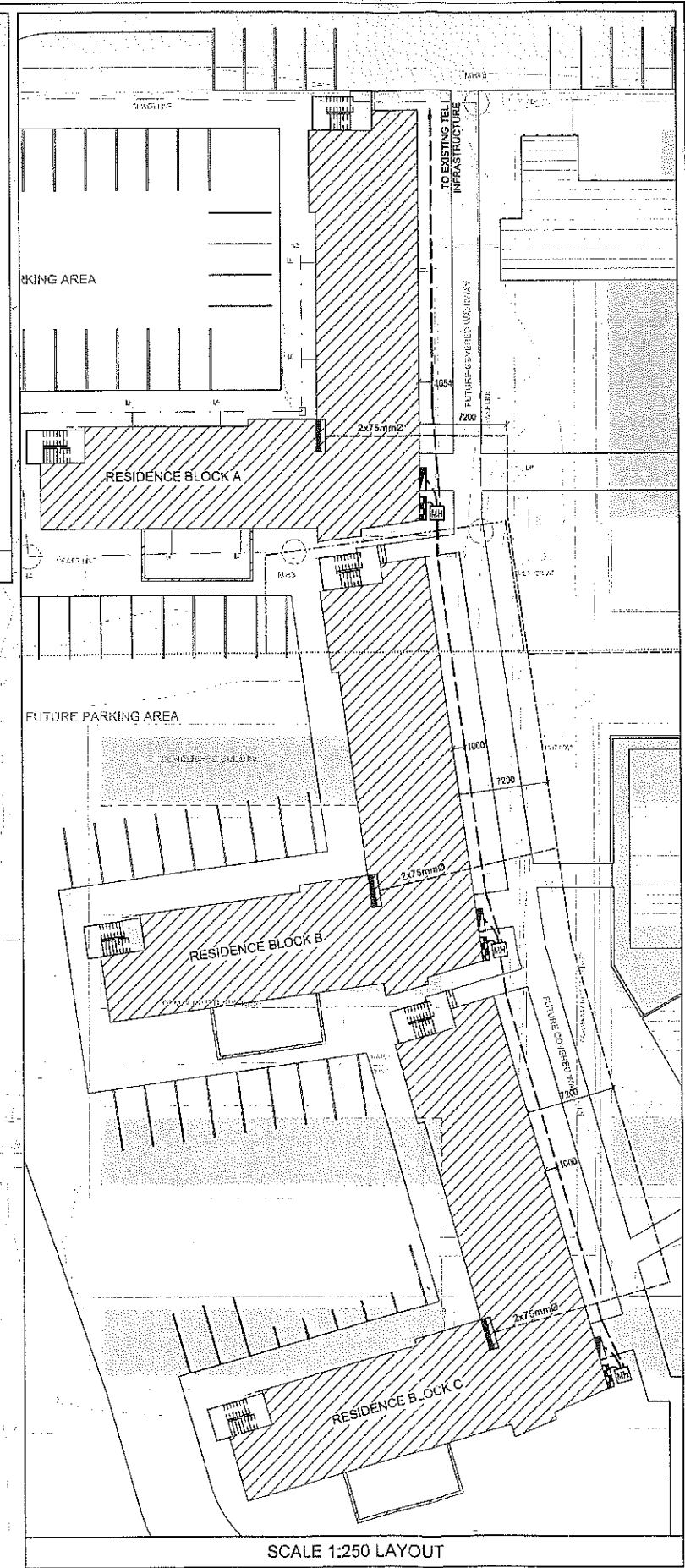
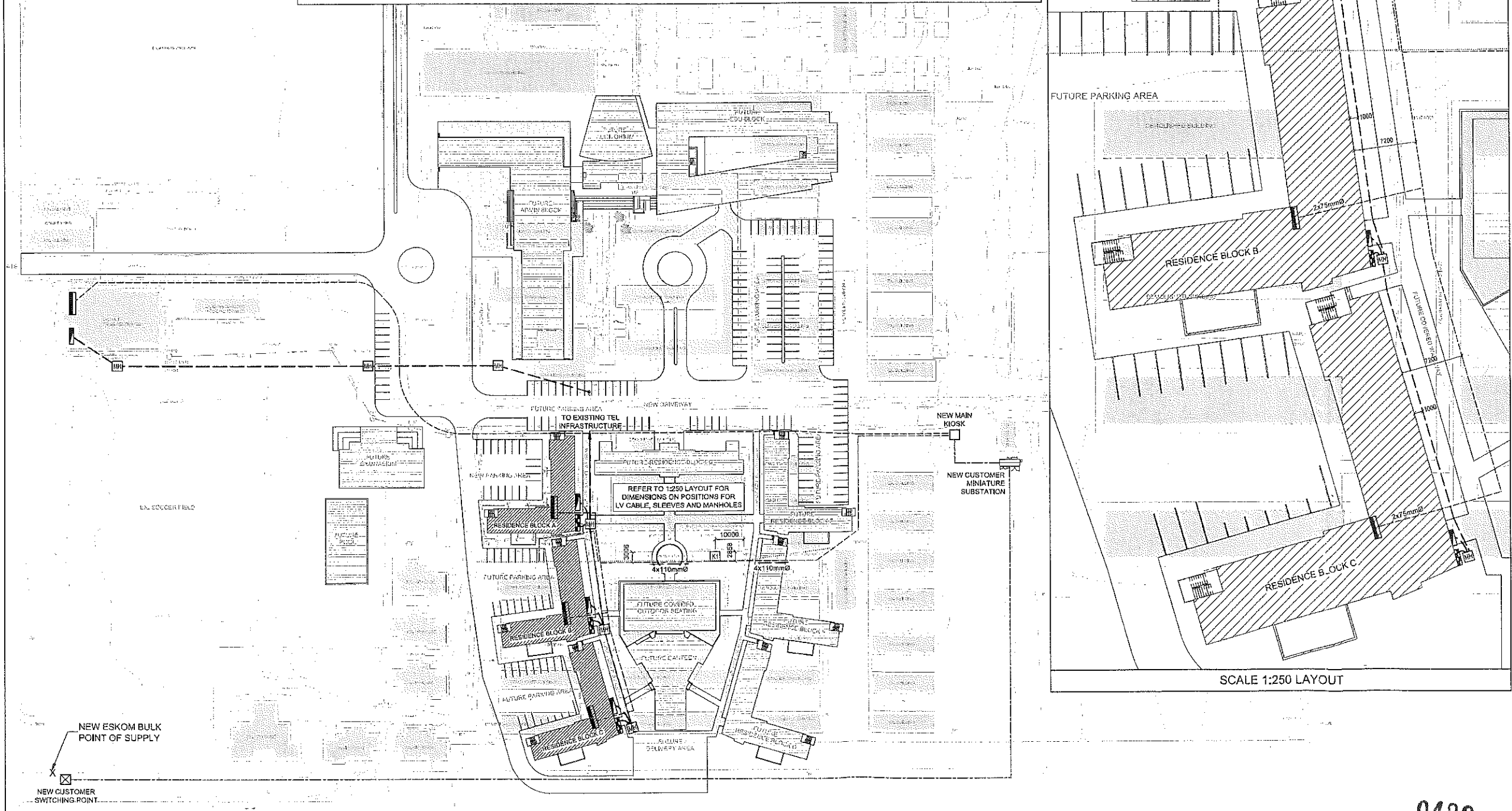


NOTE 1: ONLY PRECAST PLINTH BY SALBERG OR EQUAL AND APPROVED BEFORE TENDER CLOSING WILL BE ACCEPTED

- NOTES OF CONSTRUCTION**
- A. CONCRETE PLINTH (NOTE 1).
 - B. 4x110mm \varnothing CABLE SLEEVES.
 - C. 2x160mm \varnothing CABLE SLEEVES.
 - D. CONCRETE FOUNDATION 200mm THICK.
 - E. BRICK WORK WITH BRICK FORCE INSTALLED EVERY SECOND LAYER.
 - F. COPPERWIRE EARTH MAT (70mm)
 - G. COPPERWIRE JUMPERS TO MINIATURE SUBSTATION EARTHBAR, (70mm)
 - H. 20mm \varnothing CONDUIT FOR COPPER WIRE JUMPER ACCESS
 - J. 50mm THICK DAMPENED COMPACTED SOIL
- \varnothing HYDRAULICALLY CRIMPED T-FERRULES
 O COPPER WIRE BIND
 — 70mm BARE STRANDED COPPER CONDUCTOR.

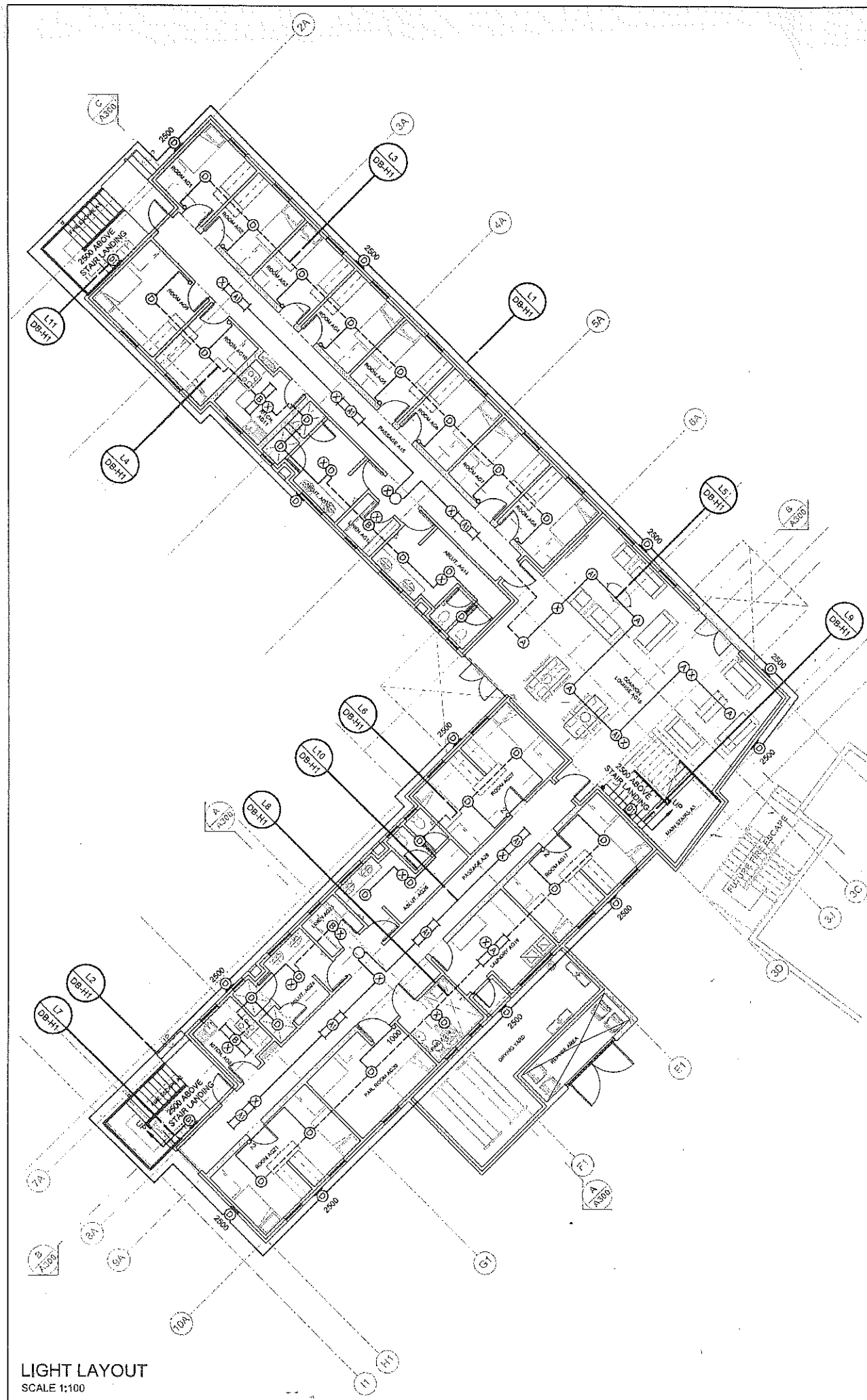
ELECTRICAL SYMBOLS

	TELEPHONE DISTRIBUTION BOARD
	DISTRIBUTION BOARD
	DATA DISTRIBUTION BOARD
	MANHOLE
	KIOSK
	RING MAIN UNIT
	MINIATURE SUBSTATION
	NEW LV CABLE ROUTE
	MV CABLE ROUTE
	PROPOSED ROUTE FOR SECTION OF EXISTING LV CABLE
	EXISTING LV CABLE ROUTE
	SLEEVE PIPES

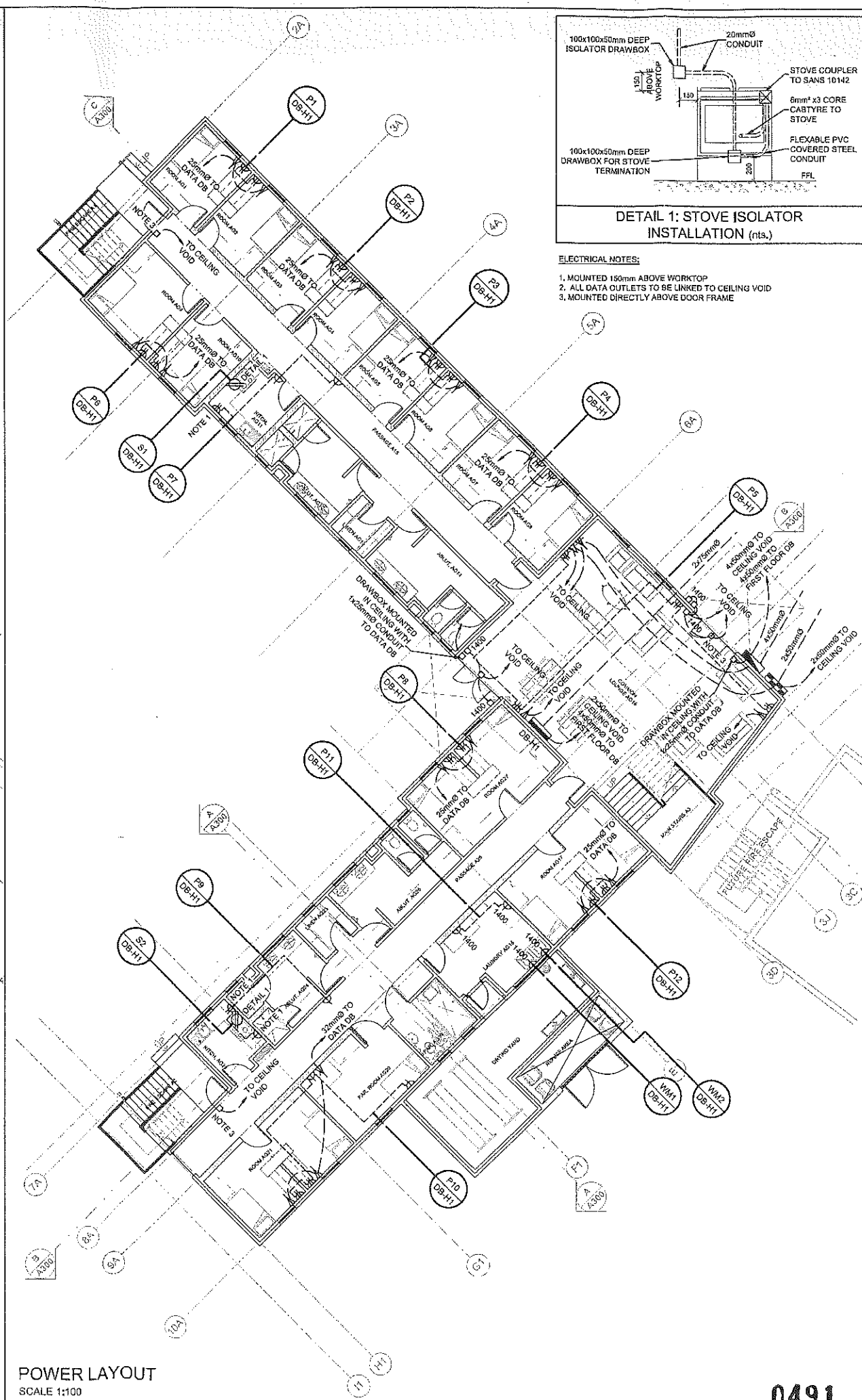


26/01/2021	C	RESIDENCE BLOCK C AND HALL RENOVATIONS ADDED			
09/09/2020	B	TEL & ELECTRICAL REVISED			
27/08/2019	A	LAYOUT REVISED & DETAILS ADDED			
DATE	DATE	NO.	DESCRIPTION / DESCRIPTION	OKD.	
				APPR.	
WYSIGINGS / AMENDMENTS					
NAME AND ADDRESS OF USER/CONSULTANT/CLIENT					
 PIENAAR & ERWEE Electrical Engineering & Electrical Engineers Reg No. 22818/06/0707					
 CESA 3 NEEHLINGSTRAAT 3 NEEHLING STREET BENDOR, POLOKWANE 0999 +27 (0)15 208 3092 email@pewee.co.za POSTNET SUITE 52 PRIVATE BAG 29878 POLOKWANE 0200					
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PROJECT: LIMPOPO TRAFFIC TRAINING COLLEGE					
DRAWING: SITE PLAN: ELECTRICAL & TELECOMMUNICATION RETICULATION					
DR.	ENR.	DESIGNER/DR.	CHK.	APP.	DATE
M DE KOCK	PEV				03/05/2018
SCALE	SHEET	TOTAL SHEETS	DATE	REV.	
1:750	A1	B1409/01/01		C	

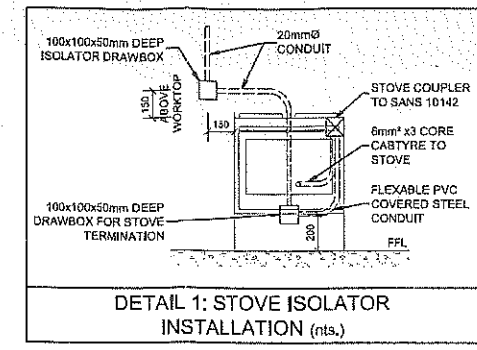
0490



LIGHT LAYOUT
SCALE 1:100



POWER LAYOUT
SCALE 1:100



ELECTRICAL NOTES:
 1. MOUNTED 150mm ABOVE WORKTOP
 2. ALL DATA OUTLETS TO BE LINKED TO CEILING VOID
 3. MOUNTED DIRECTLY ABOVE DOOR FRAME

ELECTRICAL SYMBOLS	
	DATA DISTRIBUTION BOARD
	DISTRIBUTION BOARD
	TELEPHONE DISTRIBUTION BOARD
	FLUORESCENT LIGHT FITTING
	RECESSED FLUORESCENT
	BULKHEAD LIGHT FITTING
	WALL MOUNTED LIGHT FITTING
	LIGHT SWITCH
	TWO WAY LIGHT SWITCH
	DRAWBOX
	TELEPHONE OUTLET
	DATA OUTLET POINT
	TV ANTENNA OUTLET
	15A 3 PIN SSO
	15A 3 PIN DOUBLE SSO
	15A 3 PIN DEDICATED SSO
	POWER POLE
	SINGLE PHASE OUTLET 30A DOUBLE POLE ISOLATOR
	THREE PHASE OUTLET 30A DOUBLE POLE ISOLATOR
	INDICATES DEDICATED CIRCUIT
	INDICATES SWITCHING
	INDICATES CIRCUIT
	SLEEVE PIPE
	CIRCUIT INDICATOR

DATE	NO.	REVISION / DESCRIPTION	GRD. APPR.

WYSIGINGS / AMENDMENTS

NAME AND ADDRESS OF DESIGN CONSULTANT

PIENAAR & ERWEE
 ENGINEERS & ARCHITECTS
 Reg. No. 20521/030-07

CESA
 CONSULTANTS

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 127 (0)15 296 2992 admin@pienaaranderwee.co.za

POSTNET SUITE 52 PRIVATE BAG 2676 POLKOWANE 0700

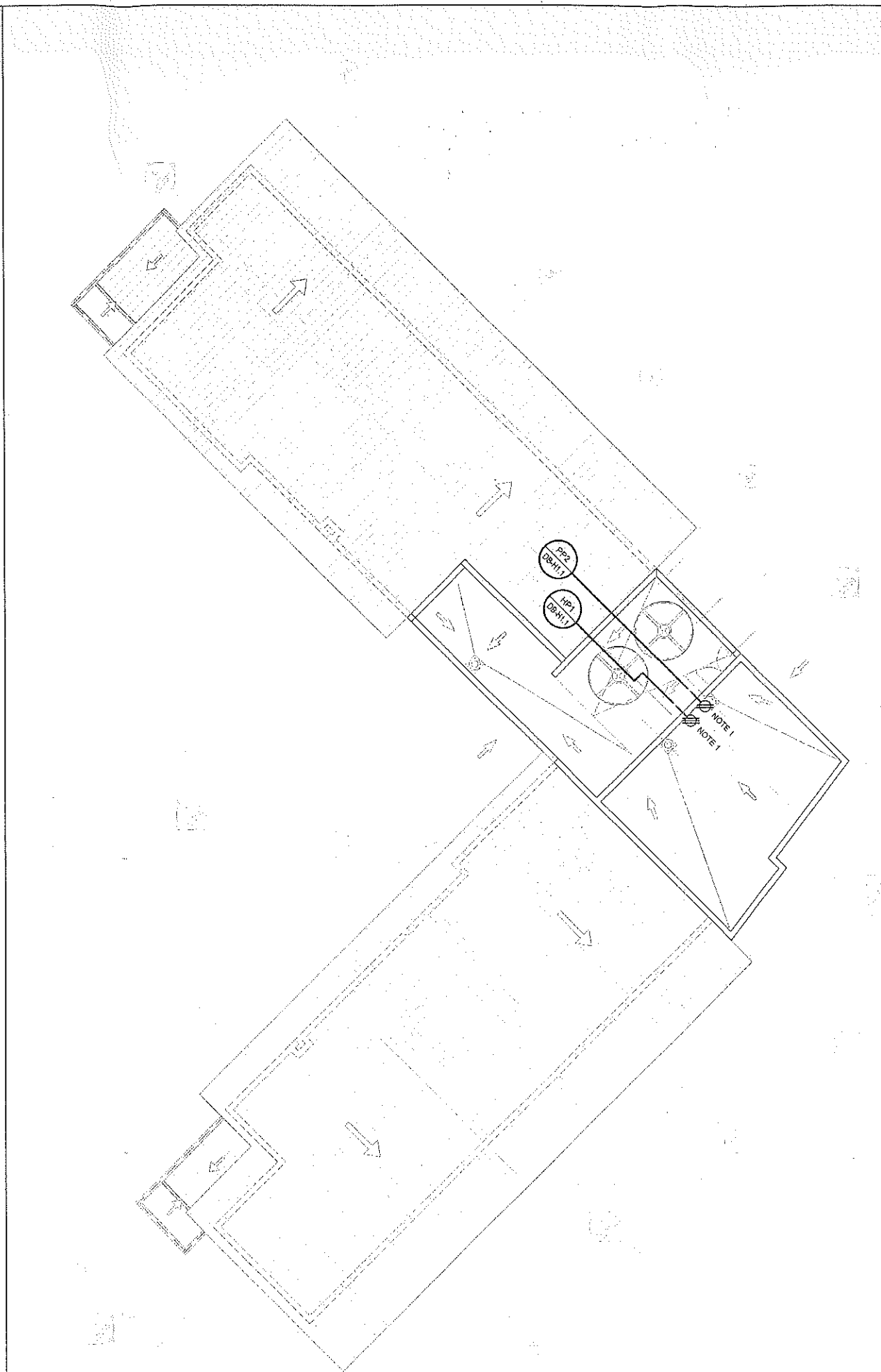
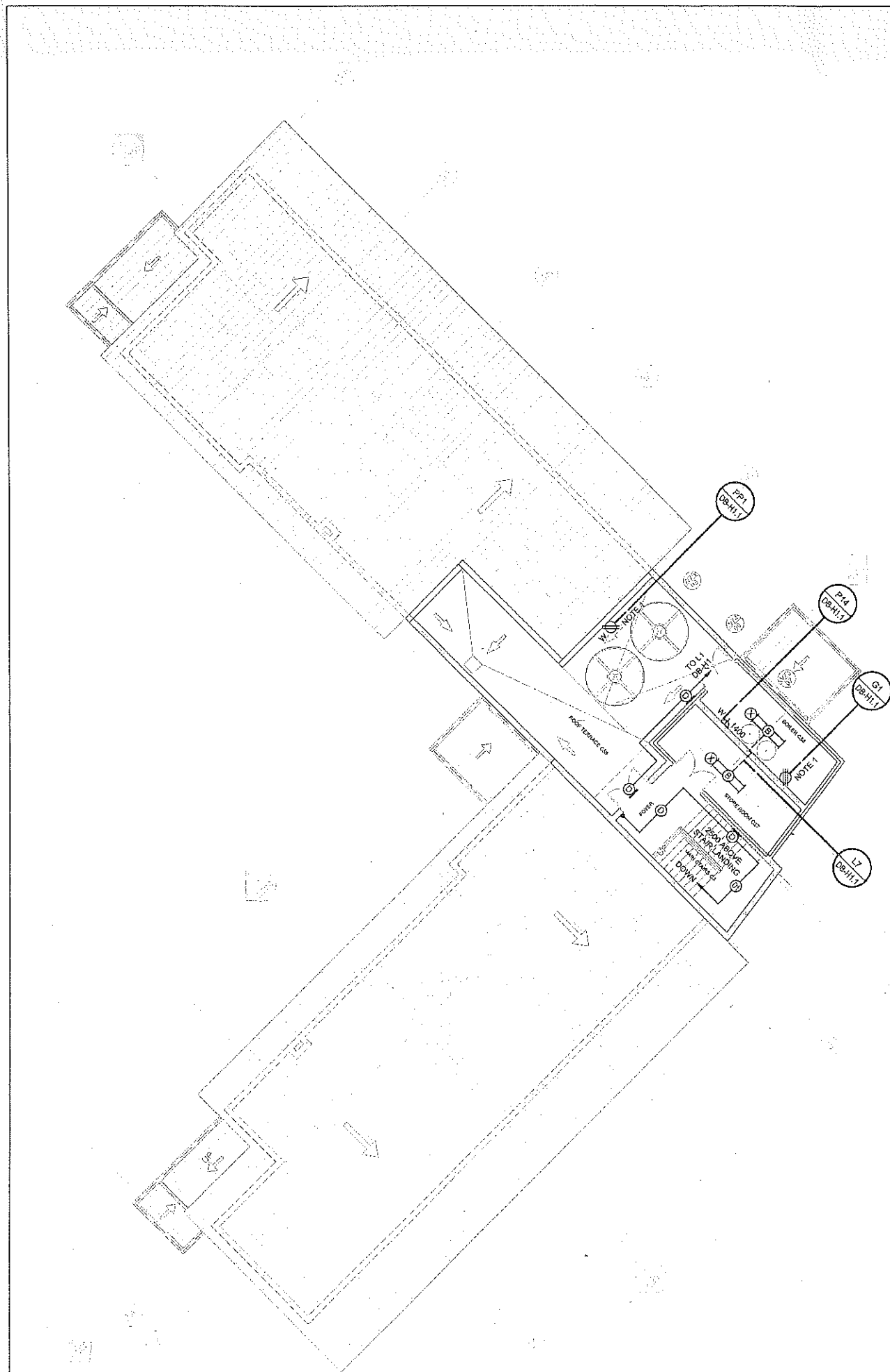
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PROJECT: **LIMPOPO TRAFFIC TRAINING COLLEGE**

WORKING DRAWING: **STUDENT RESIDENCE; BLOCK C; GROUND FLOOR: ELECTRICAL INSTALLATION**

NO.	REV.	REVISION	DATE
M DE KOCK	REV		2021/01/26

SCALE: 1:100 SHEET: A1 DRAWING NO: B1409/100/07



ELECTRICAL SYMBOLS

- DATA DISTRIBUTION BOARD
- DISTRIBUTION BOARD
- TELEPHONE DISTRIBUTION BOARD
- FLUORESCENT LIGHT FITTING
- RECESSED FLUORESCENT
- BULKHEAD LIGHT FITTING
- WALL MOUNTED LIGHT FITTING
- LIGHT SWITCH
- TWO WAY LIGHT SWITCH
- DRAWBOX
- TELEPHONE OUTLET
- DATA OUTLET POINT
- TV ANTENNA OUTLET
- 15A 3 PIN SSO
- 15A 3 PIN DOUBLE SSO
- 15A 3 PIN DEDICATED SSO
- POWER POLE
- SINGLE PHASE OUTLET 30A DOUBLE POLE ISOLATOR
- THREE PHASE OUTLET 30A DOUBLE POLE ISOLATOR
- INDICATES DEDICATED CIRCUIT
- INDICATES SWITCHING
- INDICATES CIRCUIT
- 110mm SLEEVE PIPE
- L6 DB-F CIRCUIT INDICATOR
- 78mm X 76mm WIRE TRUNKING

ELECTRICAL NOTES:
 1. FINAL POSITION OF OUTLET TO BE CONFIRMED BY OTHERS

DATE	NO.	DESCRIPTION	GRD. APPR.

WYSIGINGS / AMENDMENTS

NAME AND ADDRESS OF CLIENT/CONTRACTOR/CLIENT
 NAME AND ADDRESS OF DESIGN/CONSULTANT/FIRM

PIENAAR & ERWEE
 Electrical Engineering
 Reg No. 2023/0126/09

CESA

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 0910 POLKWANE
 0700

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PROJECT:
LIMPOPO TRAFFIC TRAINING COLLEGE

TECHNOLOGY:
**STUDENT RESIDENCE;
 BLOCK C;
 SECOND FLOOR & ROOF PLAN;
 ELECTRICAL INSTALLATION**

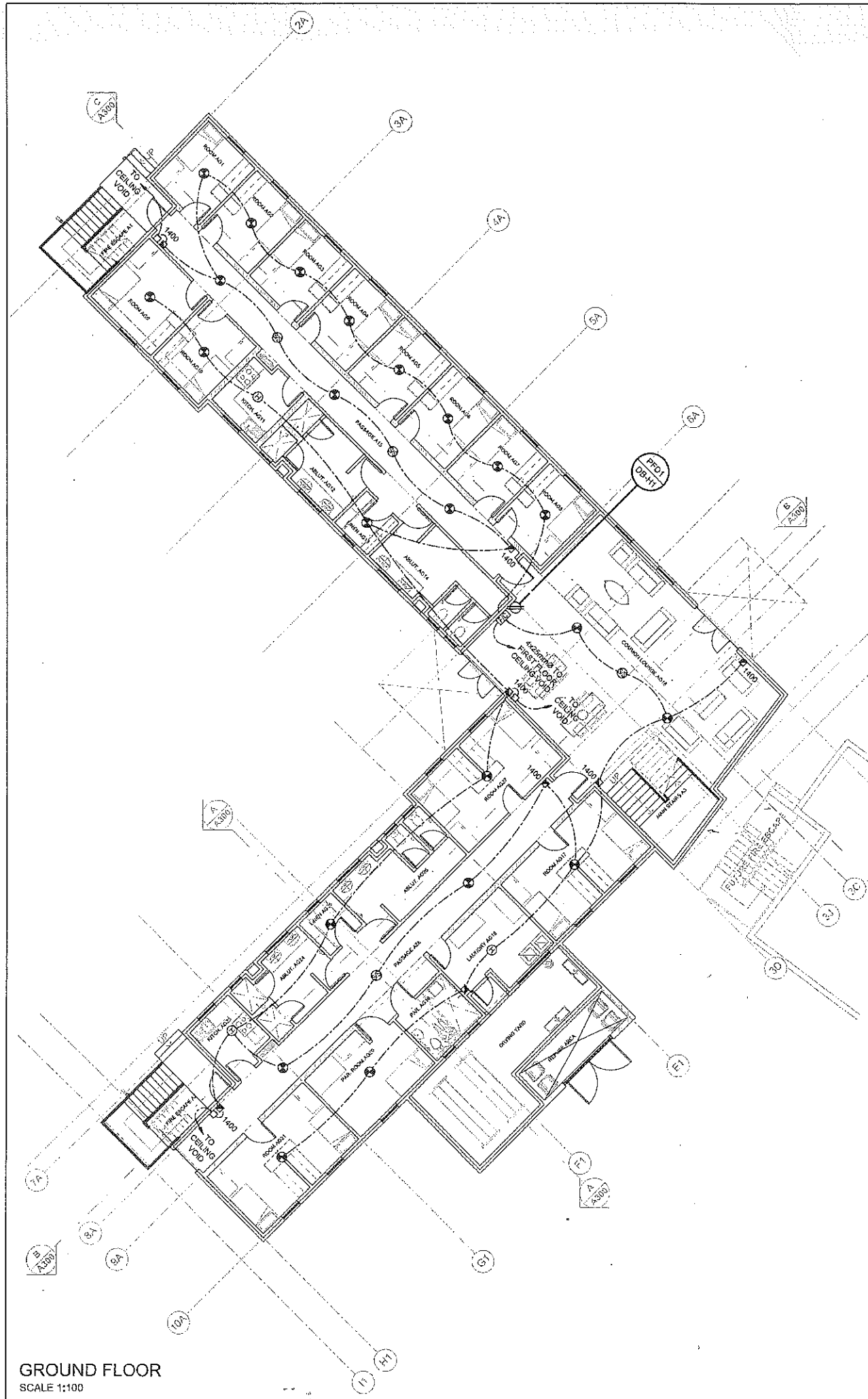
NO.	DATE	DESIGNER	CHKD.	APPR.	DATE	CHKD.
1	2021/01/26	PEV				

SCALE: 1:100 SHEET: A1 PROJECT: B1409/100/09

SECOND FLOOR PLAN
 SCALE 1:100

ROOF PLAN
 SCALE 1:100

0493



ELECTRICAL SYMBOLS

- ⊠ MANUAL CALL POINT (BREAK GLASS UNIT) (ROUND DRAWBOX AT 1400 AFFL WITH 1x25mm² CONDUIT TO CEILING VOID)
- DRAWBOX
- ⊠ FIRE CONTROL PANEL
- ⊕ SMOKE DETECTOR
- ⊕ VOID SMOKE DETECTOR
- ⊕ HEAT DETECTOR
- ⊕ SOUNDER / STROBE CONSISTING OF ROUND CONDUIT DRAWBOX
- ⊕ SINGLE PHASE OUTLET 30A DOUBLE POLE ISOLATOR

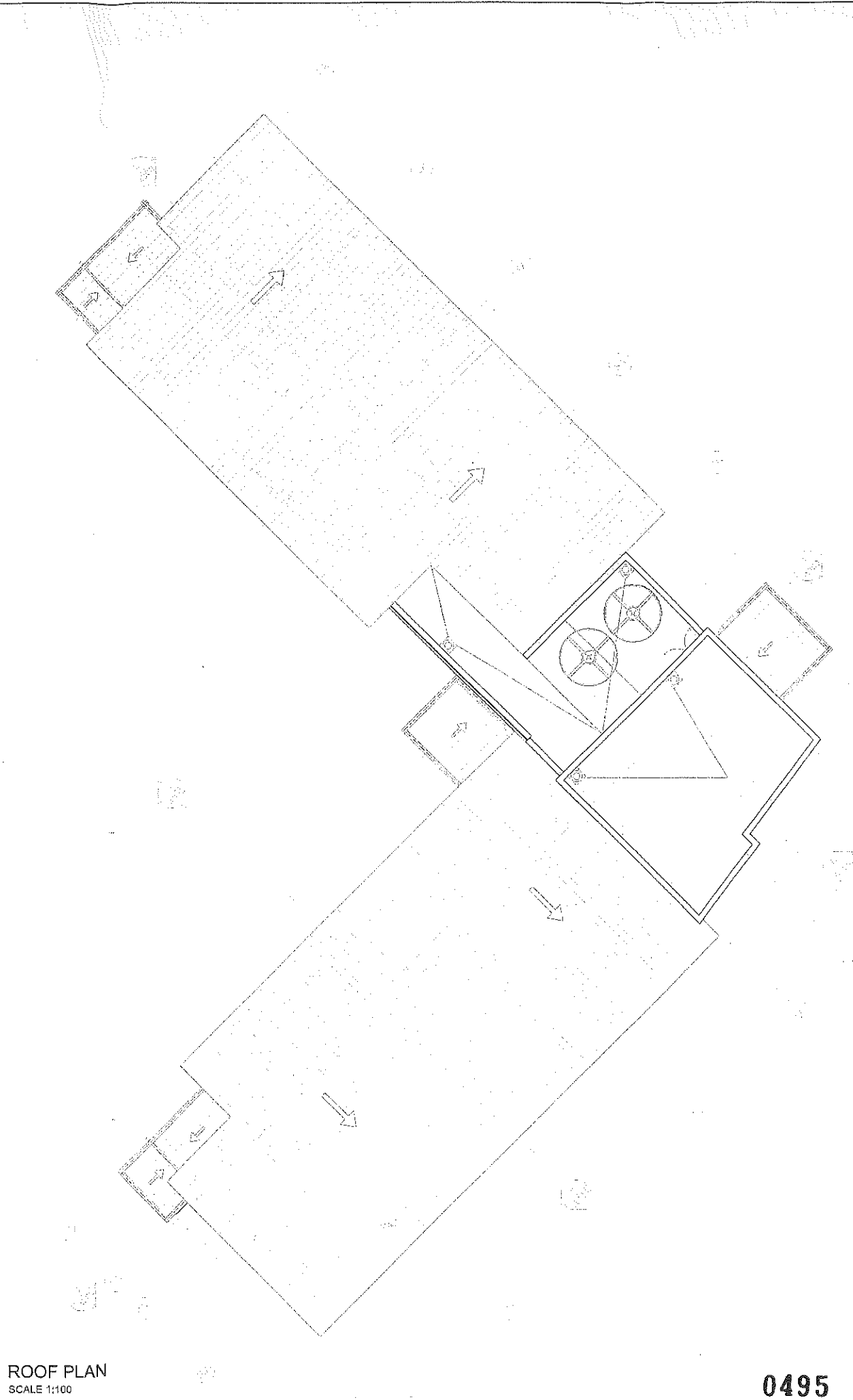
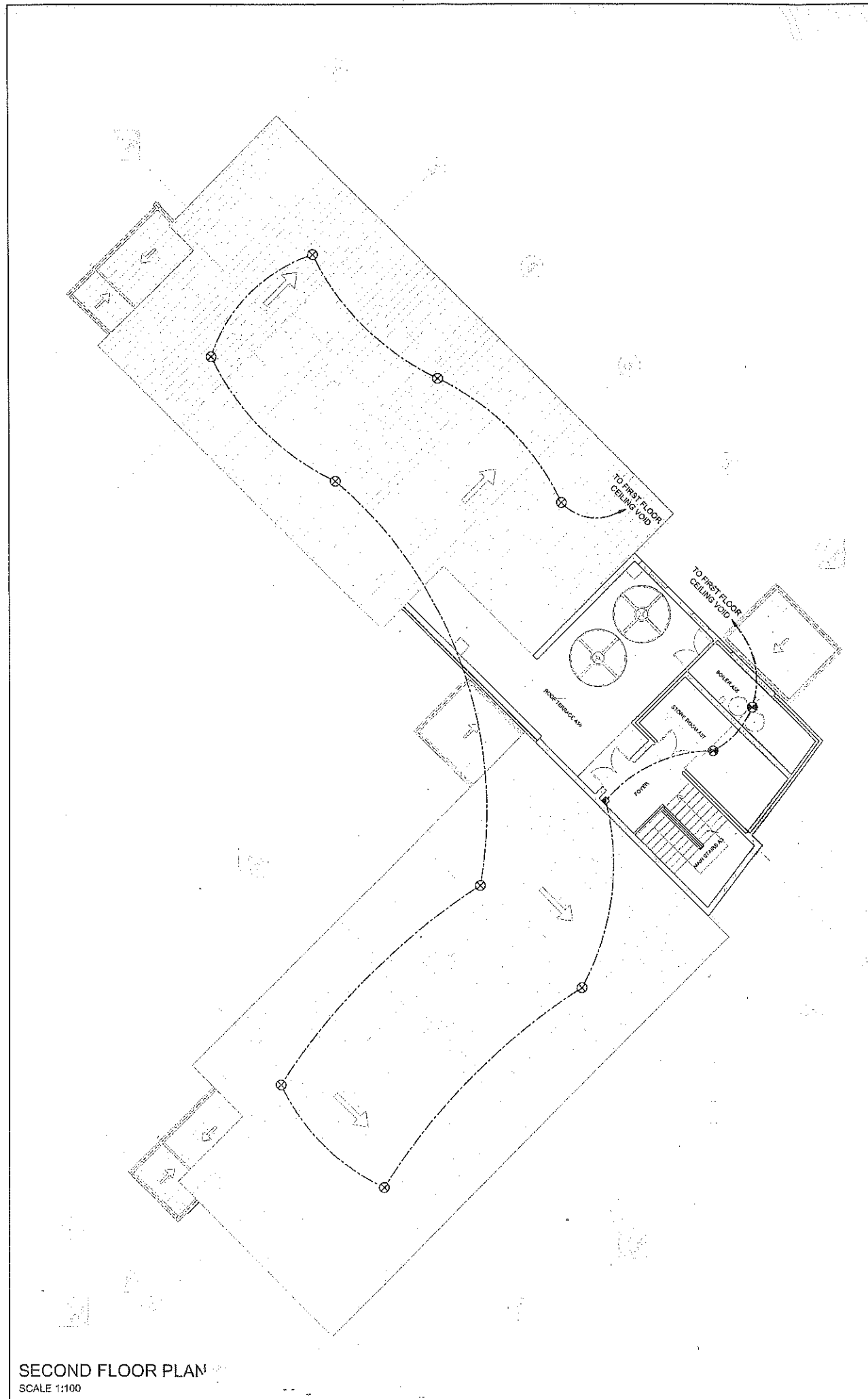
25mm² GALVANISED CONDUIT

DATE	NO.	RESKRYWING / DESCRIPTION	DRW.	APPR.
WYSIGINGS / AMENDMENTS				
NAW ENKELERS VAN ONTWERP/PASPOORT/VERBOD NAME AND ADDRESS OF CLIENT/CONTRACTANT PIENAAR & ERWEE Electrical Engineering Reg No: 2022 01016017				
21 NEETHLINGSTRAAT 3 NEETHLING STREET BENDOR, POLOKWANE 0899 +27 (0) 15 296 3097 info@pienaar.co.za			POSTNET SUITE 62 PRIVATE BAG 25876 POLOKWANE 0700	
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PROJECT / PROEKSIE: LIMPOPO TRAFFIC TRAINING COLLEGE				
TECHNIEK / ORIGIN: STUDENT RESIDENCE; BLOCK C; GROUND & FIRST FLOOR: ELECTRICAL INSTALLATION SMOKE DETECTION				
DRW.	ENK.	DEBETEKENING / PEV	GOV.	APPR.
M DE KOCK				
SCALE: 1:100	SIEDE: A1	TEKST: B1409/200/05	DRW. NO. REV.	DATE: 2021/01/26

GROUND FLOOR
SCALE 1:100

FIRST FLOOR
SCALE 1:100

0494



ELECTRICAL SYMBOLS

- MANUAL CALL POINT (BREAK GLASS UNIT)
(ROUND DRAWBOX AT 1400 AFFL WITH
1x25mmØ CONDUIT TO CEILING VOID)
- DRAWBOX
- ⊞ FIRE CONTROL PANEL
- ⊕ SMOKE DETECTOR
- ⊕ VOID SMOKE DETECTOR
- ⊕ HEAT DETECTOR
- ⊕ SOUNDER / STROBE CONSISTING
OF ROUND CONDUIT DRAWBOX
- ⊕ SINGLE PHASE OUTLET 30A
DOUBLE POLE ISOLATOR

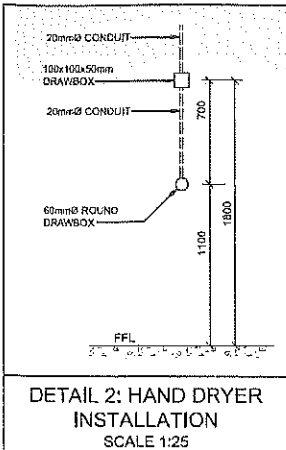
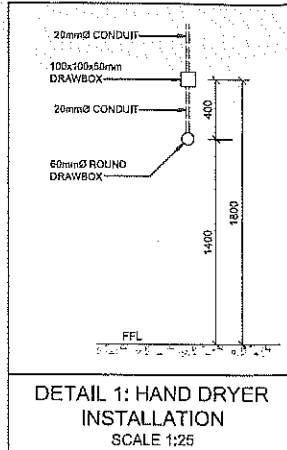
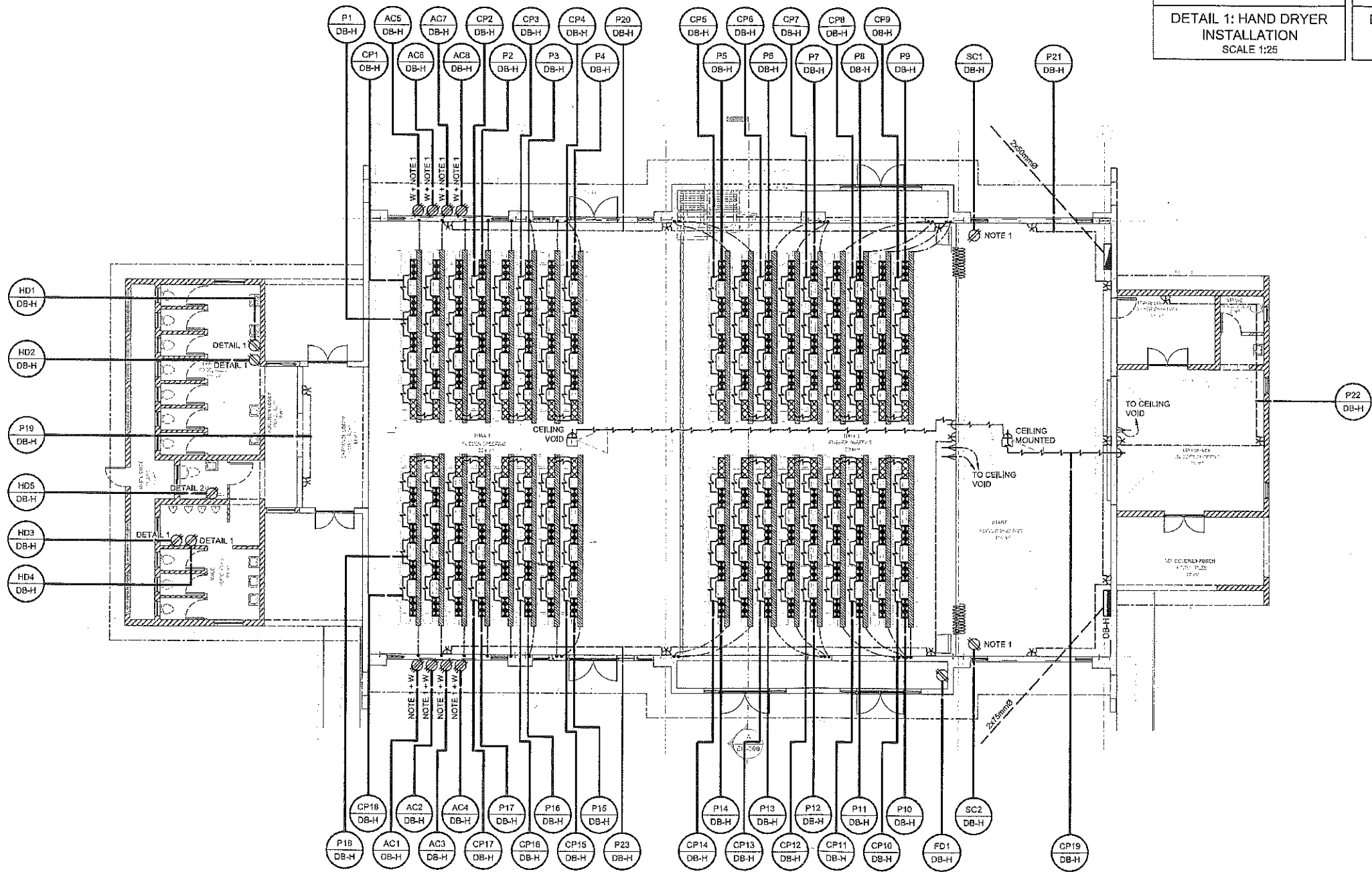
— 25mmØ GALVANISED CONDUIT

DATE DATUM	NO.	BESKRYWING / DESCRIPTION	OVD. APPR.
WYSIGINGS / AMENDMENTS			
<p>NAAM EN ADRES VAN ONTWERP-ENKELENIERS NAAM EN ADRES VAN OORSPRONKELIKE TUKHOUER</p> <p style="text-align: center;">PIENAAR & ERWEE ENGINEERS IN ARCHITECTURE, ELECTRICAL ENGINEERS Reg No 1433/01/26/07</p> <p> MEETHLINGSTRAAT 3 MEETHLING STREET POSTNET SUITE 52 BENDOR, POLOKWANE PRIVATE BAG 30075 0891 POLOKWANE +27 (0)15 296 3892 sales@pewp.co.za 0700 </p> <p><small>Copyright reserved by this drawing / ontwerp and no use or reproduction or distribution permitted without the written consent of the copyright holder. Copyright © 2020 by: PIENAAR & ERWEE ENGINEERS (Pty) Ltd</small></p>			
<p>PROJECT-PROEKT:</p> <p>LIMPOPO TRAFFIC TRAINING COLLEGE</p>			
<p>TEKENING-DRAWING:</p> <p>STUDENT RESIDENCE; BLOCK C; SECOND FLOOR & ROOF PLAN; ELECTRICAL INSTALLATION SMOKE DETECTION</p>			
ING. M DE KOCK	ENG. PEV	GETEKENDRAAIK PEV	OVD. APPR. DATA 2021/01/26
SKAAL 1:100	SCALE 1:100	BLAD A1	TEK.NR. ORIG.NR. REV. B1409/200/06

SECOND FLOOR PLAN
SCALE 1:100

ROOF PLAN
SCALE 1:100

0495



- ### ELECTRICAL SYMBOLS
- DISTRIBUTION BOARD
 - DATA DISTRIBUTION BOARD
 - LINEAR LIGHT FITTING
 - RECESSED LIGHT FITTING
 - DOWN LIGHT FITTING
 - WALL MOUNTED LIGHT FITTING
 - LIGHT SWITCH
 - TWO WAY LIGHT SWITCH
 - DRAWBOX
 - TELEPHONE OUTLET
 - DATA OUTLET
 - 1x 16A CONVENTIONAL SSO (SANS 164-1)
1x 16A IEC SOCKET OUTLET (SANS 164-2)
 - 2x 16A CONVENTIONAL SSO (SANS 164-1)
2x 16A IEC SSO (SANS 164-2)
 - 16A CONVENTIONAL DOUBLE SWITCHED SOCKET OUTLET (SANS 164-1)
 - 16A DEDICATED SWITCHED SOCKET OUTLET (SANS 164-4)
 - SINGLE PHASE OUTLET 30A DOUBLE POLE ISOLATOR
 - THREE PHASE OUTLET 30A THREE POLE ISOLATOR
 - 100x50x50 DRAWBOX BEHIND POWERSKIRTING WITH 2x25mm CONDUIT TO WIRE MESH BASKET (DATA/TEL)
 - 100x50x50 DRAWBOX BEHIND POWERSKIRTING WITH 2x25mm CONDUIT TO WIRE TRUNKING (POWER)
 - CLUSTER INSTALLED ON POWERSKIRTING COMPLETE WITH:
3x 16A CONVENTIONAL SSO (SANS 164-1),
3x 16A IEC SSO (SANS 164-2),
3x 16A DEDICATED SSO (SANS 164-4)
 - CLUSTER INSTALLED ON POWERSKIRTING COMPLETE WITH:
2x 16A CONVENTIONAL SSO (SANS 164-1),
2x 16A IEC SSO (SANS 164-2),
2x 16A DEDICATED SSO (SANS 164-4)
 - CONDUIT
 - INDICATES SWITCHING
 - INDICATES CIRCUIT
 - SLEEVE PIPES
 - INDICATES DEDICATED CIRCUIT
 - 2 COMPARTMENT POWERSKIRTING
 - 41mmx41mm WIRING TRUNKING
 - 300mm WIDE WIRE MESH BASKET
 - L1 DB-X CIRCUIT INDICATOR

ELECTRICAL NOTES:
1. FINAL POSITION OF OUTLET TO BE CONFIRMED BY OTHERS

DATE	NO.	DESCRIPTION / AMENDMENT	GRD. APPR.

WYSIGINGS / AMENDMENTS

NAME AND ADDRESS OF CLIENT/PROJECT/CLIENT
PIENAAR & ERWEE
 ENGINEERS IN ELECTRICAL ENGINEERING
 Reg No 2003/0126/01

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 +27 (0)151 290 2092 a.enk@peyrg.co.za FOLCKWANE 0799

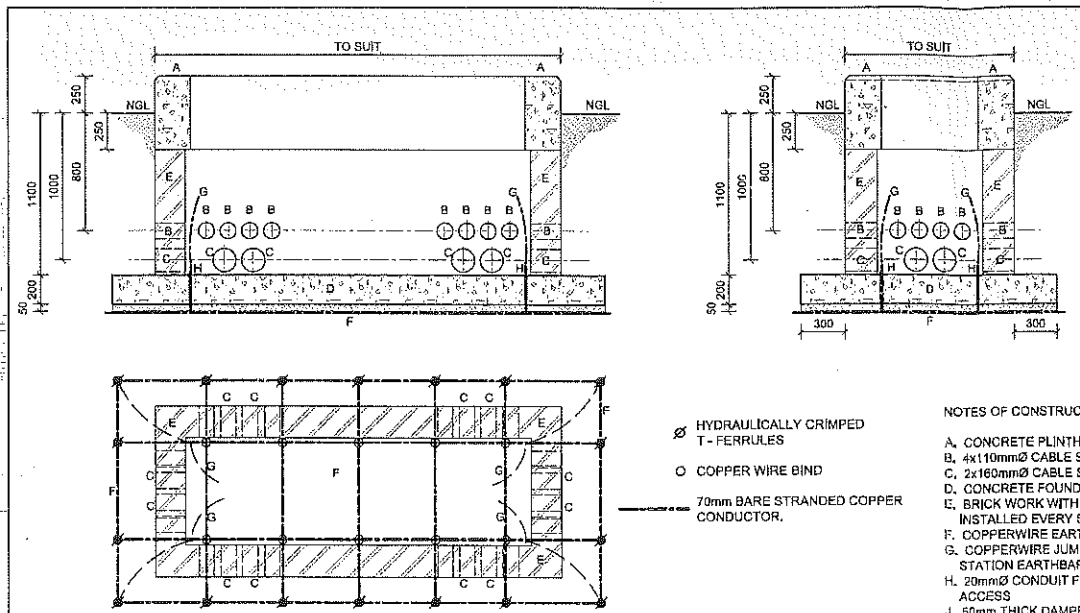
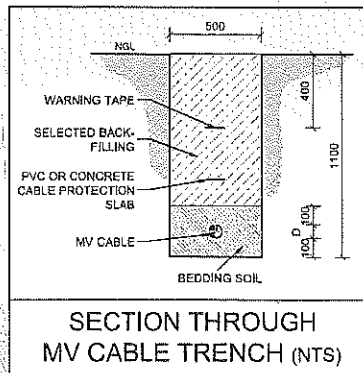
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PROJECT PROJECT
LIMPOPO TRAFFIC TRAINING COLLEGE

TERMINUS/DIENNA
**EXISTING HALL RENOVATIONS;
 GROUND FLOOR;
 ELECTRICAL INSTALLATION;
 POWER, TEL & DATA LAYOUT**

NO.	ENG.	GETEKENDE/DRYV	GRD.	PRJ.	DATUM	DATE

NO.	SCALE	REV.	TECHN.	DRWG. NO. / REV.

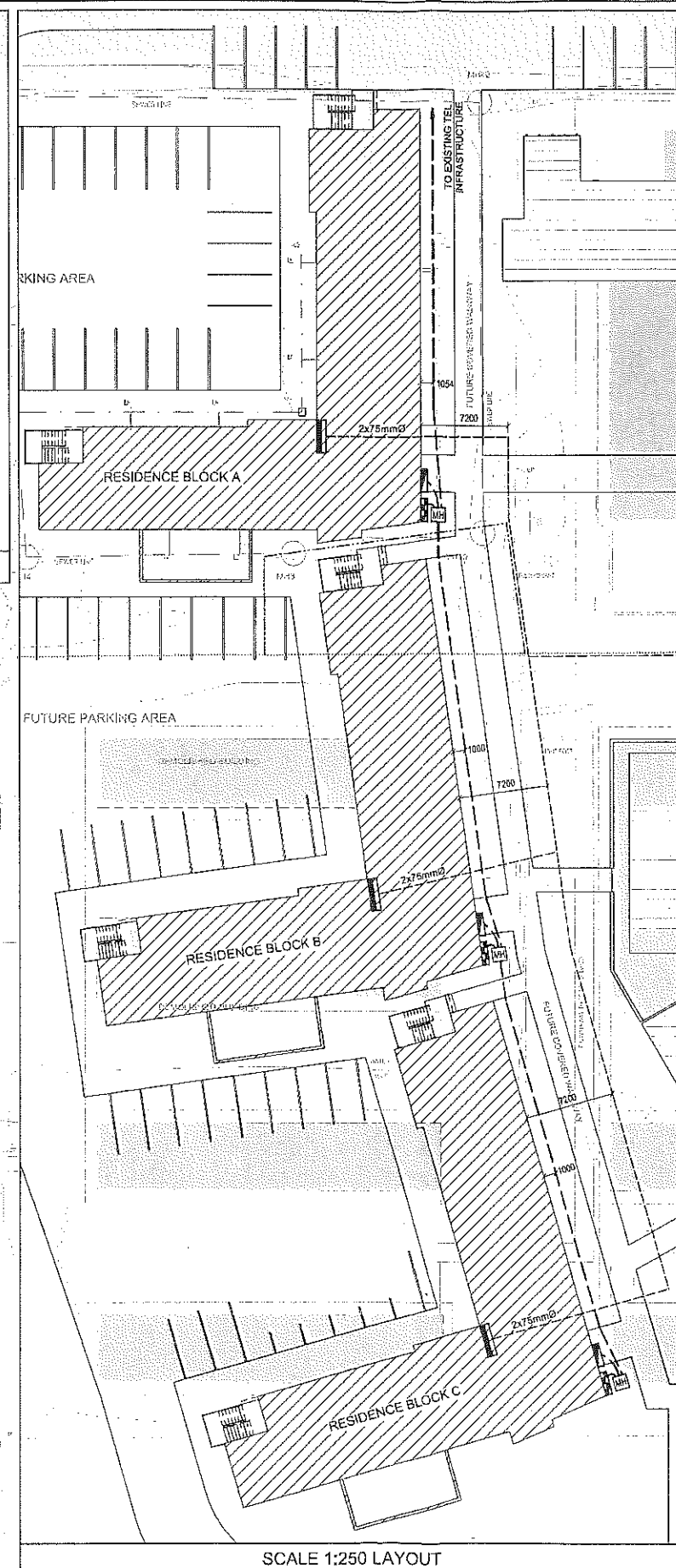
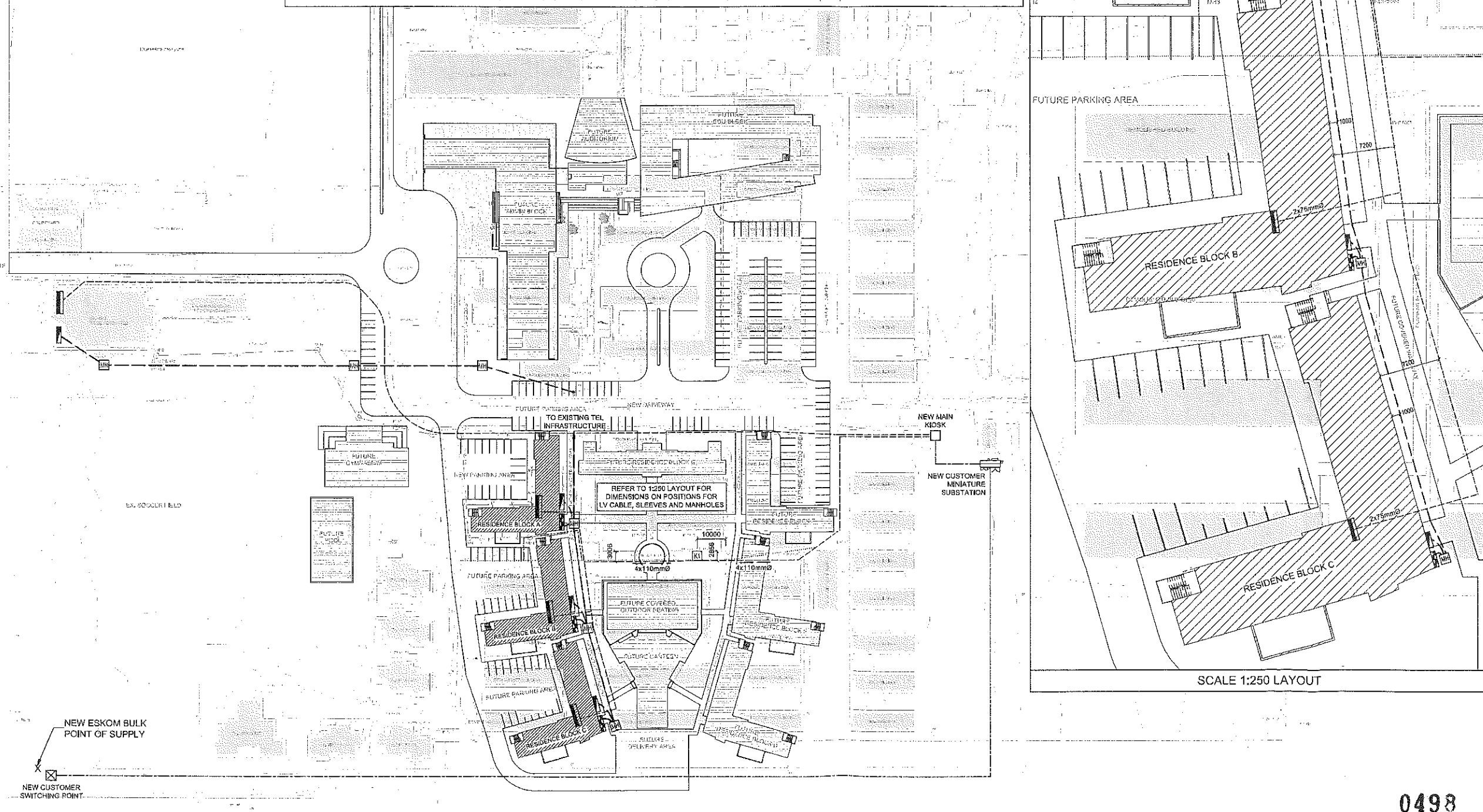


NOTE 1: ONLY PRECAST PLINTH BY SALBERG OR EQUAL AND APPROVED BEFORE TENDER CLOSING WILL BE ACCEPTED

- NOTES OF CONSTRUCTION
- A. CONCRETE PLINTH (NOTE 1).
 - B. 4x110mm² CABLE SLEEVES.
 - C. 2x160mm² CABLE SLEEVES.
 - D. CONCRETE FOUNDATION 200mm THICK.
 - E. BRICK WORK WITH BRICK FORCE INSTALLED EVERY SECOND LAYER.
 - F. COPPERWIRE EARTH MAT (70mm).
 - G. COPPERWIRE JUMPERS TO MINIATURE SUBSTATION EARTHBAR. (70mm)
 - H. 20mm² CONDUIT FOR COPPER WIRE JUMPER ACCESS
 - J. 50mm THICK DAMPENED COMPACTED SOIL
- ∅ HYDRAULICALLY CRIMPED T-FERRULES
 ○ COPPER WIRE BIND
 --- 70mm BARE STRANDED COPPER CONDUCTOR.

ELECTRICAL SYMBOLS

	TELEPHONE DISTRIBUTION BOARD
	DISTRIBUTION BOARD
	DATA DISTRIBUTION BOARD
	MANHOLE
	KIOSK
	RING MAIN UNIT
	MINIATURE SUBSTATION
	NEW LV CABLE ROUTE
	MV CABLE ROUTE
	PROPOSED ROUTE FOR SECTION OF EXISTING LV CABLE
	EXISTING LV CABLE ROUTE
	SLEEVE PIPES



SCALE 1:250 LAYOUT

28/01/2021	C	RESIDENCE BLOCK C AND HALL RENOVATIONS ADDED	
09/09/2020	B	TEL & ELECTRICAL REVISED	
27/08/2019	A	LAYOUT REVISED & DETAILS ADDED	
DATE	NO.	DESCRIPTION	OND. APPR.

WYSIGINGS / AMENDMENTS

NAME AND ADDRESS OF CLIENT CONSULTANT

PIENAAR & ERWEE
 Electrical Engineers
 Reg No. 2015/074207

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POSTNET SUITE 02
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 POLKOWANE
 6000

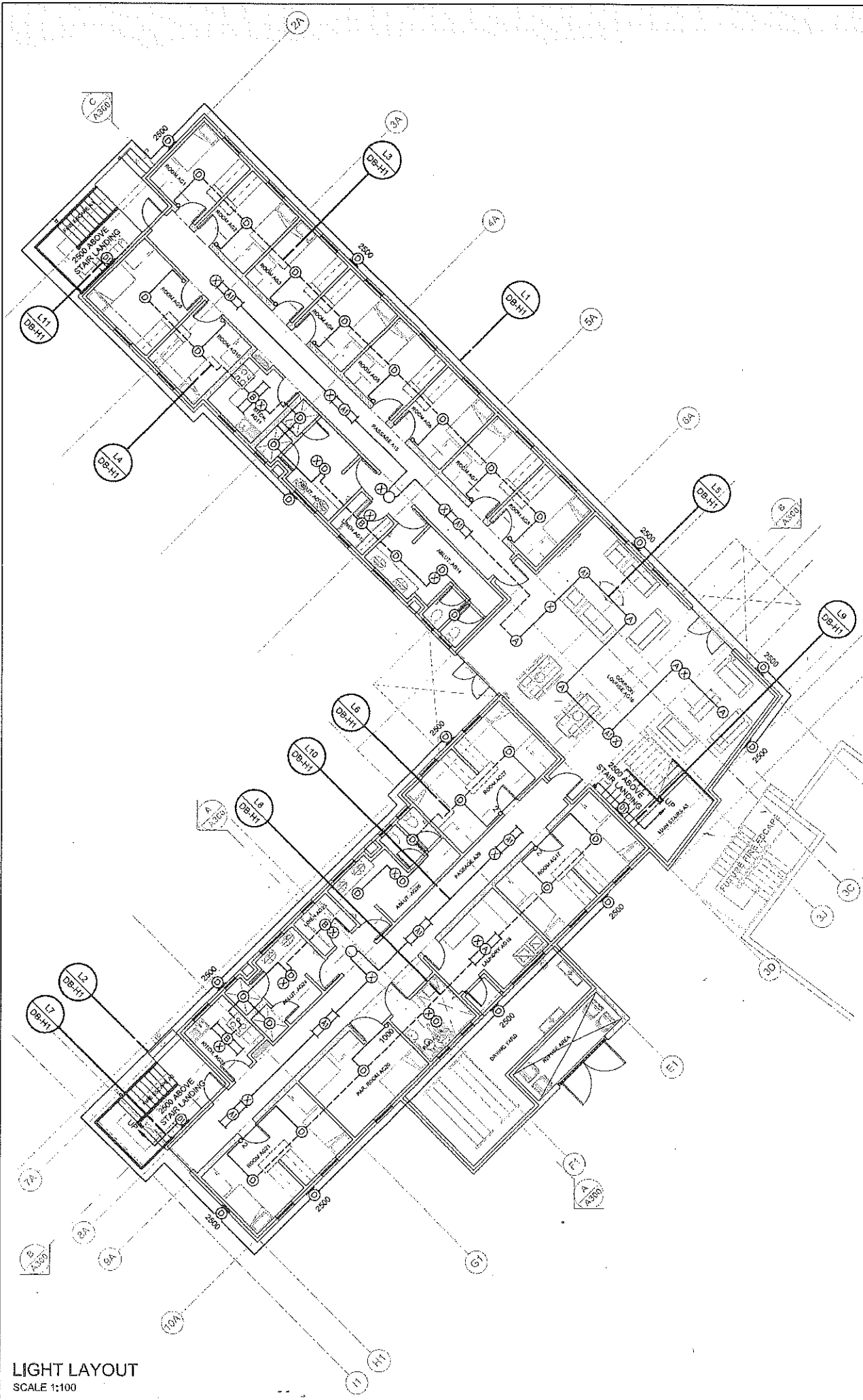
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PROJECT: LIMPOPO TRAFFIC TRAINING COLLEGE

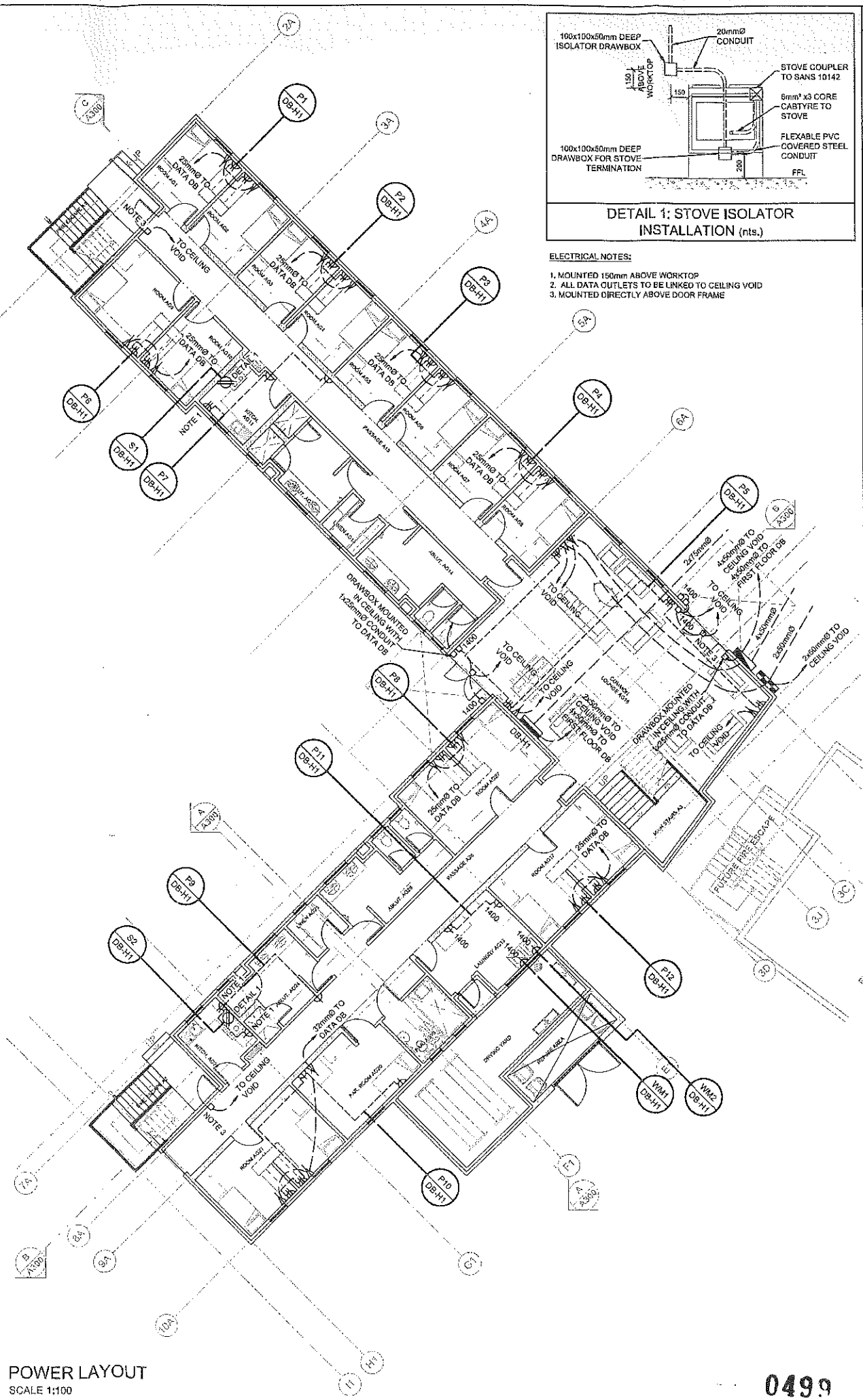
TITLE: SITE PLAN: ELECTRICAL & TELECOMMUNICATION RETICULATION

DR: M DE KOCK	ENG: PEV	DATE: 03/05/2018	SCALE: 1:750	SIZE: A1	NO: B1409/01/01	REV: C
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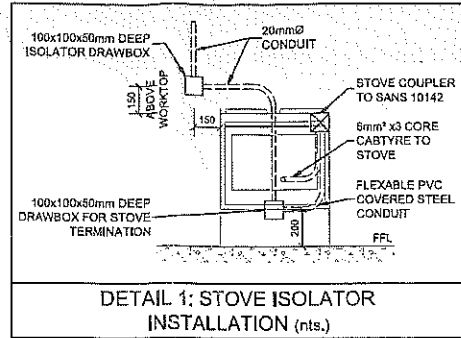
0498



LIGHT LAYOUT
SCALE 1:100



POWER LAYOUT
SCALE 1:100



ELECTRICAL NOTES:
1. MOUNTED 150mm ABOVE WORKTOP
2. ALL DATA OUTLETS TO BE LINKED TO CEILING VOID
3. MOUNTED DIRECTLY ABOVE DOOR FRAME

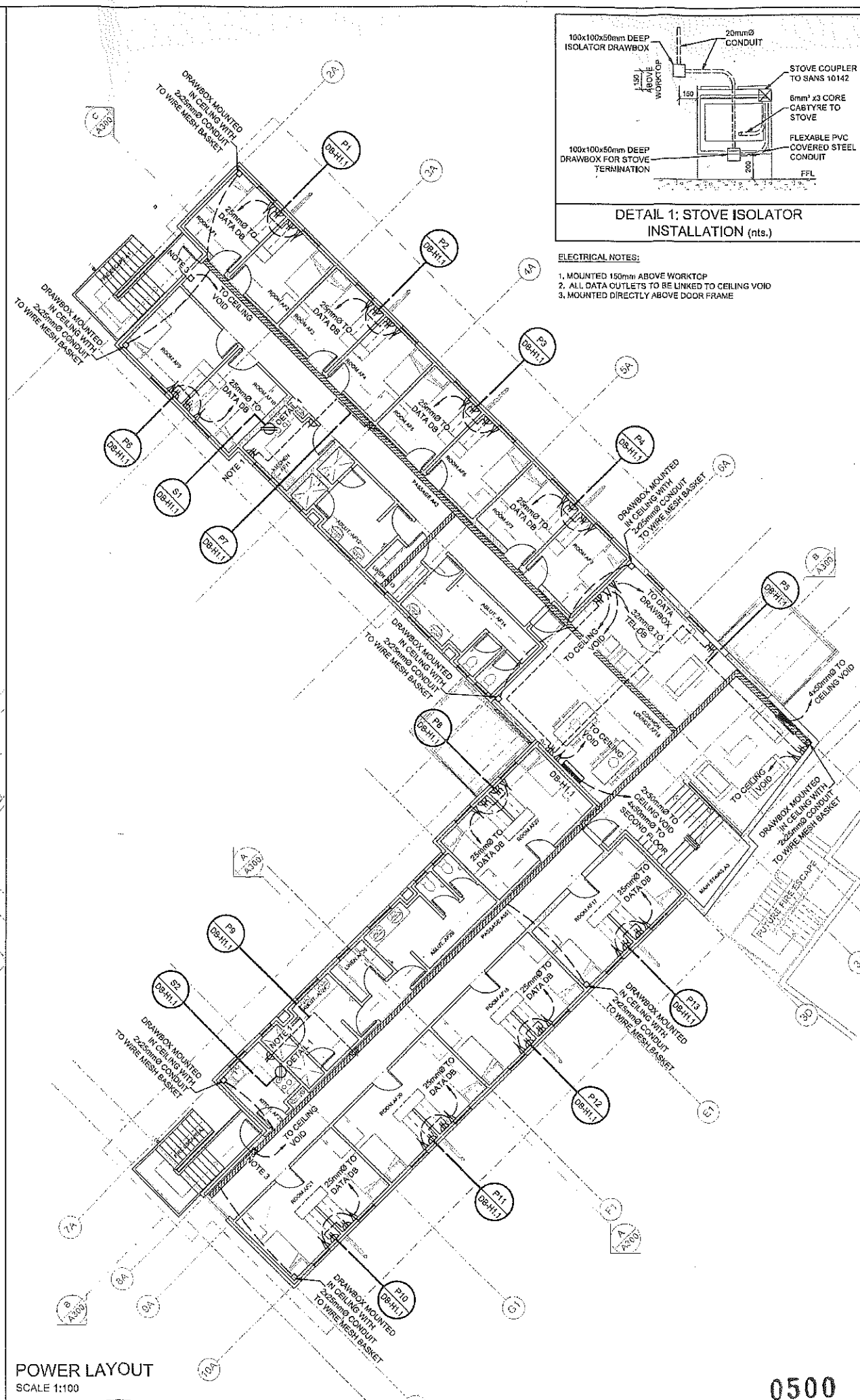
ELECTRICAL SYMBOLS	
	DATA DISTRIBUTION BOARD
	DISTRIBUTION BOARD
	TELEPHONE DISTRIBUTION BOARD
	FLUORESCENT LIGHT FITTING
	RECESSED FLUORESCENT
	BULKHEAD LIGHT FITTING
	WALL MOUNTED LIGHT FITTING
	LIGHT SWITCH
	TWO WAY LIGHT SWITCH
	DRAWBOX
	TELEPHONE OUTLET
	DATA OUTLET POINT
	TV ANTENNA OUTLET
	15A 3 PIN SSO
	15A 3 PIN DOUBLE SSO
	15A 3 PIN DEDICATED SSO
	POWER POLE
	SINGLE PHASE OUTLET 30A
	DOUBLE POLE ISOLATOR
	THREE PHASE OUTLET 30A
	DOUBLE POLE ISOLATOR
	INDICATES DEDICATED CIRCUIT
	INDICATES SWITCHING
	INDICATES CIRCUIT
	SLEEVE PIPE
	CIRCUIT INDICATOR

DATE	NL	REVISION / DESCRIPTION	GD.
WYSIGINGS / AMENDMENTS			
<p>NAAM EN ADRES VAN ONTWERP- en TOEWIJZINGEN NAAM EN ADRES VAN OORSPRONKELIK AANDRAGER</p> <p>PIENAAR & ERWEE REGISTERED ELECTRICAL ENGINEERS REG. NO. 2003/010248/07</p> <p>CESA REGISTERED ELECTRICAL ENGINEERS REG. NO. 2003/010248/07</p> <p>NEETHLINGSTRAAT 3 NEETHLING STREET POSTNET SUITE 52 BENONI, POLKOVANE PRIVATE BAG X0676 127 (011) 294 3042 edr@pienaar.co.za POLKOVANE 0700</p> <p><small>*Copyright vests in the drawing / document and no use or reproduction of this document without the written approval of the copyright holder. Copyright © 2020 by PIENAAR & ERWEE ENGINEERS (Pty) Ltd</small></p>			
PROJECT / PROJECT:			
LIMPOPO TRAFFIC TRAINING COLLEGE			
TEKENING / DRAWING:			
STUDENT RESIDENCE; BLOCK C; GROUND FLOOR: ELECTRICAL INSTALLATION			
TEK.	ONTW.	TOEGESTEMPT	GOED. AFGEK.
M DE KOCK	PEV		2021/01/28
SKALA	SKALA	BLAD	TEK. NO.
1:100	A1	B1409/100/07	

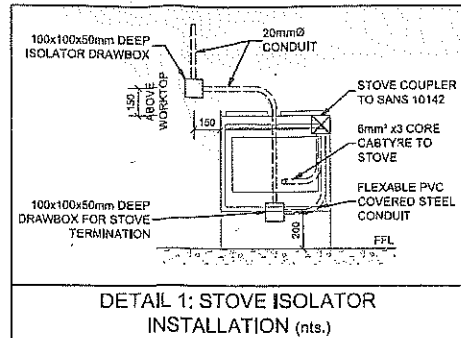
0499



LIGHT LAYOUT
SCALE 1:100



POWER LAYOUT
SCALE 1:100



ELECTRICAL NOTES:
 1. MOUNTED 150mm ABOVE WORKTOP
 2. ALL DATA OUTLETS TO BE LINKED TO CEILING VOID
 3. MOUNTED DIRECTLY ABOVE DOOR FRAME

ELECTRICAL SYMBOLS	
	DATA DISTRIBUTION BOARD
	DISTRIBUTION BOARD
	TELEPHONE DISTRIBUTION BOARD
	FLUORESCENT LIGHT FITTING
	RECESSED FLUORESCENT
	BULKHEAD LIGHT FITTING
	WALL MOUNTED LIGHT FITTING
	LIGHT SWITCH
	TWO WAY LIGHT SWITCH
	DRAWBOX
	TELEPHONE OUTLET
	DATA OUTLET POINT
	TV ANTENNA OUTLET
	15A 3 PIN SSO
	15A 3 PIN DOUBLE SSO
	15A 3 PIN DEDICATED SSO
	POWER POLE
	SINGLE PHASE OUTLET 30A DOUBLE POLE ISOLATOR
	THREE PHASE OUTLET 30A DOUBLE POLE ISOLATOR
	INDICATES DEDICATED CIRCUIT
	INDICATES SWITCHING
	INDICATES CIRCUIT
	110mm SLEEVE PIPE
	CIRCUIT INDICATOR
	200mm WIDE WIRE MESH BASKET

DATE	NO.	REVISION / DESCRIPTION	BY	APP'D.

WYSIGINGS / AMENDMENTS

NAME AND ADDRESS OF CLIENT/CLIENTS/CLIENTS
PIENAAR & ERWEE
 ENGINEERS AND ARCHITECTS
 REG. NO. 2003/01248/D

NAME AND ADDRESS OF ENGINEER/ARCHITECT
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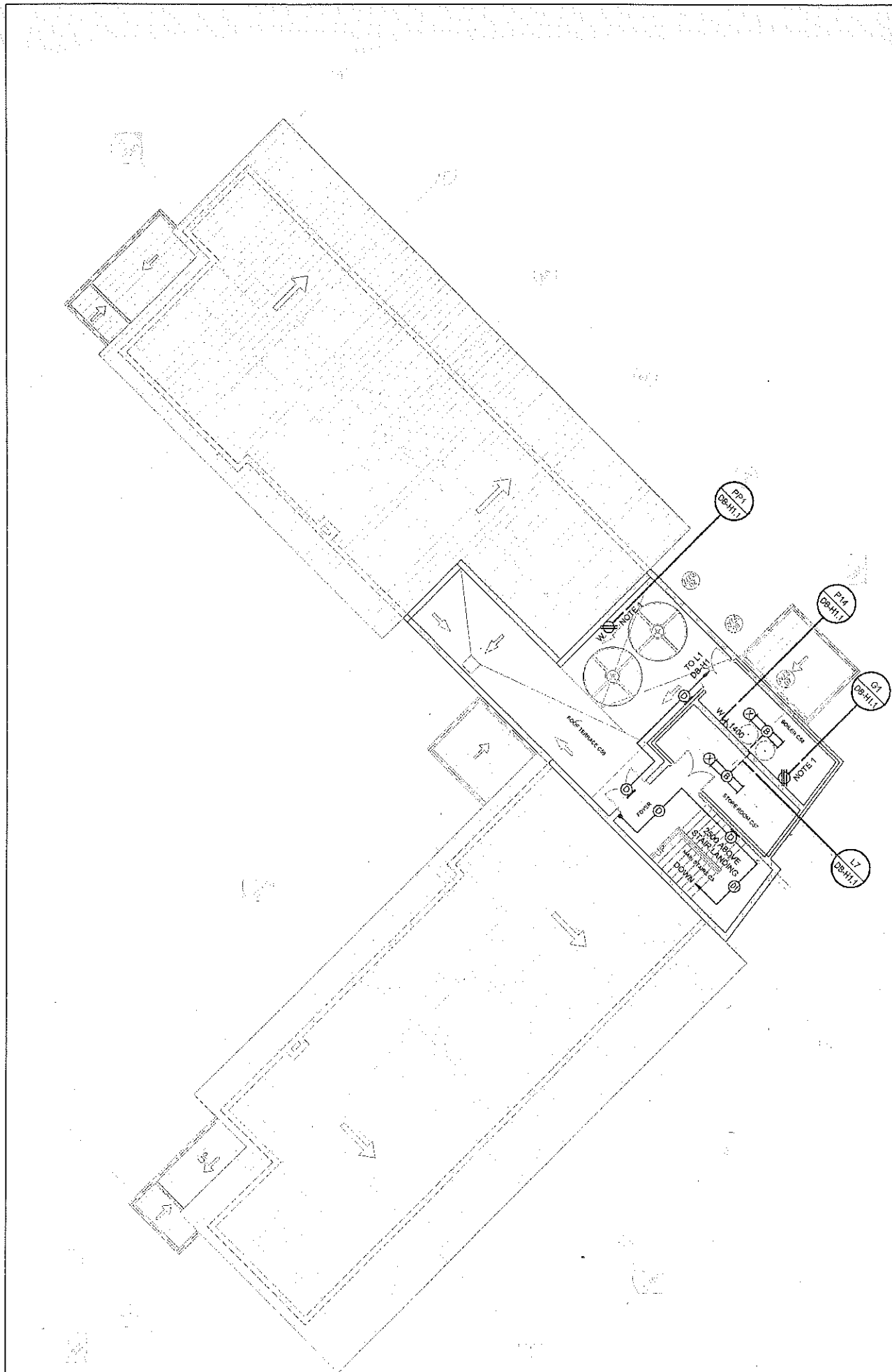
PROJECT: **LIMPOPO TRAFFIC TRAINING COLLEGE**

TECHNICAL DRAWING: **STUDENT RESIDENCE; BLOCK C; FIRST FLOOR; ELECTRICAL INSTALLATION**

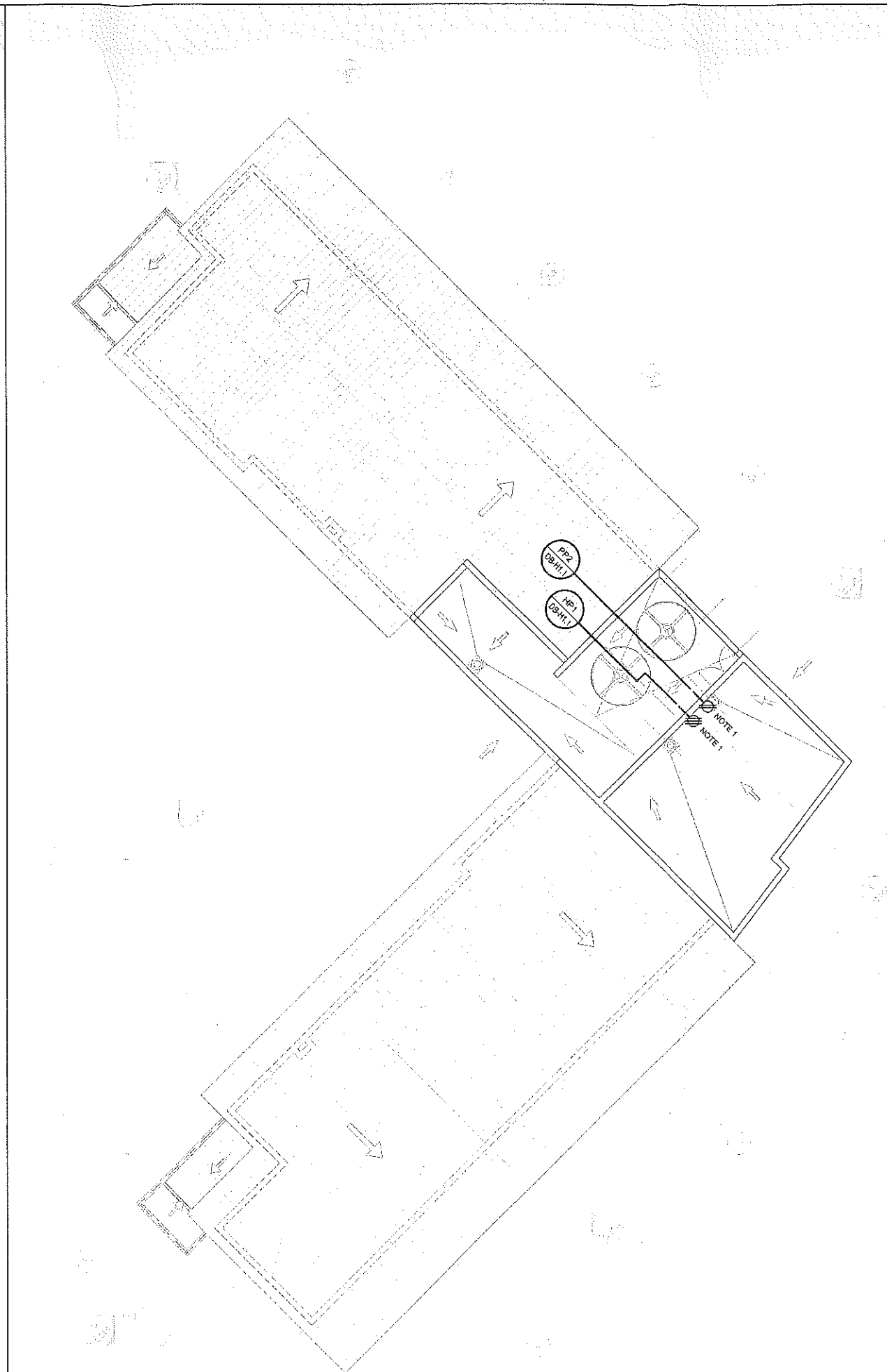
NO.	REV.	DATE	BY	APP'D.	DATE
1	1	2021/01/25	M DE KOCK	PEV	2021/01/25

SCALE: 1:100 SHEET: A1 PROJECT: B1409/100/08

0500



SECOND FLOOR PLAN
SCALE 1:100



ROOF PLAN
SCALE 1:100

ELECTRICAL SYMBOLS

- DATA DISTRIBUTION BOARD
- DISTRIBUTION BOARD
- TELEPHONE DISTRIBUTION BOARD
- FLUORESCENT LIGHT FITTING
- RECESSED FLUORESCENT
- BULKHEAD LIGHT FITTING
- WALL MOUNTED LIGHT FITTING
- LIGHT SWITCH
- TWO WAY LIGHT SWITCH
- DRAWBOX
- TELEPHONE OUTLET
- DATA OUTLET POINT
- TV ANTENNA OUTLET
- 15A 3 PIN SSO
- 15A 3 PIN DOUBLE SSO
- 15A 3 PIN DEDICATED SSO
- POWER POLE
- SINGLE PHASE OUTLET 30A DOUBLE POLE ISOLATOR
- THREE PHASE OUTLET 30A DOUBLE POLE ISOLATOR
- INDICATES DEDICATED CIRCUIT
- INDICATES SWITCHING
- INDICATES CIRCUIT
- 110mm Ø SLEEVE PIPE
- L6 DB-F CIRCUIT INDICATOR
- 76mm X 76mm WIRE TRUNKING

ELECTRICAL NOTES:

1. FINAL POSITION OF OUTLET TO BE CONFIRMED BY OTHERS

DATE	NO.	BEWYSYNG / DESCRIPTION	GRD. AMPTR.
WYSIGINGS / AMENDMENTS			

NAAM EN ADRES VAN ONTWERP- / OORWAGINGS- ENKELE
NAME AND ADDRESS OF DESIGNER / CONSULTANT

PIENAAR & ERWEE
Electrical Engineering
Reg. No. 2500-01248-02

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POLKOVANE 0700

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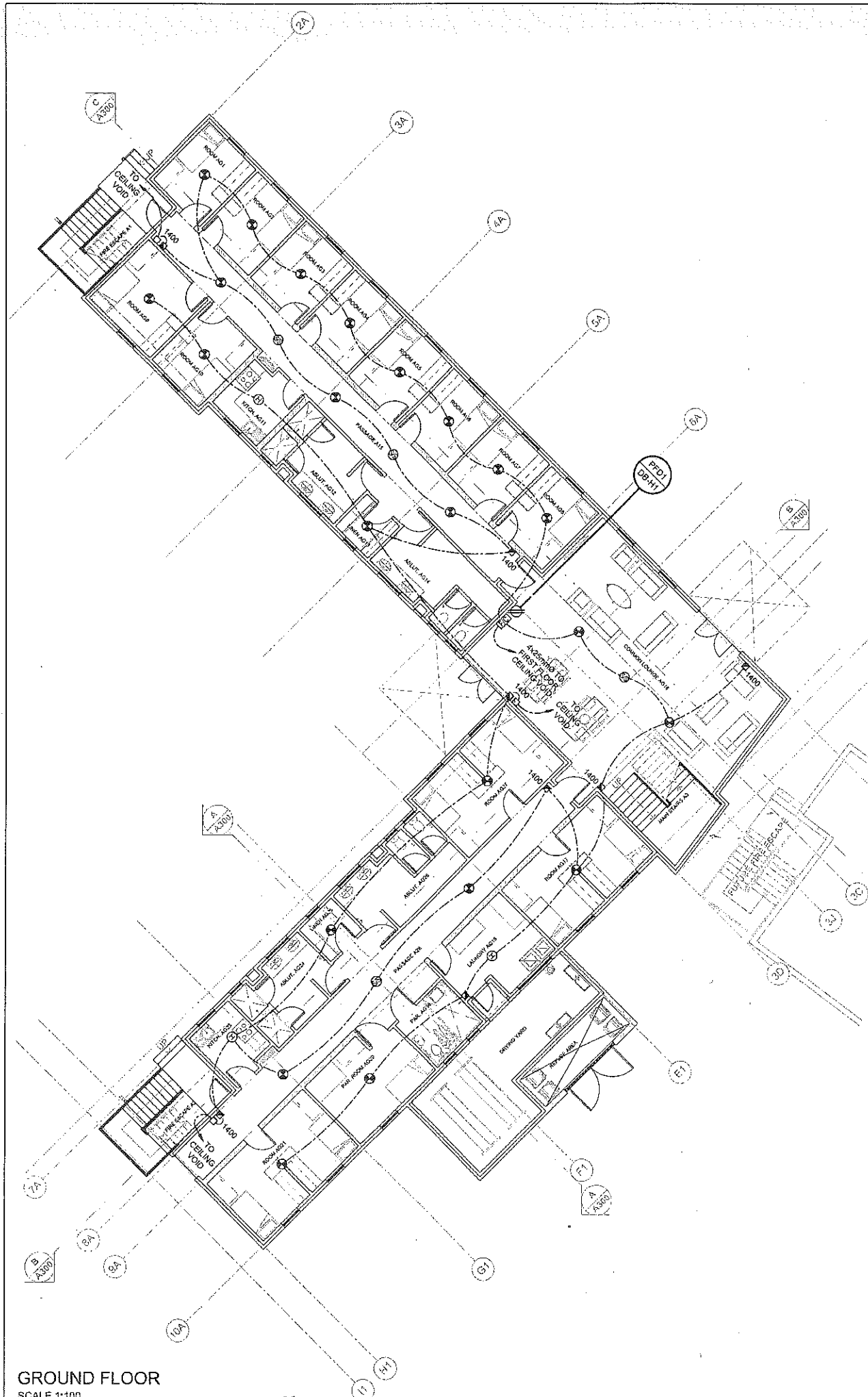
PROJECT: LIMPOPO TRAFFIC TRAINING COLLEGE

DRAWING: STUDENT RESIDENCE; BLOCK C; SECOND FLOOR & ROOF PLAN; ELECTRICAL INSTALLATION

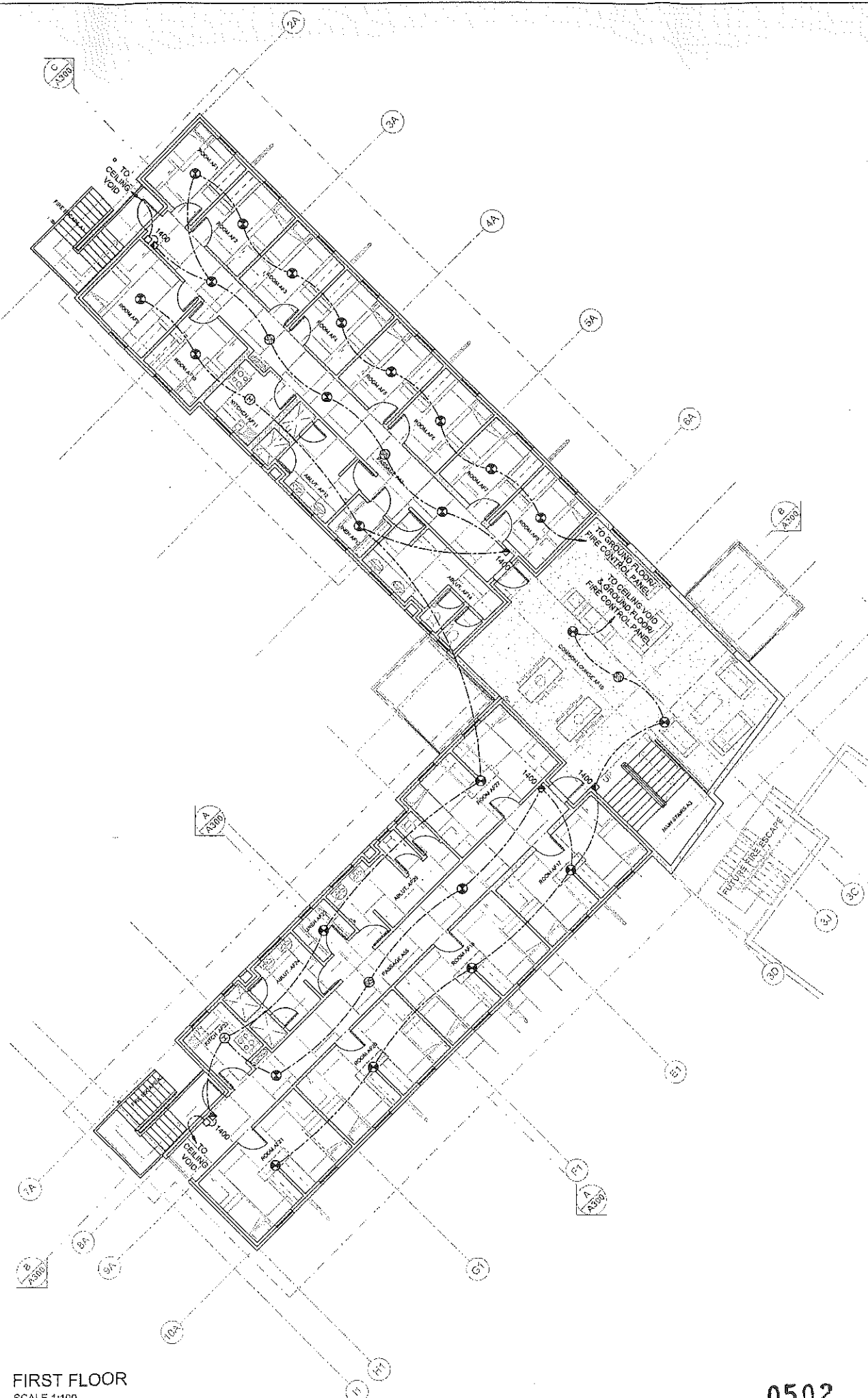
EC	DR	TEKENSKRIFTER	GOE	PROJ	DIEN	DATE
M DE KOCK	PEV					2021/01/26

DRAW	SCALE	SIZE	TEC.NR.	DRWG. NO.	REV.
1:100	A1		B1409/100/09		

0501



GROUND FLOOR
SCALE 1:100



FIRST FLOOR
SCALE 1:100

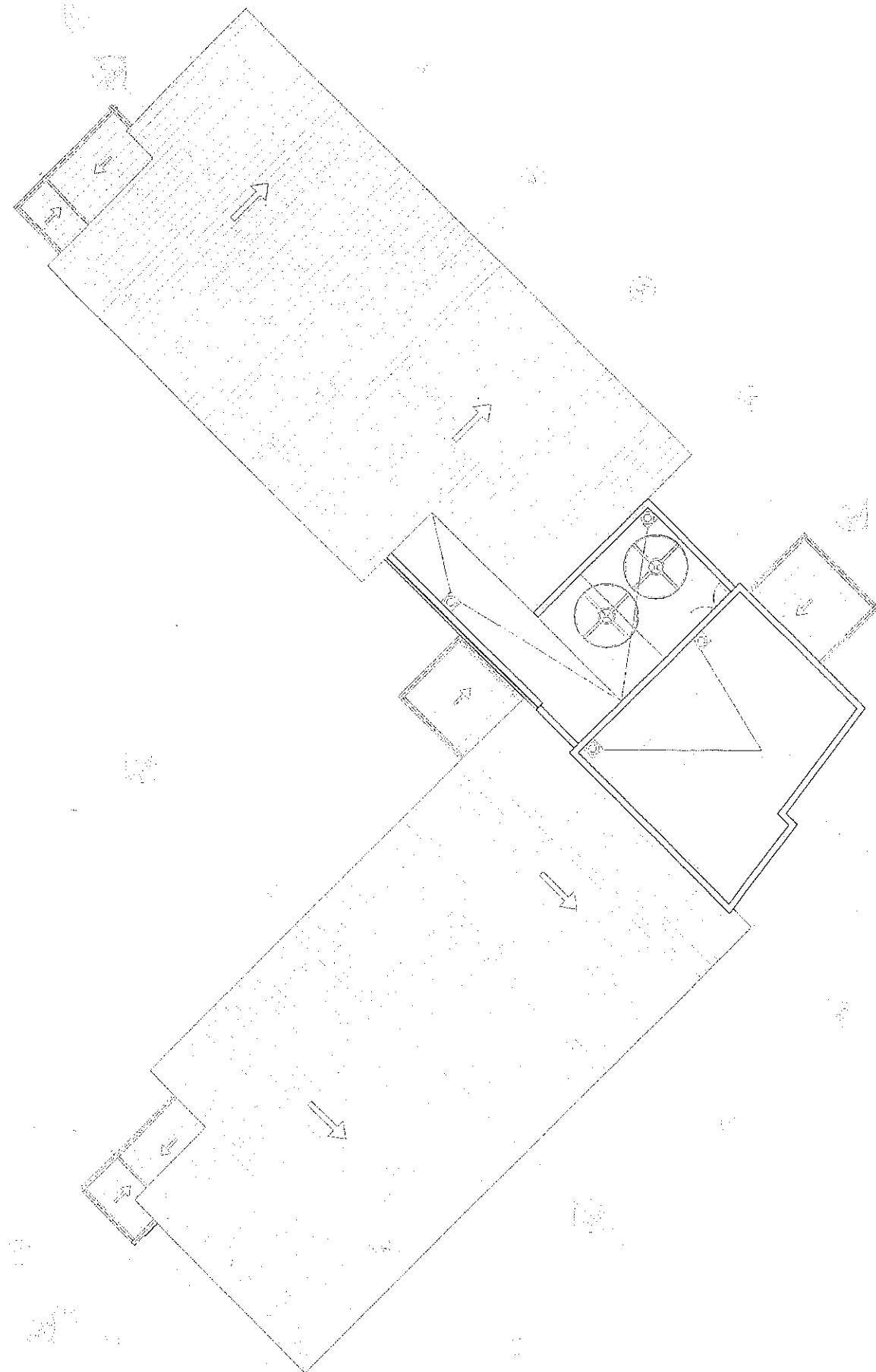
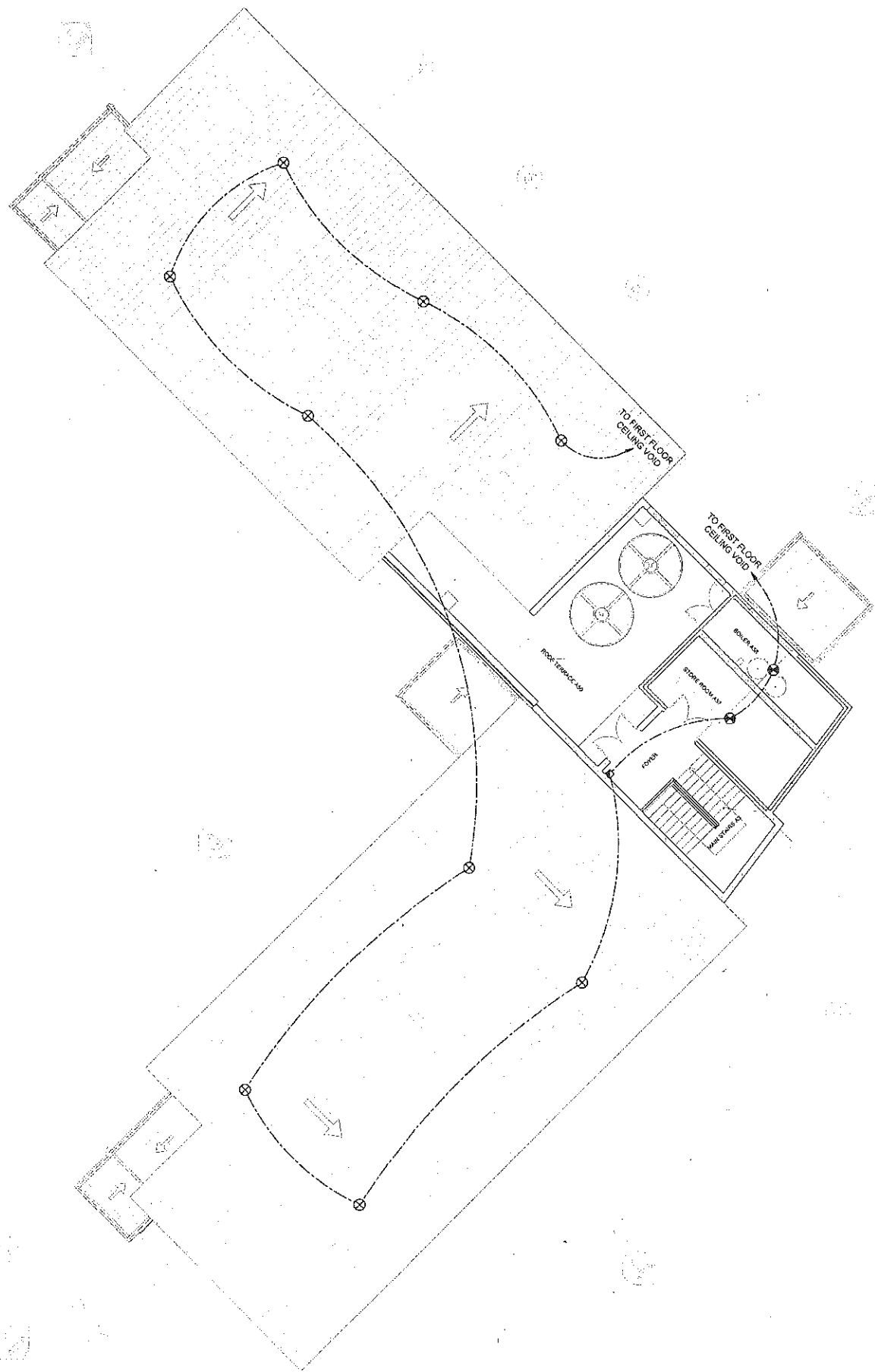
ELECTRICAL SYMBOLS

- ⊠ MANUAL CALL POINT (BREAK GLASS UNIT)
(ROUND DRAWBOX AT 1400 AFFL WITH
1x25mmØ CONDUIT TO CEILING VOID)
- DRAWBOX
- ⊠ FIRE CONTROL PANEL
- ⊙ SMOKE DETECTOR
- ⊕ VOID SMOKE DETECTOR
- ⊙ HEAT DETECTOR
- ⊕ SOUNDER / STROBE CONSISTING
OF ROUND CONDUIT DRAWBOX
- ⊙ SINGLE PHASE OUTLET 30A
- ⊕ DOUBLE POLE ISOLATOR

----- 25mmØ GALVANISED CONDUIT

DATE	NO.	DESCRIPTION / DESCRIPTION	CHKD.
WYSIGINGS / AMENDMENTS			
<p>NAME AND ADDRESS OF DESIGN-CORPORATION/TAKINGST</p> <p style="text-align: center;">PIENAAR & ERWEE S.A. (INCORPORATED IN SOUTH AFRICA) REGISTERED ELECTRICAL ENGINEERS Reg. No. 21837/UC/2014/07</p> <p> 11 NEETHLINGSTRAAT 3 HEETHLING STREET BENDOR, POLOKYANE 0959 POSTNET SUITE 52 PRIVATE BAG 93678 POLOKYANE 0700 </p> <p>+27 (0)18 238 3897 info@peerbg.co.za</p> <p><small>*Copyright vests in the employer/contractor and/or manufacturer or distributor thereof may occur without the written consent of the copyright holder. Copyright © 2024 by PIENAAR & ERWEE ENGINEERS (Pty) Ltd</small></p>			
<p>PROJECT: LIMPOPO TRAFFIC TRAINING COLLEGE</p>			
<p>DRAWING: STUDENT RESIDENCE; BLOCK C; GROUND & FIRST FLOOR: ELECTRICAL INSTALLATION SMOKE DETECTION</p>			
DRG.	SKD.	CHECKED/DRAWN	DATE
M DE KOCK	PEV		2021/01/25
SCALE	SIZE	TECHN.	DRWG. NO. / REV.
1:100	A1	B1409/200/05	

0502



ELECTRICAL SYMBOLS

- ⊠ MANUAL CALL POINT (BREAK GLASS UNIT)
(ROUND DRAWBOX AT 1400 AFFL WITH
1x25mmØ CONDUIT TO CEILING VOID)
 - DRAWBOX
 - ⊠ FIRE CONTROL PANEL
 - ⊕ SMOKE DETECTOR
 - ⊕ VOID SMOKE DETECTOR
 - ⊕ HEAT DETECTOR
 - ⊕ SOUNDER / STROBE CONSISTING
OF ROUND CONDUIT DRAWBOX
 - ⊕ SINGLE PHASE OUTLET 30A
DOUBLE POLE ISOLATOR
- 25mmØ GALVANISED CONDUIT

DATE DATUM	NO.	BESKRYWING / DESCRIPTION	GRD. APPR.
WYSIGINGS / AMENDMENTS			

JURAT BY ADRES VAN ONTVEEPINGSBEHEERER
NAME AND ADDRESS OF DESIGN/CONTRACTANT

PIENAAR & ERWEE
REGISTERED ELECTRICAL ENGINEERS
Reg No. 1203/01/04/01

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PROJECT = PROJECT
**LIMPOPO TRAFFIC TRAINING
COLLEGE**

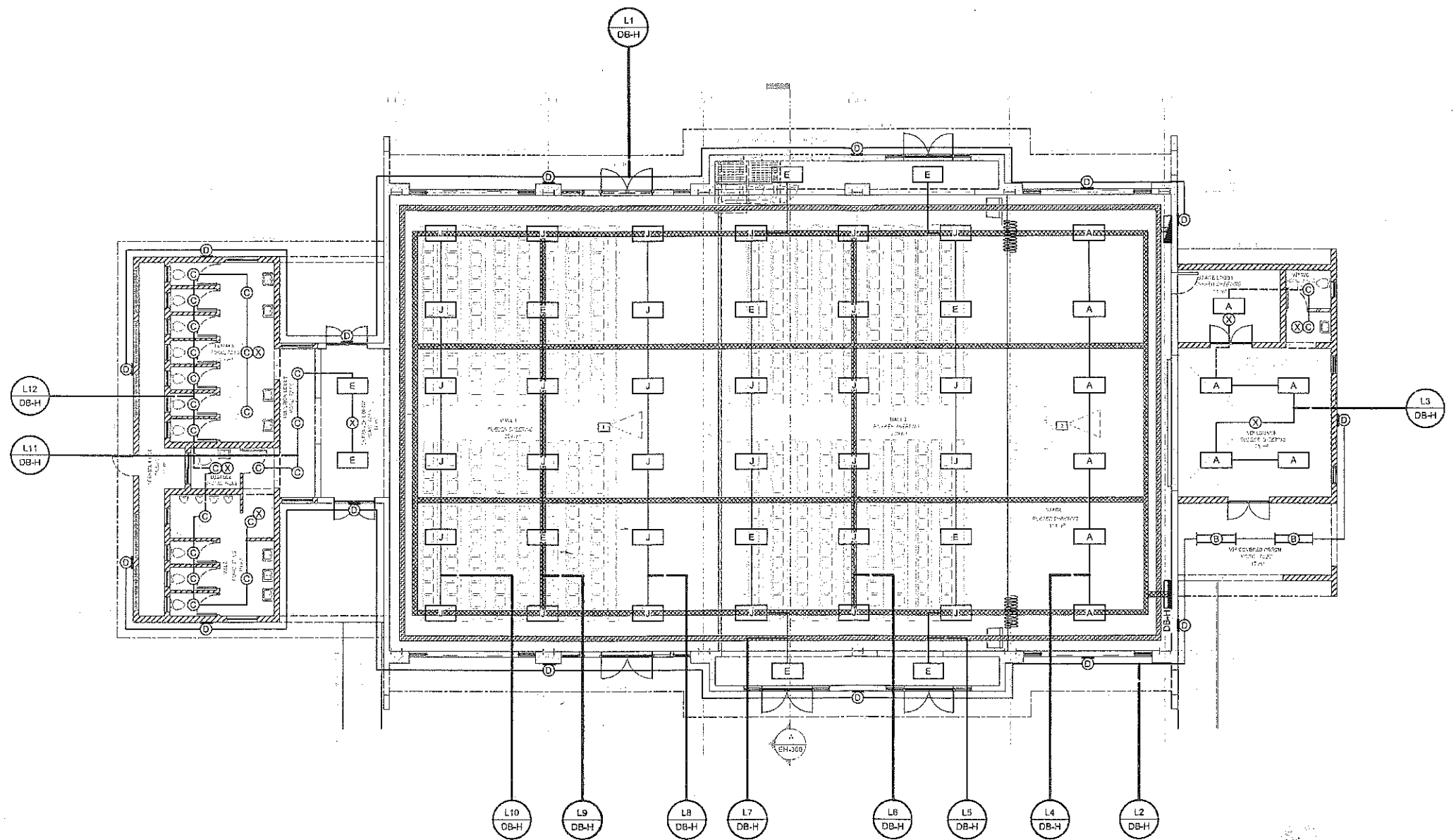
TEXTING = DRAWING
**STUDENT RESIDENCE;
BLOCK C;
SECOND FLOOR & ROOF PLAN;
ELECTRICAL INSTALLATION
SMOKE DETECTION**

REV.	SKAL	VEREKENSBY	GOEL.	APP.	DATE
	M DE KOCK	PEV			2021/01/26
SKAL	SKAL	REF.	TEK. NR.	SWA. NO.	REV.
1:100		A1	B1409/200/06		

SECOND FLOOR PLAN
SCALE 1:100

ROOF PLAN
SCALE 1:100

0503



ELECTRICAL SYMBOLS

- DISTRIBUTION BOARD
- DATA DISTRIBUTION BOARD
- LINEAR LIGHT FITTING
- RECESSED LIGHT FITTING
- DOWN LIGHT FITTING
- WALL MOUNTED LIGHT FITTING
- LIGHT SWITCH
- TWO WAY LIGHT SWITCH
- DRAWBOX
- TELEPHONE OUTLET
- DATA OUTLET
- 1x 16A CONVENTIONAL SSO (SANS 164-1)
- 1x 16A IEC SOCKET OUTLET (SANS 164-2)
- 2x 16A CONVENTIONAL SSO (SANS 164-1)
- 2x 16A IEC SSO (SANS 164-2)
- 16A CONVENTIONAL DOUBLE SWITCHED SOCKET OUTLET (SANS 164-1)
- 16A DEDICATED SWITCHED SOCKET OUTLET (SANS 164-4)
- SINGLE PHASE OUTLET 30A
- THREE PHASE OUTLET 30A
- DOUBLE POLE ISOLATOR
- 100x50x50 DRAWBOX BEHIND POWERSKIRTING WITH 2x25mmØ CONDUIT TO WIRE MESH BASKET (DATA/TEL)
- 100x50x50 DRAWBOX BEHIND POWERSKIRTING WITH 2x25mmØ CONDUIT TO WIRE TRUNKING (POWER)
- CLUSTER INSTALLED ON POWERSKIRTING COMPLETE WITH:
3x 16A CONVENTIONAL SSO (SANS 164-1),
3x 16A IEC SO (SANS 164-2),
3x 16A DEDICATED SSO (SANS 164-4)
- CLUSTER INSTALLED ON POWERSKIRTING COMPLETE WITH:
2x 16A CONVENTIONAL SSO (SANS 164-1),
2x 16A IEC SO (SANS 164-2),
2x 16A DEDICATED SSO (SANS 164-4)
- CONDUIT
- INDICATES SWITCHING
- INDICATES CIRCUIT
- SLEEVE PIPES
- INDICATES DEDICATED CIRCUIT
- 2 COMPARTMENT POWERSKIRTING
- 41mmx41mm WIRING TRUNKING
- 300mm WIDE WIRE MESH BASKET
- CIRCUIT INDICATOR

DATE	NO.	REVISION / DESCRIPTION	GRD. APPR.

WYSIGINGS / AMENDMENTS

NAME AND ADDRESS OF CLIENT/PROJECT MANAGER/ENGINEER

PIENAAR & ERWEE
REGISTERED ELECTRICAL ENGINEERS
Reg No. 2002/01246/07

CESA

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PROJECT = PROJECT

LIMPOPO TRAFFIC TRAINING COLLEGE

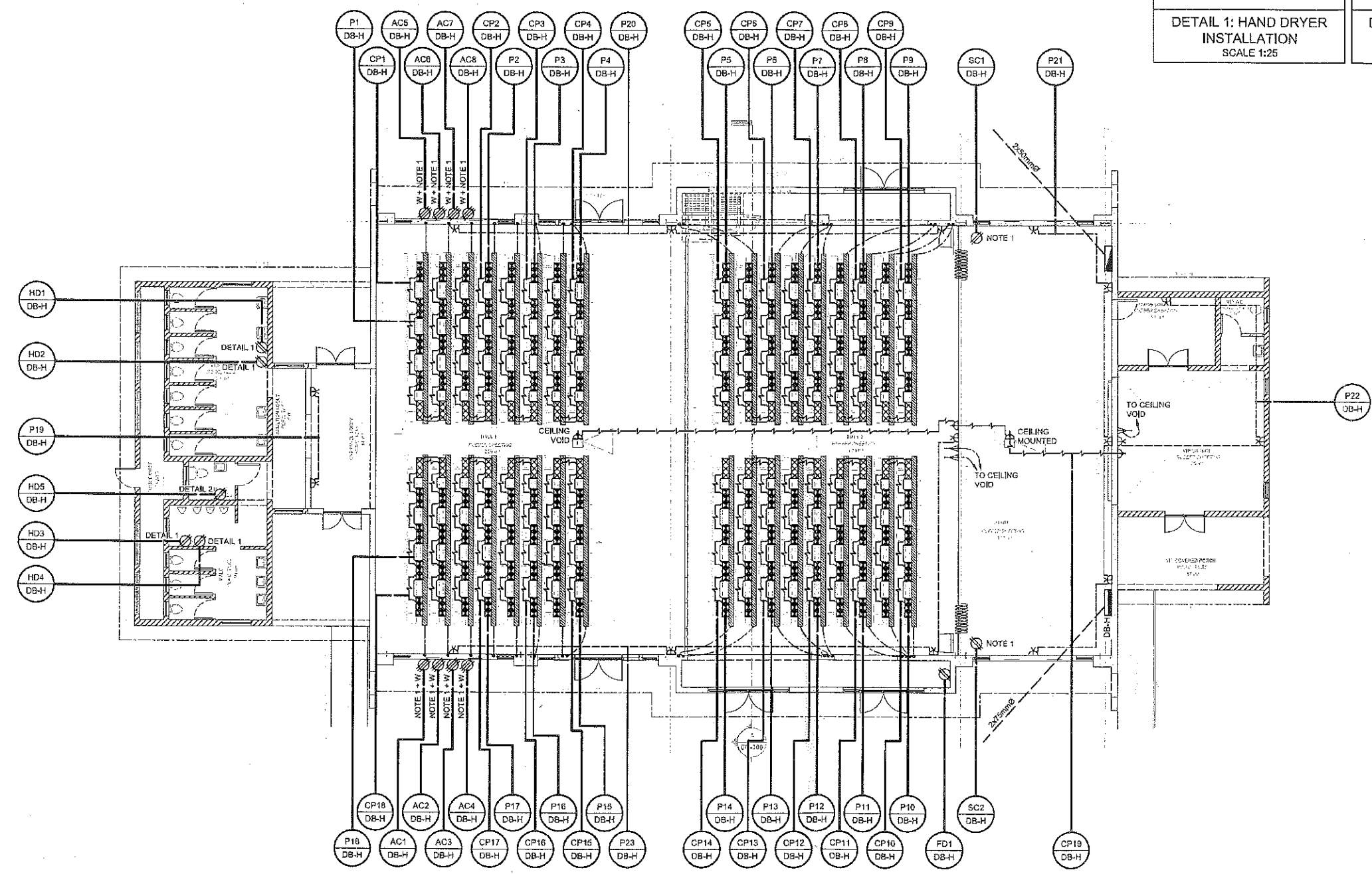
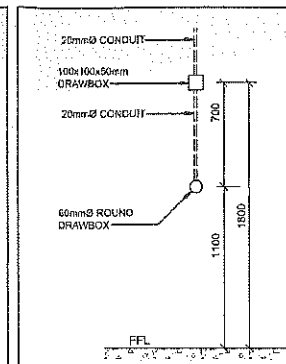
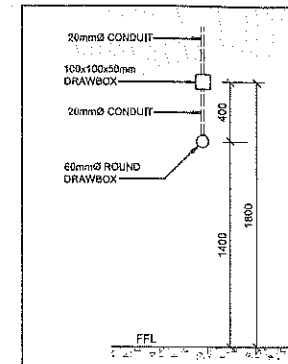
DRAWING = DRAWING

**EXISTING HALL RENOVATIONS:
GROUND FLOOR:
ELECTRICAL INSTALLATION:
LIGHT LAYOUT**

NO.	ENGR.	CHECKER/ENGR.	DATE	DATE	DATE
1	M DE KOCK	PEV	2021/01/21		

SCALE	SCALE	REV	TEC. NO.	DATE	REV.
1:100		A1	B1409/300/01		

0504



ELECTRICAL SYMBOLS

- DISTRIBUTION BOARD
- DATA DISTRIBUTION BOARD
- LINEAR LIGHT FITTING
- RECESSED LIGHT FITTING
- DOWN LIGHT FITTING
- WALL MOUNTED LIGHT FITTING
- LIGHT SWITCH
- TWO WAY LIGHT SWITCH
- DRAWBOX
- TELEPHONE OUTLET
- DATA OUTLET
- 1x 16A CONVENTIONAL SSO (SANS 164-1)
- 1x 16A IEC SOCKET OUTLET (SANS 164-2)
- 2x 16A CONVENTIONAL SSO (SANS 164-1)
- 2x 16A IEC SSO (SANS 164-2)
- 16A CONVENTIONAL DOUBLE SWITCHED SOCKET OUTLET (SANS 164-1)
- 16A DEDICATED SWITCHED SOCKET OUTLET (SANS 164-4)
- SINGLE PHASE OUTLET 30A DOUBLE POLE ISOLATOR
- THREE PHASE OUTLET 90A THREE POLE ISOLATOR
- 100x50x50 DRAWBOX BEHIND POWERSKIRTING WITH 2x25mmØ CONDUIT TO WIRE MESH BASKET (DATA/TEL)
- 100x50x50 DRAWBOX BEHIND POWERSKIRTING WITH 2x25mmØ CONDUIT TO WIRE TRUNKING (POWER)
- CLUSTER INSTALLED ON POWERSKIRTING COMPLETE WITH:
3x 16A CONVENTIONAL SSO (SANS 164-1),
3x 16A IEC SSO (SANS 164-2),
3x 16A DEDICATED SSO (SANS 164-4)
- CLUSTER INSTALLED ON POWERSKIRTING COMPLETE WITH:
2x 16A CONVENTIONAL SSO (SANS 164-1),
2x 16A IEC SSO (SANS 164-2),
2x 16A DEDICATED SSO (SANS 164-4)
- CONDUIT
- INDICATES SWITCHING
- INDICATES CIRCUIT
- SLEEVE PIPES
- INDICATES DEDICATED CIRCUIT
- 2 COMPARTMENT POWERSKIRTING
- 41mmx41mm WIRING TRUNKING
- 300mm WIDE WIRE MESH BASKET
- L1
DB-X
CIRCUIT INDICATOR

ELECTRICAL NOTES:
1. FINAL POSITION OF OUTLET TO BE CONFIRMED BY OTHERS

DATE	NO.	REVISION / DESCRIPTION	GRD. APPR.

WYSIGINGS / AMENDMENTS

NAME AND ADDRESS OF CLIENT: **PIENNAAR & ERWEE**
 NAME AND ADDRESS OF DESIGN CONSULTANT:
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 ENGINEERS & ARCHITECTS
 Reg No. 2003/0128/15/01

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PROJECT: LIMPOPO TRAFFIC TRAINING COLLEGE

TITLE: **EXISTING HALL RENOVATIONS: GROUND FLOOR; ELECTRICAL INSTALLATION; POWER, TEL & DATA LAYOUT**

PREP.	DESIGN	CHECKED	APPR.	DATE
M DE KOCK	PEV			2021/10/21

0505