DEPARTMENT OF PUBLIC WORKS

NTUZUMA SAPS

SPECIFICATION AND

BILLS OF QUANTITIES

FOR

PART B

SPECIALIST DIESEL ALTERNATOR PLANT

INSTALLATION

SUPPLY, INSTALLATION AND COMMISSIONING OF DIESEL/TERNATOR GENERATING SET (ELECTRICAL INSTALLATION)

INDEX

SECTION 1

STANDARD SPECIFICATION FOR THE SUPPLY, INSTALLATION AND COMMISSIONING OF DIESEL / ALTERNATOR GENERATING SET (200kVA)

1. GENERAL

This section covers the Standard Specification for the supply, delivery and complete installation on site in full working order of an outdoor type, containerised 200 kVA / 172.8 kW at 0.866 Pf electrical output fully silenced and operational diesel alternator (DA) generating set.

Any deviation from this Standard Specification or additional information will be given in the Detail Specification Section 5 of this document. In case of contradiction between this Standard Specification and the Detail specification, the Detail Specification shall be given preference.

Full particulars, performance curves and illustrations of the equipment offered, must be submitted with the Tender. Tenderers may quote for their standard equipment, complying as closely as possible with this Specification, but any deviations from the Specification must be fully detailed.

The Department reserves the right to accept any portion of any tender and does not bind itself to accept the lowest or any tender.

2. DELIVERY

The DA set inclusive of fully weatherproofed and sound proofed (to very quiet rural residential standards) out door containerized enclosure canopy will be installed in the location as shown on the site plans.

Tenderers must confirm that the space is sufficient for the installation of the containerized generating set inclusive of day fuel tank, silencers and the control board.

The successful Tenderer shall inform the Regional Representative of he Department, when the set is ready for installation.

Delivery shall be effected after confirmation by the Regional Representative that the site is ready for installation.

3. OUTPUT AND VOLTAGE

The set shall have a site output and voltage as specified in the Detail Specification; Section 5, of this document.

4. CONSTRUCTION

The engine and alternator of the set shall be built together on a common "Simplex" type frame, which must be mounted in a silenced container on a skid base on anti-vibration mountings. The set must be placed direct on a rigid steel base containing the day tank. A drip tray must be fitted under the engine. The tray must be large enough to catch a drip from any part of the engine. The electrical panel shall be accessible from the outside and shall have weatherproof enclosure and lockable doors.

The frame must be of the 'SIMPLEX' type.

5. OPERATION

The set is required to automatically supply the lighting and power requirements in the case of a mains power failure.

The set shall be fully automatic i.e. it shall start when any one phase of the main supply fails or get switched and shall shut down when the normal supply is re-established. In addition it shall be possible to manually start and stop the set by means of pushbuttons on the switchboard.

The automatic control shall make provision for three consecutive starting attempts. Thereafter the set must be switched off, and the start failure relay on the switchboard must give a visible and audible indication of the fault.

To prevent the alternator being electrically connected to the mains supply when the mains supply is on and vice versa, a safe and fail proof system of suitably interlocked contactors shall be supplied and fitted on the changeover switchboard.

Important Note:

The Tenderer must submit, together with his offer, the design of the control system to comply with the requirements for automatic starting, stopping, interlocking and isolation as specified.

6. ENGINE

6.1 General

The engine must comply with the requirements as laid down in BS 5514 and must be of the atomized injection, compression ignition type, running at a speed not exceeding 1 500 r.p.m. The engine must be amply **rated** for the required electrical output of the set, when running under the site conditions. The starting period for either manual or automatic switching-on until the taking over by the generating set, in one step, of a load equal to the **specified** site electrical output, shall not exceed 15 seconds. This must be guaranteed by the Tenderer.

Turbo-charged engines will only be accepted if the Tenderer submits a written guarantee that the engine can deliver full load within the specified starting period.

Curves furnished by the engine makers, showing the output of the engine offered against the speed, for both intermittent and continuous operation **as** well as fuel consumption curves when the engine is used for electric generation, must be submitted with the Tender.

6.2 Rating

The set shall be capable of delivering the specified output continuously under the site conditions, without overheating. The engine shall be capable of delivering an output of 110 % of the specified output for one hour in any period of 12 hours consecutive running in accordance with BS 5514.

6.3 Derating

The engine must be derated for the site conditions: 1200 m - asl (altitude) and 40°C ambient temperature.

The derating of the engine for site conditions shall be strictly in accordance with BS 5514 of 1977 as amended to date. Any other methods of derating must have the approval of the Department and must be motivated in detail. Such derating must be guaranteed in writing and proved by the successful Tenderer at the site test.

6.4 Starting and Stopping

The engine shall be fitted with an electric starter motor and be easily started from cold, without the use of any special ignition devices under summer as well as winter conditions.

Tenderers must state what arrangements are provided to ensure easy starting in cold weather. Full details of this equipment must be submitted. in the case of water cooled engines, any electrical heaters shall be thermostatically controlled. The electrical circuit for such heaters shall be taken from the control panel, and must be protected by a suitable circuit breaker.

6.5 Starter Battery

The set must be supplied a fully charged lead-acid type battery, complete with necessary electrolyte. The battery must have sufficient capacity to provide the starting torque stipulated by the engine makers. The battery capacity shall not be less than 120 Ah and shall be capable of providing three consecutive start attempts from cold and thereafter a fourth attempt under manual control of not less than 20 seconds duration each. The battery must be of the heavy duty "low maintenance" type, house in a suitable battery box.

6.6 Cooling

The engine may be either of the air of water cooled type. In the case of water-cooling, a built-on heavy duty, tropical type pressurised radiator must be fitted. Only stand-by sets that are water cooled shall have electric heaters.

For either method of cooling, protection must be provided against running at excessive temperatures. The operation of this protective device must give a visual and audible indication on the switchboard on the switchboard. Water-cooled engines shall in addition be fitted with a low water cut-out switch, installed in the radiator, to switch the set off in the event of a loss of coolant. The protection shall operate in the same way as the other cut-outs (e.g. low oil pressure). All air ducts for the cooling of the engine are to be allowed for. The air shall be supplied from the cooling fan cowling/radiator face to air outlet louvres in the plant room wall.

6.7 Lubrication

Lubrication of the main bearings and other important moving parts shall be by forced feed system. An automatic low oil pressure cut-out must be fitted, operating the stop solenoid on the engine and giving a visible and audible indication on the switchboard.

6.8 Fuel Pump

The fuel injection equipment be suitable for operation with the commercial brands of diesel fuel normally available in South Africa.

6.9 Fuel Tanks

A day fuel tank shall be installed in the base of the set. The tank shall have sufficient capacity for standby sets to run the engine on full load for a period of 24 hours. The day fuel tank shall be fed from 200 l drums via a hand pump and fuel fill nozzle system easily accessible from a small "bakkie"

A water trap shall be fitted in the fuel pipeline from the tank to the engine and from the bulk fuel tank to the day tank.

The day tank shall be fitted with a suitable filter, a full height gauge glass, "low fuel level" alarm, giving an audible and visible signal on the switchboard as well as a low-low fuel level cut-out.

A local hand pump set shall also be supplied for filling the day tank from 200 litre drums.

The interconnection fuel piping shall consist of Class 2 Grade copper tubes and the connection to vibrating components shall be in flexible tubing with armoured covering.

All vent pipes from the day tank shall be run up against the building to high level (1000 mm above the set) and protected against ingress of insects and water.

6.10 Governor

The speed of the engine shall be controlled by a governor in accordance with class A2 of BS 5514 of 1977 if not otherwise specified in the Detail Specification.

The permanent speed variation between no load and full load shall not exceed 4,5% of the normal engine speed and the temporary speed variation shall not exceed 10% External facilities must be provided on the engine, to adjust the normal speed setting by ± 5% at all loads zero and rated load.

6.11 Flywheel

A suitable flywheel must be fitted, so that lights fed from the set will be free from any visible flicker.

The cyclic irregularity of the set must be within the limit laid down in BS 5514 of 1977.

6.12 Air Intake and Exhaust Silencers

It is essential to keep the noise level as low as possible as this is a rural area with sleeping accommodation nearby. A fully sound effective, containerized, attenuated vermin and weatherproof Intake and exhaust silencing system of the residential type must be provided, to comply with the Municipal Regulations and noise criteria. Noise levels shall not exceed NC30, 1m away from the intake and exhaust louvers. Access door attenuation shall be included and provided as required to meet the same standard.

The exhaust pipe shall be installed in such a way that the expulsed exhaust fumes will not cause discomfort to the public or cause a fire hazard. The exhaust pipe must be flexibly connected to the engine to take up vibrations transmitted from the engine, which may cause breakage. The exhaust piping and silencer shall be lagged to reduce the heat and noise transmission and shall be protected against the ingress of driving rain at 45° to the horizontal. The exhaust pipe must be silenced the same noise level as the set

6.13 Accessories

The engine must be supplied complete with all accessories, air and oil filters, 3 instruction manuals, spare parts lists, the first fill of all lubricating oils, etc.

7. ALTERNATOR

The alternator shall be of the self excited brush less type, with enclosed ventilated drip proof housing and must be capable of supplying the specified output continuously with a temperature rise not exceeding the limits laid down in BS 5000 for rotor and stator windings.

The alternator shall be capable of delivering an output of 110% of the specified output, for one hour in any period of 12 hour in any period of 12 hours consecutive running.

Both windings must be fully impregnated for tropical climate and must have an oil resisting finishing varnish.

7.1 Regulation

The alternator must preferably be self-regulated without the utilisation of solid state elements. The inherent voltage regulation must not exceed plus or minus 5% of the nominal voltage specified, at all loads with the power factor between unity and 0,8 lagging and within the driving speed variations of 4,5% between no-load and full load.

7.2 Performance

The excitation system shall be designed to promote rapid voltage recovery following the sudden application of the load. The voltage shall recover to within 5% of the steady state within 300 mili-seconds following the application of full load and the transient voltage dip shall not exceed 18%.

7.3 Coupling

The engine and alternator must be directly coupled by means of a high quality flexible coupling, equal and similar to the "HOLSET" type.

8. SWITCHBOARD

A switchboard must be supplied and installed to incorporate the equipment for the control and protection of the generating set and battery charging.

The switchboard must conform the specification as set out in the following paragraphs.

8.1 Construction

The switchboard shall be a totally enclosed, double door and weatherproof, fabricated from steel panels, carried on and-substantial angle iron framework.

The board shall be flush fronted and all equipment to be mounted behind the front plate, on suitable supports.

All equipment, connections and terminals shall be easily accessible from the front. The front panels may be either hinged or removable and fixed with studs and chromium-plated cap nuts. Self tapping screws shall be used in the construction of the board.

All pushbuttons, pilot lights, control switches, instrument and control fuses, shall be mounted on hinged panels with the control wires in flexible looms.

The steelwork of the boards must be thoroughly de-rusted, primed with zinc chromate and finished with two coats of signal red quality enamel, or a baked powder epoxy coating.

Suitably rated terminals must be provided for all main circuits and the control and protection circuits. Where cable lugs are sued, these shall be crimped onto the cable strands. Screw terminals shall be of the type to prevent spreading of cable strands. All terminals shall be clearly marked.

For the control wiring, each wire shall be fitted with a cable or wire marker of approved type, and numbering of these markers must be shown on the wiring diagram on the switchboard. Control wiring shall be run in PVC trunking. The trunking shall be properly fixed to the switchboard steelwork. Adhesives shall not be acceptable for the fixing of trunking or looms.

The automatic control and protection equipment shall be mounted on a separate easily replaceable small panel with printed circuits. The equipment shall mainly be the "solid state" type. After mounting the equipment on the panel, the rear of this panel shall be sealed with epoxy-resin. However, other proven control systems may also be considered, but must be described in detail.

All equipment on the switchboard, such as contactors, isolators, busbars, etc., shall have ample current carrying capacity to handle at least 110% of the alternator full load current.

8.2 Protection and alarm devices

All switchboards shall be equipped with protection and alarm devices as described below.

A circuit breaker and an adjustable current limiting protection relay must be installed for protection of the alternator. The protection relay shall be of the type with inverse time characteristics. The relay shall cause contactor to isolate the alternator and stop the engine.

Protection must be provided for overload, high engine temperature, low lubricating oil pressure, over speed, start-failure, low water level.

Individual relays with reset pushed are required, to give a visible signal and stop the engine when any of the protective devices operate. In the case of manual operation of standby sets, it shall not be possible to restart the engine.

The indicators and re-set pushes must be marked in both official languages respectively.

"OVERLOAD"	"OORLAS"
"TEMPERATURE HIGH"	"TEMPERATUUR HOOG"
"OIL PRESSURE LOW"	"OLIEDRUK LAAG"
"OVERSPEED"	"OORSPOED"
"START FAILURE"	"AANSITFOUT"
"LOW WATER LEVEL"	"LAE WATERVLAK"

In addition two relays with reset pushes must be fitted giving and audible and visible signal when:

(a) The fuel level in the service tank is low. The reset push of this relay must be marked "FUEL LOW" - "BRANDSTOF LAAG".

In addition, a low-low level sensor must be provided. At this level the engine must stop to prevent air entering the fuel system,.

(b) The battery charger failed. The reset push of this relay must be marked "CHARGER FAIL" - "BATTERYLAAIER FOUTIEF".

This is also applicable to the engine driven generator/alternator.

All relays must operate an alarm hooter. A pushbutton must be installed in the hooter circuit to stop the audible signal, but the fault indicating light on the control panel must remain lit until the fault has been rectified.

An on/off switch is not acceptable. After the hooter has been stopped, it must be re-set automatically, ready for a further alarm.

The hooter must be of the continuous duty and low consumption type. Both hooter and protection circuits must operate from the battery.

Potential free contacts from the alarm relay must be brought down to terminals for remote indication of alarm conditions.

A test pushbutton must be provided to test all indicators lamps.

8.3 Manual Starting

Each switchboard shall be equipped with two pushbuttons marked "START" and "STOP" for manual starting and stopping of the set.

8.4 Battery Charging Equipment

Each switchboard shall be equipped with battery charging equipment.

The charger shall operate automatically in accordance with the state of the battery and shall generally consist of an air-cooled transformer, a full wave solid state rectifier, and the necessary automatic control equipment of the constant voltage system.

The charger must be fed from the mains. An engine driven alternator must be also a provided for charging the battery while the set is operational. Failure of this alternator must also activate the battery charger failure circuit.

8.5 Switchboard Instruments

Each generating set shall have a switchboard equipped as follows :

(a) One flush square dial voltmeter, reading the alternator voltage, scaled as follows:

(i) 0-300V for single phase generators.
(ii) 0-500V for three phase generator. In this case a six position and off selector switch must be installed for reading all phase and phase to neutral voltages.

(b) A flush square dial combination maximum demand and instantaneous ampere meter for each phase, with resettable pointer suitably scaled 20% higher than the alternator rating. A red arc stripe above scale markings from 0-20A and a red radial line through the scale at full-load current, shall be provided. This instrument shall be supplied complete with the necessary current transformer.

(c) One flush square dial vibrating type frequency meter, indicating the alternator frequency.

(d) A six digit running hour meter with digital counter, reading the number of hours the plant has been operating. The smallest figure on this meter must read 10^{th} hour.

(e) Fuses or m.c.b.'s for the potential circuits of the meters.

(f) One flush square dial ampere meter suitably scaled for the battery charging current.

(g) One flush square dial voltmeter with a spring loaded pushbutton or switch for the battery voltage.

8.6 Markings

All labels, markings or instructions on the switchgear shall be in both official languages.

8.7 Earthing

An earth bar must be fitted in the switchboard, to which all non-current carrying metal parts shall be bonded.

The neutral point of the alternator must be solidly connected this bar by means of a removable link labelled "EARTH" "AARD". Suitable terminals must be provided on the earth bar for connection of up to three earth conductors, which will be supplied and installed by others.

8.8 Operation Selector Switch

A four position selector switch must be provided on the switchboard marked "AUTO", "MANUAL", "TEST" and "OFF".

With the selector on "AUTO", the set shall automatically start and stop, according to the mains supply being available or not.

With the selector on "TEST", it shall only be possible to start and stop the set with the pushbuttons, but the running set shall not be switched to the load.

With the selector on "MANUAL", the set must take the load when started with the pushbutton, but it must not be possible to switch the set on to the mains, or the mains onto the running set.

With the selector on "OFF", the set shall be completely disconnected from the automatic controls, for cleaning and maintenance of the engine.

8.9 Automatic Change-over System

A fully automatic change-over system shall be provided and installed in the Main LT board. All control and signal cabling shall be provided.

8.11 Start delay

Starting shall be automatic in event of a mains failure. A 0-15 adjustable start delay timer shall be provided to prevent start-up on power tips or very short interruptions.

8.12 Stop delay

A stop delay with timer is required for the set, to keep the set on load for an adjustable period of one to sixty seconds after the return of the mains supply, before changing back to the supply. An additional timer shall keep the set running for a further adjustable cooling period of 5 to 10 minutes at no-load before stopping.

9. INSTALLATION

The tenderer must include for the complete installation and wiring of the set in running order, including the connection of the incoming cable and outgoing feeder cables for fully automatic operation.

The connecting of the cable and control cabling to the generator and the control terminals in the LV board remains the responsibility of the tenderer.

A PF contact for a remote alarm signal shall be provided and connected to the Fire Detection system, for remote monitoring of any fault on the set

10. WARNING NOTICES

Notices, in both official languages, must be installed in the plant rooms.

The contents of these notices are summarized below.

(a) Unauthorized entry prohibited.

(b) Unauthorized handing of equipment prohibited.

(c) Procedure in case of electric shock.

(d) Procedure in case of fire.

The successful tenderer must consult the Act and get approval of the wording from the Department's representative, prior to ordering the notices.

Lettering must be black on a yellow background.

Notices (a) must be installed outside next to the entrance of the plant room and (b-d) inside the plant room.

In the plant room, a clearly legible and indelible warning notice must be mounted in a conspicuous position.

The motive shall be made of a non-corrodible and non-deteriorating material, preferable plastic, and must read as follows :

DANGER: This engine will start without notice. Turn selector switch on control board to "OFF" before working on the plant.

11. DRAWINGS

The successful Tenderer must, as soon as possible after receipt of the order, submit detailed drawings and wiring diagrams of the plant and the switchgear. One diagram shall be contained in a metal pouch on the side of the switchboard.

12. INFORMATION REQUIRED

Tenderers must furnish detailed descriptions and illustrations of the equipment offered and must complete the questionnaire following this specification. This includes drawings of the switchboard layouts and control diagrams.

Failure to submit any of the information asked for, may disqualify the tender.

13. GUARANTEE

The successful Tenderer will be required to guarantee the complete plant for a period of 12 months form the date it has been taken over by the Department in running order.

If during this period the plant is not in working order, or not working satisfactorily owing to the faulty material, design or workmanship, the Contractor will be notified and immediate steps shall be taken by him to rectify the defects and/or replace the affected parts on site, at his own expense.

14. MAINTENANCE

14.1 Initial Maintenance

The successful Tenderer will be required to maintain the plant in good running order for a period of twelve months after the plant has been taken over by the Department. The full costs of this maintenance must be included in the tender price, inclusive of overheads and travelling fees. A part from the consumables as detailed below, the department shall not acknowledge any cost claims additional to this maintenance cost as tendered.

However, should the Contractor fail to hand over the plant in good working order on expiry of the specified twelve months, the Contractor will be responsible for further monthly maintenance until final delivery is taken.

Under this agreement the Contractor will undertake to arrange once per month for a visit to the plant by a qualified member of his staff, who shall :

(a) Report to the Officer-in-charge, keeping the maintenance records, and enter into a log book the date of the visit, the tests carried out, the adjustments made, and any further details that may be required.

(b) Grease and oil moving parts, where necessary.

(c) Check the air filter and, when necessary, clean the filter and replace filter oil.

(d) Check the lubricating oil and top-up when necessary.

(e) After the plant has run one oil change for the number of hours stipulated by the manufacturers, drain the sump and refill with fresh lubricating oil. The reading of the hour meter on the switchboard will be taken to establish the number of hours run by the plant.

Under this heading only the cost of the actual oil used, shall be charged as an extra on the monthly account.

(f) Clean the lubricating oil filter and/or replace the filter element at intervals recommended by the engine manufacturer, the cost of a new filter element to be charged as an extra on the monthly account.

(g) Check and when necessary adjust the valve settings and the fuel injection equipment.

(h) Check the battery and top-up the electrolyte when necessary.

(i) Test-run the plant for 0,5 hour and check the automatic starting with simulated faults on the mains, the proper working of all parts, including the electrical gear the protective devices with fault indicators, the changeover equipment and the battery charger. Make the necessary adjustments.

(j) Report to the Department and to the Contractor on any parts that become unserviceable through fair wear and tear, or damaged by causes beyond the control of the Contractor.

The Contractor on receiving the report, shall immediately submit a detailed quotation for the repair or replacement of such parts to the Department.

(k) Advise the Department when it has become necessary to decarbonise the engine and submit a quotation for this service.

(l) Top up the water of the radiator, if applicable.

(m) Clean the plant and its components.

14.2 Maintenance Agreement

(a) After the lapse of the abovementioned 12 month period, the Contractor may be required to enter into a 4 year maintenance agreement, as described under Clause 14,1 initially for one year with a possible yearly renewal.

(b) Acceptance of the tender shall not bind the Department to accept this maintenance service.

14.3 Instruction of Operator

After completion of the installation and when the plant is un running order, the successful Tenderer will be required to instruct an attendant in the operation of the plant, until he is fully conversant with the equipment and the handling thereof.

Three copies of a maintenance fault-localising and operating manual are to be handed over the Department's representatives on site.

15. TESTS

The following tests are to be carried out:

(a) At the supplier's premises, before the generating set will be delivered to site Representatives of the Department may be present during the test to satisfy themselves that the generating set complies with the specification and delivers the specified output. The test must be carried out in accordance with BSS 5514, Part 2 and 3. The Department must be timorously advised of the date for the test.

(b) At the site after completion of the installation, in accordance with Clause 12.2 of the Standard Conditions (form O.W.G. 379), forming part of this specification.

The resistance for the load and all instruments which may be required for the tests have to be provided by the successful tenderer.

Test reports of both tests as specified under (a) and (b) are to be submitted to the Department.

SECTION 2

DETAILED TECHNICAL SPECIFICATION

1. GENERAL

Supply, delivery, install commission, test and maintain an emergency generating set at the NTUZUMA SAPS. This installation must comply fully with all the sections and drawings of this document. This detail specification is supplementary to the Standard Technical Specification, Section 4, and must be read together where they are at variance the detail specification shall apply.

The set must be installed in an outdoor enclosure supplied and installed by the diesel generator supplier. Sound attenuation shall also be provided to comply with local by laws.

2. SITE INFORMATION AND CONDITIONS

2.1 LOCATION

The site is at NTUZUMA SAPS DURBAN Kwazulu Natal

2.2 SITE CONDITIONS

The following site conditions will be applicable, and equipment shall be suitably rated to develop their assigned rating and duty at these conditions.

a)	Height above sea level	: 1300 METER
b)	Maximum ambient temperature	: 40°C
c)	Maximum ambient humidity at lowest temperature	: 40%
d)	Minimum ambient temperature	: -5°C

3. OUTPUT AND VOLTAGE

After the derating factors for the engine and generator due to site conditions have been taken into account, the set must have a site output and voltage as follows :-

No load voltage	:	400/231 Volt
Rating	:	200kVA
Power at 0.866 power factor	:	172.8kW
Frequency	:	50Hz
Fault Level	:	10KA

Noise Level (external 1.0m from the set): NC 30

4. LOAD ACCEPTANCE

The generating set shall be capable of accepting 100% of the specified site electrical output. The 100% load acceptance shall not exceed 15 seconds.

5. SWITCHBOARD/CONTROL PANEL UNIT

The switchboard/control panel unit shall be a free standing floor mounted type, which shall be installed in the enclosure with separate access doors.

All switch- and control gear shall be rated for a fault current level of 10kA.

6. FUEL SUPPLY TANKS

The fuel tank shall be set mounted and shall have enough capacity to enable the diesel generator to operate for 24 hours. A drip tray approximately 100mm deep shall be mounted below the fuel tank and must be large enough to collect any fuel that drips from set. The drip shall be manufactured from black mild steel with a thickness of not les than 2mm. A full tank shall be provided after all testing has been done and shall be included in the price

7. CABLE CONNECTIONS

The contractor will be responsible for all electrical cable connections associated with the complete generating set installation

8. ALARM HOOTER AND RED LIGHT

One alarm hooter and red light shall be supplied and installed on the outside wall of the generator enclosure. The hooter shall consist of an electronic unit similar and equal to a Klaxon type SY. 725 hooter with a continuously rated output and 110dB at a distance of 2 metres, and shall be IP55 weatherproof rated.

The warning light shall consist of a 40 watt flashing light which shall be mounted on a galvanised steel frame together with the hooter. The hooter and light shall be switched on or off simultaneously after initiation or cancellation of an alarm condition. The supply and installation of the wiring between the control board and the alarm unit forms part of this contract.

10. INFORM

The successful tenderer shall inform the regional Representative when the set is ready for installation.

SECTION 3

PRICE SCHEDULE

Nett price in SA
Currency, duty paid

1. **TENDER PRICE**

The supply and complete installation in working order, including 12 months maintenance, of one 200kVA diesel generating set with all accessories and switchgear in accordance with the Specification :

DA SET

a)	Local Content	R .....
b)	Imported Content	R .....
c)	Delivery and Installation	R .....
d)	Fill fuel tank with diesel fuel	R.....
e)	Maintenance for 12 months as per Clause 14.1 of the Standard Specification.	R..... R .....

TOTAL TENDER PRICE (EXCL VAT) FOR DIESEL GENERATOR INSTALLATION CARRIED OVER TO BILL OF QUANTITY IN PART B R.....

2. **NETT COST**

Cost of engine and alternator only, excluding VAT, but including all duties.

a) Engine R .....

b) Alternator R .....

3. **DELIVERY AND ERECTION**

Written acceptance of a Tender (or Quotation) by the Chief Director Office of the State Tender Board or the department of Public Works constitutes a binding contract and the Contractor may order materials as the delivery period commence from such date of acceptance.

4. **MAINTENANCE (Post Contract)**

For carrying out the maintenance of the set as specified, for a period of four years, starting 12 months after the plant has been taken over by the Department in running order.

Price per year R ..... (nett of VAT)

Price per visit R..... (nett of VAT)

NOTE:

1. The amount given above as the "Total Tender Price" and carried over to the official tender form will be regarded as including the fixed amounts shown in the Price Schedule an no adjustment will be made for any failure by tenderers to include these amounts in the total appearing on the official tender form.

2. The Bill of Quantity must be completed and submitted with the tender. It will be accepted that any item prices that are not filled in are included in the "Total Tender Price".

3. The completed price schedule shall be checked by the Engineer and the right is reserved to adjust any individual price and to rectify any discrepancy whilst the "Total Tender Price" quoted remains unaltered.

4. All materials covered by this specification should wherever possible, be of South African manufacture. In the adjudication of tenders, preference will be given to South African materials or items manufactured in the Republic of South African materials.

   Should any tenderer offer products of South African manufacture as an alternative to imported products which may be specified, such offers will receive full considerations provided the alternative article complies with the technical requirements of the specification.

   I/We tender for the execution of the service as described herein and in accordance with the conditions contained in the covering tender form, the documents specially mentioned therein, with the contents of all of which I/We acknowledge myself/ourselves to be fully acquainted.

   TENDERER`S SIGNATURE:
   NAME : .....

   ADDRESS : .....

   TELEPHONE : .....

   FAX : .....

   DATE : .....

SECTION 4

SCHEDULE OF DRAWINGS

1 Drawing EE/046725/SP/01 indicates the position of the diesel alternator and the single line diagram of the main switchboard and interconnecting cables, circuit and changeover circuit breakers.

DEPARTMENT OF PUBLIC WORKS

NTUZUMA SAPS

SPECIFICATION
AND
BILLS OF QUANTITIES

FOR

PART C

UNINTERRUPTED POWER SUPPLY INSTALLATION

DEPARTMENT OF PUBLIC WORKS
NTUZUMA SAPS
PART C: UPS INSTALLATION

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SECTION 1: STANDARD CONDITIONS

STANDARD CONDITIONS IN RESPECT OF THE SUPPLY, DELIVERY AND INSTALLATION OF ELECTRICAL AND MECHANICAL EQUIPMENT, PLANT AND MATERIALS

1. TESTS AND FINAL DELIVERY

1.1 Tests

After completion of the Works and before first delivery is taken, a full test will be carried out on the installation for a period of sufficient duration to determine the satisfactory work thereof. During this period the whole of the Works will be inspected and the Contractor shall make good, to the satisfaction of the Representative / Agent or main Contractor, any deficiencies that may arise.

The Contractor shall provide all instruments and equipment required for testing as well as any water, power and fuel required for the commissioning and testing of installations at completion.

1.2 Final Delivery

As prescribed in of the Conditions of Contract: free maintenance and guarantee shall be twelve months in respect of the following installations:

1 Emergency generating sets
2 UPS power supply systems
3 Mechanical installations
4 Fire protection systems
5 Electrical reticulation equipment and cables.

2. CONTRACTOR'S LIABILITY IN RESPECT OF DEFECTS

2.1 As prescribed in of the Conditions of Contract: 12 months.

2.2 Maintenance of installations

With effect from the date of the First Delivery Certificate the Contractor shall at his own expense undertake the regular servicing of the installation during the period stated in clause 2.1 hereof and shall make all adjustments necessary for the correct operation thereof.

If during the said period the installation is not in working order for any reason for which the Contractor can be held responsible, or if the installation develops defects, he shall immediately upon being notified hereof take steps to remedy the defect or faults or to make any necessary adjustments.

Should such stoppages however by so frequent as to become troublesome, or should the installation otherwise prove unsatisfactory during the said period the Contractor shall, if called upon by the Representative / Agent or the Director-General, at his own expense replace the whole installation or such part thereof as the Representative / Agent or the Director-General may deem necessary with apparatus specified by the Representative or the Director-General.

3. COMPLIANCE WITH REGULATIONS

1 The installation shall be erected and tested in accordance with the following Acts and regulations.

2 The latest issue of SABS 0142" "Code of Practice for the Wiring of Premises".

3 the Occupational Health and Safety Act, 1993 (Act 85 of 1993) as amended,

4 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.

5 The Fire Brigade services Act 1993 Act 99 of 1987 as amended.

6 The Electricity Act 1984 (Act 41 of 1984), and

7 The Regulations of the local Gas Board where applicable.

SECTION 2: DETAILED SPECIFICATION

2.1 GENERAL

This part of the specification describes the specific requirements for this installation. Where the requirements of the Detail Specification are in conflict with the requirements of the General Specification, the requirements of the Detail Specification must be adhered to.

2.2 CONTRACT WORK

The installation shall be carried out entirely by the contractor's own staff a Specialist UPS Supplier.

2.3 NOTICES

The contractor shall issue all notices and make the necessary arrangements with Supply Authorities, the Postmaster General, SA Transport Services, Provincial or National Road Authorities and other Authorities as may be required with respect to the installation. The contractor will be held responsible for damage to any existing services brought to his attention by the relevant authorities and will be responsible for the cost of the repairs.

2.4 TENDER PRICE

Tenderers shall complete the information schedule and the price schedule included. Failure to do so will mean that the tender price is taken to be firm in all respects. Tenderers may quote for the standard equipment complying as closely as possible with this specification, but any deviation from the specification must be fully detailed in a paragraph by paragraph schedule, with reference to the paragraph numbers of this document.

2.5 ORDERING OF MATERIALS

The contractor shall order all items of equipment in good time to ensure the timeous completion of the contract.

2.6 CONTRACT WORK

Tenderers are required to visit the site and acquaint themselves fully with the working conditions on site, access hours to the site, size and location of the site, availability of labour and labour conditions, transport, loading and off-loading, storage and security of stored materials, workshop area, scaffolding, cranes and tackles and all tools required for the erection of the installation since the client will not entertain any subsequent claims in respect of lack of knowledge of conditions or any matter arising as a result of non-compliance with these instructions.

2.7 INFORMATION

The tenderer's attention is drawn to the fact that if the information schedules attached to this specification are not completed or if he fails to submit any other information called for with his tender, his tender may be disqualified. All information shall be submitted in duplicate.

2.8 MAKING GOOD

The successful Tenderer will be responsible for making good in all trades, and damage or disturbance to the building, installation, tarred surfaces, concrete surfaces, paved surfaces, drains and other surfaces, or lawns, which he or his employees may have caused in the course of the construction of the system. The contractor will be responsible for keeping the site tidy during the course of the construction of the system, and shall remove from the site all rubble and litter resulting from the construction work.

2.9 REDUNDANT MATERIALS AND EQUIPMENT

All redundant materials and equipment remains the property of the client and shall be delivered to the client's stores, in consultation with the client's representative.

2.10 INSTALLATION OF THE UPS UNIT

The successful Tenderer will be required to undertake the installation of the complete uninterrupted power supply with batteries, etc, all in running order. All electrical wiring, builder's work, including the cutting of holes and making good, plinths, stands etc. connected with this equipment shall be provided by the successful tenderer.

2.11 AMBIENT OPERATING CONDITIONS

a)	Ambient Temperature	-5° C to 40 C
b)	Relative Humidity	0 – 85/%
c)	Altitude	1200maslas at Dundee Kwazulu
d)	Dust	Severe
e)	Corrosion	Normal

2.12 SITE INFORMATION

The UPS's must be installed in suitable position, preferably in the server room at this facility.

2.13 SCOPE OF WORK

The contract shall include the supply, installation, commissioning and handing over to the client, to the Engineer's satisfaction, a system complete in all respects consisting of:

a) 50Kva three phase fully automatic uninterrupted power supply, (UPS) complete with batteries, control equipment and protection equipment all housed in a single metal enclosed cubicle.

b) The distribution panels, cables, connectors and mounting brackets as required for the system.

c) All test equipment required to take all measurements and readings specified, as stated by the contractor and as otherwise required to ensure that the installation is handed over in good working order. All test equipment remains the property of the contractor and shall be calibrated by an approved laboratory.

d) The contract includes further the supply and use of all material and equipment not specifically stated in these documents but which is nonetheless necessary to execute the contract in accordance with the requirements of these documents and all other regulations, statutes and Codes of Practice which are applicable to the installation.

2.14 UPS REQUIREMENTS

The UPS unit required in terms of this contract must comply with the requirements of the general specification in general and in particular the following:

The batteries must be guaranteed for a period of 5 years. The manufacturers guarantee shall be ceded to the user client.

2.15 POWER SUPPLY

The power supplies to the UPS to be 3 phases, 4 wires, and will be installed by the Electrical Contractor on site. Allow for 10kA fault level at the input terminals of the unit circuit breaker.

2.16 POWER OUTPUT

10kVA 50Hz three phase 400Volt (in and out).

The output supply cable from the 50kVA UPS to the respective DB's as indicated on the relevant drawing will be installed and connected by the Electrical Contractor on Site.

2.17 POWER DISTRIBUTION

No power distribution is required.

2.18 BATTERIES

The batteries shall be lead calcium maintenance free type, providing a stand-by time of 30 minutes at full load rated at 0.8 power factor. See clause 3.2.2.5 in this regard.

2.19 IMPORTED EQUIPMENT

Imported equipment will not be subject to fluctuations in the rate of exchange.

Should, however, the contractor choose to be protected against fluctuations in the rate of exchange on imported equipment, the following conditions will apply :

(i) Annexure "A" which forms part of the tender documents, must be completed.

(ii) Any fluctuations in the rate of exchange will be for the account of the Government and shall be calculated from a date 7 (seven) days prior to the date of the receipt by the contractor's bank of the negotiable bill of lading or the exporter's invoice, provided this latter date is not later than 30 days after the date of payment. Thereafter fluctuations in the rate of exchange shall not be for the account of the Government.

2.20 FULL LOAD TEST

The unit shall be fully load tested on Site, demonstrating the unit under power failure conditions, battery backup for 10 minutes, and static bypass switching to mains.

To this effect the contractor shall provide dummy loads to carry out the full load tests, bypass to mains and maintained battery supply for 30 minutes.

SECTION 3: GENERAL (QUALITY) SPECIFICATION

3.1 QUALITY, STANDARDS AND REGULATIONS

All material and equipment supplied for this contract shall be new and the best of their respective kind. All new materials and equipment supplied, shall comply fully with the requirements laid down in the specification. The whole of the works shall be executed in accordance with best practice and to approval of the engineer. The equipment shall comply with the latest issues of the following standard specifications:

3.1.1 SOUTH AFRICAN BUREAU OF STANDARDS

SABS 150	Insulated wire.
SABS 1091	Colour standards for paint.
SABS 0142	Wiring code of practice.
SABS 1474	UPS units.

3.1.2 REGULATIONS AND RIGHTS OF ENGINEER

Apart from any other authority which the engineer may have in terms of the contract, he shall have the right to set the standard and to accept or reject part of the specified equipment depending on the quality of material and workmanship offered.

The contractor shall be notified if the quality of such materials and/or workmanship is not acceptable. In such an event, the contractor shall replace the specific part or repair it to the satisfaction of the engineer, all at the cost of the contractor. Such an instruction shall not exempt the contractor from any of his obligations in terms of the contract.

The installation shall be erected and carried out in accordance with:

a) The Basic Conditions of Employment Act and the Machinery and Occupational Safety Act of 1983, as amended.

b) The local Municipality by-laws and Regulations as well as the regulations of the local Supply Authority.

c) The local Fire regulations.

d) The Regulations of the Department of Posts and Telecommunications.

e) The Standard Regulations of any Government Department or public service company where applicable.

In addition the contractor shall at his cost issue all notices in respect of the installation to the local authorities, and shall exempt the client from all losses, costs or expenditures which may arise as a result of the contractor's failure to comply with the requirements of the regulations enumerated above.

It shall be assumed that the contractor is conversant with the abovementioned requirements. Should any requirements, by-law or regulation, which contradicts the requirements of this document, apply or become applicable during erection of the

installation, the contractor shall immediately inform the engineer of such a contradiction. Under no circumstances shall the contractor carry out variations to the installation in terms of such contradictions without obtaining the written permission to do so from the engineer.

3.2 UNINTERRUPTED POWER SUPPLY (UPS)

3.2.1 DEFINITIONS

(a) **UPS** shall denote the complete UPS unit with associated controls, remote alarm panel and batteries and any accessories required by the system for its successful operation.

(b) **Power Converter Module** shall denote a rectifier, battery charger, inverter, electro mechanical by-pass switch and manually operated by-pass switch.

(c) **Rectifier** shall denote that portion of the converter module containing the equipment and controls to convert the incoming AC power to regulated DC power required by the inverter.

(d) **Inverter** shall denote that part that converts the DC supplied by the rectifier to AC satisfying the load requirements.

(e) **Electro-mechanical** by-pass static switch shall denote a by-pass system provided break free switching from inverter to mains operation and vice versa.

(f) Battery charger shall denote that portion of the power converter module containing the equipment and controls to convert the incoming AC power to precisely regulated DC power required for battery charging.

(g) Critical load denotes the load as presented to the UPS by the computer or other load requiring constant supply and associated circuits and apparatus.

(h) Mean-Time-Between-Failure (MTBF) shall denote an overall MTBF of the UPS as a complete system.

(i) A system failure shall denote any interruption to, or degradation of the critical load bus voltage or frequency beyond the limits set forth herein.

(j) **Efficiency** shall denote the ratio of real output power (kW) to real input power (kW) with the UPS operating at a defined load power at the defined power factor, the battery fully charged and with nominal input voltage.

3.2.2 SYSTEM REQUIREMENTS (THE REQUIRED INPUT AND OUTPUT VOLTAGES ARE DETAILED IN PART 2 OF THIS SPECIFICATION)

3.2.2.1 **Input to the UPS**

(a)	Input voltage	:	380V ± 10%
(b)	Frequency	:	50Hz ± 4%
(c)	System	:	3 phase 4 wire with operative earth conductor, supplied from utility network or standby generator set. Refer to detail specification.
(d)	Power factor		Not less than 0,8 lagging.
(e)	Max starting current:		10 times full load current for not more than ½ a cycle with rectifier soft starting facility.

3.2.2.2 **Output to Load**

(a)	Rating	:	Refer to detail specification.
(b)	Output voltage:		Refer to detail specification.
(c)	Frequency	:	50 Hz ± 0,5 Hz.
(d)	System	:	1 phase 2 wire with operative earth conductor. Refer to detail specification.
(e)	Voltage regulator	:	± 10% maximum deviation of steady state voltage recovering to within 5% in less than 50 ms and to within 1% less in that 100 ms.
(f)	Frequency stability	:	Normally automatically synchronised to mains frequency if the latter is within 50 Hz ± 2% (adjustable window) Runs free at 50 Hz ± 0,5 Hz at any load when mains is out of limits.
(g)	Harmonic content	:	Less than 4% total distortion.
(h)	Amplitude modulation	:	Less than 2%

3.2.2.3 **Overall Performance**

(a) Efficiency (overall): 80 - 85%

3.2.2.4 **Ambient Operating Conditions**

Refer to Detail Specification: 2.13

3.3. Ventilation

All equipment racks shall be positioned in logical fashion on the floor in a configuration which will ensure proper ventilation

Each cubicle containing heat generating equipment (thyristors, transformers electronic circuitry, filters, etc) shall, where necessary, have extraction ventilation fans mounted on the top of the cubicle to assist air circulation. These fans shall be fed from the output distribution panel of the uninterrupted power supply.

3.4 Quality assurance

The manufacturer shall be responsible for the performance as specified herein and to prove such performances to the satisfaction of the engineer. Except as otherwise specified, the supplier must utilise facilities acceptable to the engineer.

3.5 Guarantee

The successful tenderer will be required to guarantee the complete system for a period of **12 months** from the date it has been taken over in running order.

If during this period the system is not in working order, or not working satisfactorily owing to faulty material, design, or workmanship, the contractor will be notified, and immediate steps shall be taken by him to rectify the defects and/or replace the affected parts on site, at his own expense.

3.6 Maintenance

The successful tenderer will be required to maintain the complete system in good running order for a period of **12 months** after the plant has been taken over by the client. The cost of this maintenance must be included in the tender price. The number of visits remains unspecified and the tenderer must allow for whatever number of visits he deems necessary to fully maintain the equipment.

After lapse of this 12 month period, the successful tenderer may be required to enter into a 4 year maintenance agreement with the client. This agreement will initially be for one calendar year, and may subsequently be renewed for yearly periods.

The successful tenderer must be able to render 24 hour maintenance and repair service at all times, including statutory holidays. Full details of the firm's standby service facilities shall be submitted at the time of tendering.

Tenderers shall prepare and submit a pro-forma maintenance and service contract commencing after completion of the 12 month free maintenance period. The maintenance and service contract shall be a formal service agreement of the suppliers of the uninterrupted power supply system signed by an authorised employee and shall include the monthly cost of the services to be provided. Tenderers must state to what extent the price quoted will be subject to variation.

The entering into a Maintenance and Service contract shall in no way invalidate the Guarantee as stated.

The service contract shall include the following minimum provisions:

(1) To provide regularly scheduled preventative maintenance and service by factory trained service representatives of the suppliers of the uninterrupted power supply system. At each visit, which shall be arranged in advance with the client's representative, a record of maintenance carried out shall be kept. The time and date of visits shall be entered in a log book.

(2) To check the mechanical soundness of all parts.

(3) To check and adjust all the output and control values of the system (voltage, frequency, control voltages, etc.)

(4) To take control measurements on the major system components and record these measurements.

(5) To replace **all** defective components. Materials only shall be to the client's account.

(6) Service the batteries.

(7) Service the ventilation plant.

(8) Clean all equipment or rooms as required.

(9) To make available, upon request, emergency maintenance service.

(10) To carry out annually a thorough system check with the use of all the testing equipment and instruments required. A detailed report comparing system performance at the time of testing and the time of handing over, shall be prepared and submitted to the client along with comments.

(11) To incorporate improved system reliability as it becomes available for the system from the manufacturer. This provision shall include direct component replacements or wiring changes but shall not include major system design changes.

3.7 Drawings

As soon as possible after the awarding of the contract, the successful tenderer shall at his expense submit to the engineer for approval, three prints of:

(1) All general arrangement drawings.

(2) Detailed dimensioned drawings of all plant and equipment.

(3) Complete wiring diagrams and block schematic diagrams.

At the same time a list of all equipment designations, labels, etc. in both official languages shall be submitted for approval.

The approval of drawings shall not relieve the successful tenderer of his liability to carry out work in accordance with the terms of the contract.

On completion of the contract, a complete set of transparencies of all drawings of a quality acceptable to the engineer shall be handed to the engineer at the expense of the successful tenderer. These final drawings shall include:

(1) A proper and accurate as-made wiring diagram of the complete installation showing circuit numbers, terminal strip numbers and conductor colours.

(2) A schematic diagram clearly showing functions and component values. A material list showing make, model and characteristics of all components of the control equipment and switchgear is to be included.

(3) Fully dimensioned as-made physical layout drawing of the equipment, batteries and ventilation equipment.

(4) A detailed **schedule** of all wiring.

The contract shall be deemed incomplete until all drawings have been received by the client.

3.8 Instruction of operator and manuals

After completion of the installation, and when the plant is in running order, the successful tenderer will be required to instruct an attendant in the operation of the plant, until he is fully conversant with the equipment and handling thereof.

Three (3) copies of maintenance, fault-localising and operating manuals together with the drawings required shall be handed over to the engineer.

3.9 Tests

The complete testing including the provision of test facilities, instruments, dummy loads and switchgear at the manufacturer's premises in the Republic of South Africa shall form part of this contract. If the factory tests cannot be performed in the RSA, the client may, at his discretion and own cost, decide to attend tests at the supplier's overseas factory. Tenderers shall not allow for this.

For the test in the manufacture's premises the client shall be notified four weeks in advance in order that a representative can be sent to witness these tests.

NOTE : A FULL LOAD TEST ON SITE IS REQUIRED

3.10.1 Battery tests

(1) The output voltage of the battery unit (i.e. all the cells making up one battery) shall be tested with the incoming supply removed.

(2) The full rated load for the battery shall then be connected to it. The voltage shall be measured at 5 minute intervals for the duration discharge period.

(3) The batteries shall be left to recharge. The voltage shall be checked after 14 hours with the load and incoming supply removed as well as with the load connected but incoming supply removed.

(4) When fully recharged, the voltage and specific gravity of every cell shall be measured with the incoming supply removed.

(5) The circulating A.C. current through and the A.C. voltage across the batteries shall be measured when the rectifiers are on with the battery discharged and fully charged.

3.10.2 **Oscillator tests**

(1) Frequency within tolerances at all loads.

(2) Parallel redundancy.

(3) Auto automatic synchronisation for connection of the synchronous motor/alternator to mains via the thyristor switch.

(4) An electronic frequency counter shall be used to measure the frequency.

3.10.3 **Rectifier tests**

(1) Output voltage of rectifiers at no load and full load with batteries charged and not charged.

(2) Current limit, both for mains failure and return to mains.

(3) Switch off value mains input monitor.

(4) Sequential switch on for return to mains.

(5) Soft start circuits.

3.10.4 **General**

Ammeters will not be acceptable to prove the above items. A wave analyser and a recording oscilloscope will be required. Photographs shall be taken of the oscillograms by the contractor in the presence of the engineer.

The overall efficiency of the complete uninterrupted power supply shall be proved to be within the specified limit at full load and at no load.

The over current protection mechanisms of the A.C.B. shall be proved by current injection (either primary or secondary)

The bypass and detour circuits shall be proved.

All alarms, indications and control functions shall be proved.
The test instruments provided shall in all cases be of high quality and suitable to be able to adequately assess the quantities being measured and the equipment being

tested. All instruments shall be calibrated by a testing laboratory approved by the National Calibration Service of the CSIR. The test equipment remains the property of the successful tenderer.

At the completion of the tests, a full test report shall be submitted by the contractor to the engineer in triplicate.

Continuously adjustable dummy loads of a rating suitable to comprehensively test the UPS shall be provided by the contractor as well as any temporary cables required for the connection of the dummy load to the UPS on site.

3.11 Information

All tenderers are required to submit the following information with their tenders:

(1) The information requested in the schedule of information.

(2) A paragraph by paragraph schedule of compliance with detailed description of any deviations from this specification.

(3) If alternative systems are offered, a clear description of the operating characteristics and special features of the equipment along with a motivation for offering the alternative.

(4) Descriptive and illustrated brochures and other information pertaining to the inverter and ventilation equipment and switchgear.

(5) The proposed layout as stated.

(6) Arrangement of batteries.

(7) A sample test report as stated.

(8) The circuit diagram requested.

(9) The information requested.

(10) Tenderers shall submit a list of successful installations completed in the Republic of South Africa.

3.12 Cabinet

The contractor shall supply and install a metal cabinet with lockable doors of sufficient size to house all operating and maintenance instructions, drawings, spares, tools, etc.

3.13 Schematic Diagram

A schematic diagram of the complete system shall be mounted in a suitable place and shall be resin encapsulated.

SECTION 4

4.1 PRICE SUMMARY

		Nett price in SA currency duty paid
(a)	Local content (excluding batteries)	R.....
(b)	Battery as specified	R.....
(c)	Imported content	R.....
(d)	Maintenance manuals.	R.....
(e)	Delivery, erection, commissioning and 12 months maintenance	R.....

TOTAL TENDER PRICE (EXCL VAT) FOR UPS INSTALLATION CARRIED OVER TO BILL OF QUANTITY IN PART B R.....

PRICE SCHEDULE

Prices shall include the supply, delivery, off loading, positioning, installation, commissioning, testing and handing over in good working order of the stated equipment.

A price shall be sufficient for each item. Where no price is supplied, the price of such item shall be deemed to be included elsewhere.

Main items only are listed in the price schedule. Tenderers shall however, allow for the complete installation as specified.

All prices shall include all levies, import duties, etc. VAT shall be separately allowed for as indicated.

4.2 MAINTENANCE

For carrying out the maintenance of the set as specified, for a period of 4 years, starting 12 months after the plant has been taken over by the Department in running order.

Price year	R.....
Number of visits per 12 months	R.....
Price per visit	R.....
Add value added tax @.....	R.....

TOTAL PRICE FOR ONE YEAR'S MAINTENANCE R.....

.....
Tenderer (signature)

Address:

.....

.....

.....

Date .....

Witnesses

1. .....

2. .....

DEPARTMENT OF PUBLIC WORKS

NTUZUMA SAPS

SPECIFICATION FOR

PART D:

FIRE PROTECTION AND DETECTION INSTALLATION

TABLE OF CONTENTS

Clause

FIRE PROTECTION AND DETECTION INSTALLATIONS

Supply and install Fire Protection and Detection Installations in accordance with the enclosed project specification.

Section 1: General Standard Specification

1. General

1.1 This general specification shall be read as the minimum requirements to which the fire protection and fire detection installations as specified in the project specification shall be manufactured, supplied, erected, built, commissioned, tested and maintained.

1.2 Clauses of this standard technical general specification which are applicable to the contract shall apply whether specifically referred to in the supplementary specification or not.

2. Related Documents

This specification forms part of the supplementary specification and drawings issued by the consultants for each service. In so far as the conditions herein contained are at variance with anything contained in the supplementary specifications, the contract shall be interpreted in terms of the supplementary specification for each particular service.

3. Reference Specifications And Standards

The latest revision of any specification, code of practice or standard referred to in this specification, shall apply.

Equipment, materials and operational methods shall, in order of preference, comply with the relevant SABS, ISO, BSS, DIN or equivalent American Standard, whether prescribed or not.

4. Statutory And Regulatory Requirements

The installation shall be manufactured, erected, built, constructed, commissioned, tested and maintained in compliance with the following regulations, where applicable:

SANS-10142 "Code of practice for the wiring of premises" as amended.

SABS 0400 "The application of the national building regulations" as amended.

SABS 0139 "The prevention automatic detection and extinguishing of fire in building" as amended.

The Occupational Health and Safety Act (85/1993) as amended, and contingent regulations.

The latest edition of the Rules of the Automatic Installations distributed by the Fire Protection Industries of South Africa and compiled by the Automatic Sprinkler Inspection Bureau (Pty) Ltd. (ASIB)

SABS 0287 "Automatic Sprinkler Installation for fire fighting purposes".

The National Fire Protection Association of USA requirements : NPFA 10-15.

The by-laws of the Local Municipality.

The Local Fire Department Regulations.

Any other applicable Statutes and Regulations.

The Automatic Sprinkler Inspection Bureau Standards and regulations.

The South African Bureau of Standards (SABS) regulations and standards.

Section 2: Fire Detection and Alarm

Supply and install Fire Detection and Alarm in accordance with Drawing No. EE/046725/SMK/01.

Standards

The code of practice for installation and servicing of fire detection and alarm systems shall generally be in accordance with SABS 0139, BS 5839 and European Standard EN54.

The system offered shall be designed to comply with:

The Rules of the Fire Offices' Committee and the Insurance Council of South Africa governing the installation of Automatic Fire Alarm Systems.

The requirements of the Fire Officers' Committee's recommendations for the protection of Computer Suites against fire.

Approvals

All equipment shall carry the full approvals of either the Fire Offices' Committee, the Insurance Council of South Africa, the Underwriters' Laboratory of the United States and the Canadian Underwriters' Association, unless otherwise stated or other regulations governing their use.

General
The proposed system shall be designed to provide Early Warning Automatic Fire Detection of all areas detailed in the attached location schedule. To achieve the desired level of protection, a number of Early Warning Automatic Fire Detectors are to be positioned throughout the areas to be protected in accordance with one of the aforementioned govering bodies.

To provide immediate zonal location of the Fire incident, the areas are sub-divided into separate zones determined by the geographical layout of the premises. The detectors in each zone shall be grouped together and each group wired back separately to its own Zone Indicator in the Control Unit.

The Control Unit shall provide visual indications of alarm and fault conditions and also provide various test and monitor control facilities, later described in detail.

The detection system in areas where a Manual/Automatic Gaseous Fire Extinguishing System is installed shall be arranged on a cross zone array. No two adjacent detectors shall be on the same detection circuit.
Break Glass Manual Alarm Units are to be included in the system and will be wired into the appropriate detector zone wiring.

Operation Of The System
On the detection of the products of combustion or Visible Smoke, the following alarms will be given automatically and simultaneously:

Audible throughout the affected zone by Bells. Visually and audibly at the Control Unit giving zonal location of the area affected. By a L.E.D. mounted on or adjacent to the affected detector. All floor void detector units should be indicated by means of an extended L.E.D. displayed within a floor void mimic diagram.

In an area where a Manual/Automatic Gaseous Extinguishing System is designed to be actuated by the detector system, the operation of any one detector shall trigger the various alarms

described in the preceding paragraph.

A different and distinctive audible alarm will sound to alert personnel that the release of gas into the protected area is imminent, (after the operation of two detectors wired into separate electrical circuits or zones in the same area.)

Allow the lapse of a preset time delay of 20 - 30 seconds duration to allow personnel to evacuate the protected area into which the gas will be released.

The audible alarm will continue to sound until the system is manually reset.

Ancillary Functions

The system shall be designed to activate the following functions on activation of the second circuit detectors.

Shut down the Air Conditioning System, fresh air ventilation and close the fire dampers.
Shut down the Computer System/Sub Station.

Detectors

All detectors offered must be fully approved by the F.O.C. National Board of Underwriters of New York or other recognised similar authority and shall comply with BS 5839 or SABS 0139.

Detectors are to be installed in a position where they will have maximum effect and will not be affected by draughts.

Detectors with different levels of sensitivity are to be available and interchangeable at no additional cost with the type offered.

Full details of the detectors offered are to be included with the Tender submission.

Detectors are to have a light to give an indication which detector has given a signal. Where detectors are concealed, a remote indicator is to be installed. The remote indicator shall be positioned as near as possible to the detector except in the case of floor void detectors as mentioned earlier.

The equipment shall give an alarm when the concentration of smoke in a protected space reaches 3% of the air volume.

The detector shall have a voltage rating of 24 Volts d.c. and shall be capable of withstanding 110 percent of the rated voltage continuously without damage. The normal signaling activity shall operate successfully at this increased voltage as well as at 85% of normal voltage.

The sensitivity of the detector shall be stable over a temperature range of -0°C to 50°C.

A 50% - 50% mix of ionisation and photo optical smoke detectors shall be used.

When the protected risk areas give rise to smoke or fumes (such as kitchens, welding shops and loading bays) a heat detector is to be installed instead of the smoke detector. This detector is to operate on a sudden rise in temperature and if the temperature should exceed 55°C.

Detectors are to be mounted such that the sensing element is no more than 200 mm or not less than 25 mm below the ceiling or roof.

Level Of Detection

The following minimum levels of detection are to be maintained:

1 Detector per 25 m^2 with a minimum of two detectors in any single room, the area is to be divided into overlapping zones.

In ceiling and floors:

Minimum coverage by detectors for each of these areas will be 50 m^5 per detector.

Control Unit

One Control panel shall be provided containing and shall comply with the requirements of BS 5839 and SABS 0139.

The Power Unit
Alarm and Fault Indicators
Audible Alarm Relay
Alarm Silencing Switch
Test and Reset Switch
Zone Isolation Switches
Fire Brigade Signalling Relay
Automatic Zone Monitoring
Facilities to link up to central monitoring system.

A standby power unit incorporating sealed lead acid or nicad batteries should be capable of providing standby power for the monitoring of the complete system for a period not less than 72 hours plus 1 hour full alarm load.

Wiring

The signalling circuits must be wired in approved galvanised conduit by means of 0,75 mm^2 660V grade PVC insulated flexible conductors complying with the SABS requirements or with fire resistant cables.

The audible alarms must be wired in 600V grade PVC Insulated flexible conductors calculated to ensure that there is not more than 2 volts drop at full alarm load.

Fire Brigade Signalling Facilities

The control unit must incorporate the necessary features to signal a fire or fault to the Fire Brigade via Telkom lines. The contractor must supply the signalling equipment at both the transmitting and receiving ends. It will therefore be necessary to consult the local Fire Brigade to ascertain what type of equipment is required.

Block Plan

An approved block plan indicating the various zones according to the appropriate reference numbers of the zone indication lights on the control unit must be mounted next to the control unit. This block plan must be discussed with the Head: Works before it is produced.

Operating Instructions

Instruction cards, indicating clearly in English and Afrikaans the procedure to be followed in the event of a "Fire" alarm, are to be framed in non-ferrous material frames and neatly mounted on the walls alongside the control and external indicator panels respectively, where they can be clearly read.

In the case of the control panel, the instruction card must also state clearly the procedure to be followed in the event of a "Fault" alarm.

NATIONAL DEPARTMENT OF PUBLIC WORKS

NTUZUMA POLICE STATION, KWAZULU-NATAL

NEW CCTV BUILDING

AIR CONDITIONING & VENTILATION INSTALLATION SPECIFICATION

PART 1 : DETAILED TECHNICAL SPECIFICATION

PART 1 : DETAILED TECHNICAL SPECIFICATION

INDEX

PART 1 : DETAILED TECHNICAL SPECIFICATION

1. STANDARD TECHNICAL SPECIFICATION

The installation shall comply with the following Standard Specification:

The Standard Specification for Air conditioning and Ventilation Installations issued by the National Department of Public Works of the Republic of South Africa, 1998.

2. SCOPE OF WORK AND DESIGN PARAMETERS

2.1 Scope of Work

Supply and installation of new air conditioning and ventilation installation comprising in-ceiling split, cassette and mid wall type air conditioning units in each room connected by refrigerant piping to central plant space individual condensing units. A condensate drain system shall be fitted to the evaporator units. A fresh air and exhaust air system shall be incorporated with this system.

Supply and installation of extract fan systems from toilet and other areas.

Preparation of construction drawings and builders work requirements for the air conditioning and ventilation installation.

Testing, commissioning and preparation of operating and maintenance manuals for the air conditioning and ventilation installation.

Maintenance and guarantee of the air conditioning and ventilation installation for a period of 12 months from first delivery of the installation.

2.2 Design Parameters

o Altitude	Approximately 300m above sea level
o Electrical Supply	380-400 Volts, 3 phase, 50Hz, 4 wire
o Summer Ambient Design Conditions	33°C d.b., 26.0°C w.b.
o Winter Ambient Design Conditions	8.0°C d.b., 7.0°C w.b.
o Internal Design Conditions	22.5°C ±1.5°C, 60% RH (Summer) 21.5°C ±1.5°C, 60% RH (Winter)

3. DRAWINGS

3.1 Mechanical Engineer's Drawings

Unless otherwise specified, the Mechanical Engineer's Tender drawings are not manufacturing drawings and the dimensions given are only sufficient for tendering purposes or to enable the Contractor to complete manufacturing drawings. It is the responsibility of the Contractor to verify all dimensions.

3.2 Contractor's Drawings

The Contractor will be furnished, on request, with the following drawings, as applicable or pertinent to the project:

(a) The Mechanical Engineer's drawings

(b) The Architect's drawings

(c) The Structural Engineer's drawings

(d) The Electrical Engineer's drawings

(e) The drawings of other service installations that are relevant for co-ordination and installation purposes

(f) The installation drawings of other Contractors

The Contractor will be furnished, on request, with the following drawings, as applicable or pertinent to the project:

Unless otherwise stated, three (3) sets of the Mechanical Engineer's drawings, Specifications and Schedules (if any), and one set of (b) and (c) above, will be issued free of charge to the Contractor for installation purposes.

The Contractor shall supply to the Mechanical Engineer four (4) copies of marked up structural or other drawings showing any changes and/or additional requirements to be made in the structure in order to meet the dimensional requirements of the equipment and materials to be installed by him. These builder's work drawings shall be supplied to the Mechanical Engineer within four (4) weeks after notification by the Mechanical Engineer that his tender was successful.

The Contractor shall supply four (4) copies of each detail design drawing for approval. The Contractor shall allow the Mechanical Engineer three (3) weeks for drawing approval. After a marked-up copy with all the Mechanical Engineer's comments has been returned, the Contractor shall update the original which shall then be submitted to the Mechanical Engineer for signature. This will ensure that all prints used for construction will be certified as approved.

Four (4) copies of the certified drawing shall be issued to the Mechanical Engineer for distribution.

The Contractor will be required to produce the following detail design drawings:

(a) Builder's Work Drawings

(b) Mechanical Drawings
- These are all Workshop and Equipment Layout Drawings required for the manufacture and erection of the Installations.

(c) Instrumentation Drawings, such as: Schematic Control Diagrams
- General Arrangement Drawing of Control Board

(d) Electrical Power Drawings, such as:
- General Arrangement Drawing of Switchboard
- Circuit Diagrams and interconnecting diagram giving cable schedules with numbers and sizes corresponding with the circuit diagrams and interconnection diagram.

Unless otherwise specified, cable routes shall be superimposed on the Mechanical Layout Drawings, showing the runs and fixing details.

Any work done by the Contractor without an approved signed drawing, will be at the risk of the Contractor.

The Contractor shall update all drawings ('As-Built Drawings') once the installation has been completed. Four (4) sets of paper prints and one (1) electronic copy shall be supplied to the Mechanical Engineer as part of the 0perating & M Manual.

3.3 Progress Drawings

The Contractor shall arrange for a full set of white prints of installation drawings to be kept on the site showing the progress of all work in connection with this Contract. Such prints shall be kept up-to-date.

The progress drawings shall be available for inspection at any time by the Architect/Quantity Surveyor/Mechanical Engineer and Contractor or any other authorized person.

The Contractor shall include for his representative to keep a diary recording the progress of the works and details of all instructions received. The diary shall be at the disposal of the Mechanical Engineer as and when required.

3.4 Equipment Drawings

The Contractor shall provide the Mechanical Engineer with working drawings of all items of equipment, with a detail technical specification of the equipment, for approval, before placing an order for the equipment.

4. OPERATING AND MAINTENANCE MANUAL

The Contractor shall, at his cost, prepare and supply manuals for the successful operation and maintenance of the Installation.

Six weeks prior to the commencement of commissioning, the Contractor shall supply a draft of the manual to the Mechanical Engineer for approval.

Two weeks after commissioning, the Contractor shall supply four (4) additional manuals which have been updated and include all commissioning data and 'as built' drawings.

These manuals shall contain the following information:

INDEX OF CONTENTS
SECTION 1: SYSTEM DESCRIPTION

A comprehensive description of the Installation

SECTION 2: OPERATING INSTRUCTIONS

2.1 Starting and stopping instructions

2.2 Prestart checks

2.3 Equipment running checks

SECTION 3: MECHANICAL EQUIPMENT

The following information shall be provided in full for each item of equipment:

3.1 General Information
Description, Make, Model Number, Name and Address of Supplier, Manufacturer etc.

3.2 Design Information
Design Data Sheet containing all design and selection parameters, calculations, selection curves, etc.

3.3 Settings and values recorded during commissioning

3.4 Manufacturer's Brochures and Pamphlets

3.5 Maintenance data and Schedules
The lapse of time between services and the description of the service required of each part, lubrication requirements, etc.

3.6 Schedule of Spares

SECTION 4: ELECTRICAL EQUIPMENT

The following information shall be provided for all electrical equipment whether in a switchboard or field mounted.

4.1 A complete Electrical Equipment Schedule
Description, Make, Model Number, Rating and other Design Criteria, Commissioned Setting, Name and Address of Supplier.

4.2 Maintenance information

4.3 Manufacturers Brochures and Pamphlets

SECTION 5: INSTRUMENTATI ON AND CONTROL

5.1 Detail description of the operation of the electrical and control systems

5.2 Design information

5.3 Manufacturers Brochures and Pamphlets

5.4 Settings and values recorded during commissioning

5.5 Maintenance data and schedules

SECTION 6: DRAWINGS
Paper prints or reduced size prints of all Contractor's drawings updated to 'as built' drawings.

5. CODING, LABELLING AND NOTICES

5.1 General

The Contractor shall supply and install all coding, labelling and notices as required under this Clause.

The wording shall be in English.

To reduce the possibility of incorrect labels and/or notices, the Contractor shall submit a schedule of labels and notices to the Mechanical Engineer for approval. Costs to rectify inscriptions, resulting from the failure by the Contractor to obtain approval, will be for his account.

5.2 Coding

5.2.1 General

FOR PAINTING COLOUR CODING REFER TO ITEM 13 OF THIS DOCUMENT

Codes and numbers for wiring and pneumatic piping shall be CRITCHLEY IZ-type Cable Marker interlocking endless expanding markers, as supplied by CABLE ACCESSORIES (PTY) LTD., CRITCHLEY C-type or other approved Cable Markers shall only be used with the approval of the Mechanical Engineer where wires and piping have already been terminated.

Lettering shall be marked in black on a white background.

5.3 Electrical

Provide and install the following coding:

(a) Numbering of both ends of power and control conductors in switchboards.

(b) Numbering of both ends of field cables.

(c) Numbering of both ends of individual field conductors within cables of control circuits only, where such conductors are not uniquely identified by means of insulation colour codes.

5.4 Labelling

5.4.1 General

Labelling shall be CRITCHLEY UNILABEL or other approved Cable Marker, as supplied by CABLE ACCESSORIES or other approved, or engraved ' IVORENE' or 'TRAFOLITE ' labels.

Black letters on a white background shall be used.

Labels shall be fixed with screws or acceptably glued to all equipment.

5.4.2 Equipment

All mechanical, electrical and instrumentation equipment shall be identified by means of an equipment code.

Minimum height of letters: 10 mm

5.5 Notices

Supply and install all notices required in terms of Statutory Regulations.

In terms of the Occupational Health and Safety Act of 1993, the following notices are required:

5.5.1 (C.52)

At the entrance to each plant room, the following notice shall be provided.

(i) Prohibiting unauthorized persons from entering

(ii) Prohibiting unauthorized persons from handling or interfering with electrical apparatus

(iii) Directions as to procedure in case of fire

(iv) Directions as to restoration of persons suffering from the effects of electrical shock

5.5.2 (C.73)

Manufacturer's Plate on Pressure Vessels:

(i) Manufacturer's name

(ii) Country of Origin

(iii) Maker's Number

(iv) Year of Construction

(v) Maximum permissible working pressure in pascal

(vi) Capacity in cubic metres

(vii) Name and Number of Code of Manufacture

5.5.3 (C.95)

Particulars to be marked on Boilers. Refer to the Occupational Health and Safety Act of 1993, for requirements.

6. INSPECTIONS AND TESTING

6.1 Inspections (Part III, SAACE - 1978)

The Mechanical Engineer shall have general supervision and direction of the Contract Works. Supervision shall comprise such periodic visits as the Mechanical Engineer may consider necessary to inspect the Contract works for conformity with the Contract documentation and to provide clarification and further information as necessary.

The Mechanical Engineer shall have the power at any time to inspect and examine any part of the Contract Works or any materials intended for use in or on the Contract Works, either on the site or at any factory, workshop or other place where such parts or materials are being constructed or manufactured or at any place where same are lying or from where they are being obtained, and the Contractor shall give all such facilities as the Mechanical Engineer may reasonably require to be given for such inspection and examination.

The Contractor shall not be liable for the cost of inspecting materials at the place of manufacture, construction or storage nor be responsible for any travelling or accommodation costs arising out of the execution of such inspection etc.

6.2 Testing

The Contractor shall supply all test equipment, test facilities and everything necessary, at his cost, to perform these tests. The minimum testing and commissioning equipment that is required, is as follows:

- Pitot tube and manometer
- Hot wire anemometer
- Crane type manometer for balancing valves
- Thermometer for insertion into pipe and duct pockets alongside temperature detectors
- Noise meter with octave band analyser
- Sling psychrometer
- Revolution counter suitable for measuring fan and motor shaft rotation
- Megger equipment
- Clamp on ammeter
- Voltmeter
- Power factor meter
- Ohmmeter suitable for continuity testing
- Neon type ON/OFF test lamp
- Maximum indicating ammeter suitable for measuring peak motor starting currents

The Contractor shall record all measurements taken during testing and shall do the necessary adjustments until the Mechanical Engineer is satisfied with the results.

The Mechanical Engineer shall be notified one (1) week in advance of any tests so that he may witness such tests.

Unless otherwise specified, the Contractor will be required to perform the following tests:

6.2.1 Electrical Switchboards

A simulated functional test in the factory to ensure the correct operation of equipment, controls, interlocks and measuring circuits.

A 2,5 kV pressure test in the factory.

6.2.2 Ducting

Pressure test medium and high pressure ducting in terms of SABS 0173- 1980: Code of Practice for the Installation, Testing and Balancing of the Air Conditioning Ductwork.

6.2.3 Water Piping

Pressure test of all piping at a test pressure of 1,5 times the maximum working pressure at the lowest point in the system, but not less than 700 kPa. All instrumentation or other equipment which could be damaged during the pressure test, shall be removed from the pipe systems. The relevant system shall be filled with water and all high points shall be vented at least 24 hours before the test.

The duration of the pressure test shall be 24 hours, after which no water leaks shall be visible and no pressure drop shall occur after corrections have been made for changes in ambient temperature during the test period. A mechanical or electronic Recorder shall be used to verify the pressure test results.

Pressure tests shall be completed in sections, which adhere to the schedule as specified in this specification, prior to insulating or covering piping.

If leaks are found, welded connections shall be cut out and rewelded and screwed joints shall be dismantled, cleaned and reconnected. Rectified piping shall be retested.

6.2.4 Pressure Vessels

Refer to the requirements set out in the Occupational Health and Safety Act of 1993.

6.2.5 Refrigerant Piping

Factory charged systems shall first be pressure tested and thereafter be vacuum tested. Field charged systems shall only be pressure tested.

Refrigerant pipes and equipment shall be tested under vacuum at a pressure of 0,68 kPa absolute, maintained for a period of one hour with the vacuum pump uncoupled. Any leaks under these conditions are not acceptable.

Refrigerant pipes and equipment shall be tested in terms of SASS 0147 - 1978: Code of Practice for Refrigeration and Air Conditioning Installations. All connections shall be inspected for leaks by means of a sensitive leak detector and soap bubble test.

7. COMMISSIONING AND HANDING OVER

7.1 Procedure

- Physical Completion
  After physical completion of the erection phase of the Installations, the Mechanical Engineer will issue a Snags List certifying that commissioning can proceed. Items which would not influence the commissioning process could, at the discretion of the Mechanical Engineer, be attended to during commissioning stage.

- Commissioning Stage
  After commissioning the Mechanical Engineer will issue a second Snags List (the Commissioning Snags List). Any outstanding work will be recorded on this List.

- Mechanical Engineer's Certificate
  After completion of all outstanding items and receipt of all manuals and drawings as recorded on the Commissioning Snags List, the Mechanical Engineer will issue a Mechanical Engineer's Certificate. This certificate will accompany a certificate of acceptance by the Mechanical Engineer. The one year maintenance and guarantee period will commence on the date of the Mechanical Engineer's Certificate.

7.2 Commissioning

The Contractor shall commission the Installation in terms of the following codes, or any other code approved by the Mechanical Engineer:

7.2.1 Air Distribution Systems:
SABS 0173 - 1980: Code of Practice for the Installation, Testing and Balancing of Air Conditioning Ductwork.

7.2.2 Refrigeration Systems:
CIBS : Commissioning Code : Series R : Refrigeration Systems

7.2.3 Control System:
CIBS : Commissioning Code : Series C : Automatic Controls

7.2.4 Water Distribution Systems:
CIBS : Commissioning Code : Series W : Water Distribution Systems

The Contractor shall submit a commissioning programme to the Mechanical Engineer, at least four (4) weeks prior to the commencement of commissioning.

The power connections to the various installed equipment must be energized to facilitate commissioning of the installation. The Contractor is to liaise timeously, with the Electrical Contractor responsible for the new transformer installation, to ensure that power will be available when required to avoid delays to the Mechanical Installation Programme.

To enable this switch-on to take place the Mechanical installation must be substantially complete.

The Contractor shall inform the Mechanical Engineer within (4) weeks of his appointment, what time allocation has been allowed for commissioning purposes. This must be reflected on the Critical Path Schedule to be submitted by the Contractor.

7.3 Handing over Procedures

The Contractor shall provide a suitably qualified and trained person to train the Mechanical Engineer's staff in the correct operation and maintenance of the Installation. The Contractor shall allow for this person to be full time on site for a period of three (3) days immediately after the handover date.

It is a condition of this Specification that the commissioning of the air conditioning and ventilation installation will be carried out by a firm specialising in this field of work as well as the major equipment supplies and the results submitted to the Mechanical Engineer.

8. MAINTENANCE DURING THE GUARANTEE PERIOD

During the guarantee period the Contractor shall be fully responsible for complete maintenance of the installation. The guarantee period on material, equipment and labour performed commences on the date when the Mechanical Engineer's Certificate is issued and expires one calendar year later.

Maintenance of the Installation shall mean the regular servicing, lubrication, repairing, cleaning and adjustment of the Installation as well as the free of charge replacement of any defective components during the guarantee period.

A suitably qualified and trained person, shall check and ensure the correct and proper operation of the plant once a month, and shall also perform all necessary maintenance tasks to ensure smooth and faultless operation. Emergency calls shall be immediately attended to.

A Logbook shall be kept in the Chiller Plant room. Details of each service and all repairs shall be recorded in this Logbook with meticulous care. The Logbook shall at all times be put at the disposal of the Mechanical Engineer.

9. STATUTORY AND REGULATORY REQUIREMENTS

The Installations shall be designed, erected, commissioned and maintained in compliance with the appropriate regulations as specified in the Standard Technical Specification.

In addition, the Contractor shall exempt the Mechanical Engineer from all losses, costs or expenditures which may arise as a result of the Contractor's negligence to comply with the requirements of the regulations enumerated in this Clause.

It shall be assumed that the Contractor is conversant with the above-mentioned requirements. Should any requirement, bylaw or regulation, which contradicts the requirements of this Document, apply or become applicable during erection of the Installation, such requirements, bye- law or regulation shall overrule this Document and the Contractor shall immediately inform the Mechanical Engineer of such a contradiction.

Under no circumstances shall the Contractor carry out any variations to the Installations in terms of such contradictions without obtaining the written permission to do so from the Mechanical Engineer.

It shall be the responsibility of the Contractor to make the necessary arrangements at his own cost with any Statutory Authority, and to supply the labour, equipment and means to inspect, test, commission and to hand over the Installation.

The Contractor shall supply and install all notices and warning signs that are required by the appropriate laws or regulations and/or by these Documents.

10. LAYOUT OF PLANT

The various plant shall comply in capacity and general layout with the details given in the specification and drawings. Should the Contractor offer equipment at variance with these requirements, full details and calculations and the supporting reasons therefore shall be given.

The general layout may be altered or modified to suit the Contractor's equipment, but a sketch showing the intended layout submitted to the Mechanical Engineer before the tender is awarded.

Dimensions shown on the Drawings are sufficiently accurate for tendering purposes, but before construction of the plant is commenced, these dimensions together with all structural members etc., must be verified on site and the plant constructed accordingly. If the Contractor requires alterations to the structure these must be described timeously so as not to affect the construction programme. Minor structural alterations which might facilitate the work can be arranged with the Mechanical Engineer and/or Architect as the work progresses, but no claims will be entertained for alterations to plant, etc. constructed before the necessary dimensions and details had been verified.

The Contractor must ensure that his plant selection is suitable for the plant room dimensions.

11. ALTERNATIVE EQUIPMENT

The words 'or other approved', are implied wherever specific descriptions of equipment is provided.

In the case of specific product names being provided in schedules, implies that such equipment was selected for design purposes only.

Tenderers may offer alternative equipment with the understanding that such alternative offers are 'or other approved' the selected equipment (in quality and performance) on which the design was based.

The Mechanical Engineer shall reserve the right, on behalf of the Client, to decide whether such equipment is acceptable or not. Subject to a tender being accepted with such alternatives, approval must be obtained from the Mechanical Engineer for such alternatives prior to the Contractor placing orders for the equipment.

12. REQUEST BY MECHANICAL ENGINEER FOR CHANGES (VARIATIONS)

When a variation becomes necessary, the Mechanical Engineer shall notify the Contractor in writing, setting out the scope and nature of the proposed variation.

The Contractor shall then determine what cost variation, if any, is involved, giving due consideration to any material already prepared or work already done which would require alterations.

Variation in cost shall be in accordance with rates set out in the Contract where these are applicable. A price breakdown is to accompany the variation quotation submitted.

Within seven (7) days of receipt of the Mechanical Engineer's request for variation, the Contractor shall inform him of the price adjustment attributable to the proposed variation. If it is decided that the work shall proceed, the Mechanical Engineer will then issue a variation order to the Contractor, authorizing him to carry out the variation.

If the Contractor should fail to notify the Mechanical Engineer within seven (7) days that there will be a cost increment associated with the proposed variation, it will be assumed in default that no cost variation is applicable.

If the carrying out of any variation instructed by the Mechanical Engineer would, in the opinion of the Contractor, prevent him from fulfilling any of his obligations under the Contract, including the timely completion of the Contract, he shall notify the Mechanical Engineer in writing without delay, and shall submit computations or other evidence in support of his opinion.

The Mechanical Engineer should then decide whether or not the variation is be carried out. If the Mechanical Engineer confirms his instructions to carry out the variation, the Contractor shall be held relieved of his obligation under the Contract insofar as they are affected by the required variation. The Mechanical Engineer's decision as to the validity of the Contractors claim is however final.

13. PAINTING

13.1 General

Unless otherwise specified the Contractor will be responsible for the painting of the complete Installation.

The air handling unit and the metal fan enclosures may be provided pre- painted in terms of the required stated specifications of manufacturers and/or supplies of such equipment.

The Contractor shall be responsible for the painting of all pipework, ductwork and hangers in accordance with this specification.

13.2 Identification Colour Marking (where applicable)

The installation shall be painted in accordance with the following colour coding, unless the Mechanical Engineer issues an instruction to deviate from the specified coding.

Before commencing with painting, the Contractor shall obtain confirmation from the Mechanical Engineer that the given coding is applicable to the specific Installation.

Services which are not listed in the schedule below, shall be identified in accordance with SABS 0140: Identification Colour Marking: Part I - General: Part III - Contents of Pipe Lines.

Identification Colour Marking shall be in accordance with SABS 0140.

Colours referred to are in terms of SABS 1091: National Colour Standard for Paint.

13.3 Application

All surface to be painted shall be clean and dry and shall be free from oil or grease.

The cleaning and preparation of surfaces, the application and type of undercoats and paints, shall be in accordance with the prescriptions and specifications, applicable to the specific material and surface, of an approved paint manufacturer and of this section of the specification which shall take priority.

During painting, the Contractor shall ensure that all the necessary fire prevention and fire fighting precautions have been taken.

ITEM	BASIC COLOUR	COLOUR NO. TO SABS 1091-1975	COLOUR CODE INDICATOR	COLOUR NO. TO SABS 1091-1975	COMMENTS
1. **PIPING**					Colours and Colour Marking shall generally be in accordance with SABS 0140: Part 111 1978
1.1 Water Pipes					
1.1.1 Domestic Cold Water	Brilliant Green	H10	Cornflower	F29	
Hot Water	Brilliant Green	H10	Crimson + Cornflower	A03 F29	
1.1.2 Distilled Water	Brilliant Green	H10	Crimson + White + Crimson	A03 A03	
1.1.3 Demineralized Water	Brilliant Green	H10	White		
1.1.4 Chilled Water	Brilliant Green	H10	Golden Yellow + Ultramarine	B49 F09	
1.1.5 Condenser Water	Brilliant Green	H10	Golden Yellow + Golden Brown	B49 B13	Galvanised piping shall remain unpainted unless the external zinc layer has, according to Engineer, been damaged.
1.1.6 Hot Water	Brilliant Green	H10	Golden Yellow + Crimson	B49 A03	
1.1.7 Drain Water	Black	-	-	-	
1.1.8 Hosereel and Hydrant Water	Signal Red	All	Canary Yellow	C61	
1.1.9 Sprinkler Water	Signal Red	All	Numbers of Control valves on distribution	C61	Numbers shall be marked every 6 metres
1.2 Air Pipes					
1.2.1 Compressed	Arctic Blue	F28	-	-	Copper pipes shall not be painted
1.2.2 Instrument	Arctic Blue	F28	Salmon Pink	A40	
1.2.3 Vacuum	Arctic Blue	F28	Primrose	C67	

ITEM	BASIC COLOUR	COLOUR NO. TO SABS 1091-1975	COLOUR CODE INDICATOR	COLOUR NO. TO SABS 1091-1975	COMMENTS
1.3 Steam Pipes					
1.3.1 Diesel Fuel	Golden Brown	B13	White	-	
1.3.2 Hydraulic Power	Golden Brown	B13	Salmon Pink	A40	
1.3.3 Lubricating	Golden Brown	B13	Verdigris Green	E22	
1.3.4 Transformer	Golden Brown	B13	Crimson	A03	
1.4 Steam Pipes					
1.4.1 Steam	Pastel Grey	G54	-	-	Stainless Steel, Aluminium or Galvanised insulation covering shall not be painted
1.4.2 Condensate	Brilliant Green	H10	Pastel Grey	G54	
2. AIR HANDLING EQUIPMENT					
2.1 Fans	Cornflower	F29	-	-	Only the external surface of plenums manufactured from galvanised sheetmetal, need to be painted
2.2 Air handling units and plenums	Cornflower	F29	-	-	
2.3 Air Ducts			Identification and coding shall be in terms of SABS 0173-1980		
2.3.1 Internally insulated galvanised sheetmetal ducts	Light Grey	G29	-	-	Only visually exposed ducts shall be painted
2.3.2 Externally insulated ducts	-	-	-	-	Unpainted
2.3.3 Aluminium ducts	-	-	-	-	Unpainted
2.3.4 Stainless Steel	-	-	-	-	Unpainted
2.3.5 P.V.C.	-	-	-	-	Unpainted

ITEM	BASIC COLOUR	COLOUR NO. TO SABS 1091-1975	COLOUR CODE INDICATOR	COLOUR NO. TO SABS 1091-1975	COMMENTS
3. ELECTRICAL EQUIPMENT					
3.1 Switchboards	Black Frame with Orange Panels	B20	-	-	SABS 074 - 1961
3.2 Electrical Heater	Flag Orange	B20	-	-	
3.3 Cable Trays	Flag Orange	B20	-	-	Galvanised sheetmetal trays and channels shall be painted
4. GENERAL					
4.1 Bases and plinths	Blacks	-	-	-	Approval of standard colours of equipment shall be obtained from Engineer prior to ordering. If the painting is found to be damaged during the final inspection, the subcontractor shall repaint the equipment in accordance with the prescriptions of the Manufacturer and to the
4.2 Equipment	-	-	-	-	
4.3 Safety Guards	Flag Orange	B20			
4.4 Refrigeration Piping (Copper)	Unpainted	-	-	-	To NOSA requirements

Name plates, labels and notices on equipment shall not be painted.

The Contractor shall adequately protect the painted surfaces of all equipment which have been pre-painted in the factory, since such equipment will have to be repainted in total if the Mechanical Engineer is not satisfied with the paint surfaces during the final inspection.

Before any painting is applied, the surfaces shall be prepared according to SABS 064 Code for Preparation of Steel Surfaces for Painting.

All galvanised surfaces shall be thoroughly degreased. In the case where detergent is used, the surface shall be well rinsed and dried. It shall then be painted with one coat of wash primer (self etch primer) to SABS 723. When dry, the surface shall be painted with one undercoat to SABS 681, Type 11 and one coat high gloss enamel paint to SABS 630m, Grade 1 as top coat.

Exposed and unlagged galvanised piping shall be painted with one coat wash primer (self etch primer) to SABS 723 followed by one undercoat to SABS 681, Type 11 and one coat high gloss enamel paint to SABS 630, Grade 1 as top coat.

Unlagged black piping, flat iron, angle iron, rods etc. for supports, brackets, frames, duct stiffeners etc., shall be painted on all sides with a zinc chromate primer to SABS 679 type 1, followed by two coats of enamel paint to SABS 630, Grade 1.

14. NOISE AND VIBRATION

14.1 General

The plant shall be as noise and vibration free as possible. The Contractor shall take special care in this respect and must allow for all the items necessary to ensure that the sound levels as specified in the specification are not exceeded as a result of the noise and vibration created by the installations (in particular the air distribution systems).

14.2 Noise Levels

Noise levels caused by the operation of the air distribution installation, whether generated in the specific areas or transmitted to them through ductwork, walls, floor or roofs, shall not exceed 40 dBA.

The above noise level shall be measured at various positions in the spaces at a height of 1.2 m above floor level and not less than 1.0 m from walls.

14.3 Vibration Isolation

14.3.1 General

All equipment creating vibrations shall be installed on vibration damping mountings to prevent transmission of vibrations to the surrounding structure.

The method of installation and the number of mountings required shall be strictly in accordance with the manufacturer's instructions.

Mechanical equipment, piping, etc. shall be mounted on or suspended from approved and specified foundations or supports. Floor mounted equipment shall be erected on a 100 mm high reinforced concrete base or as detailed on the drawings. Where vibration isolation equipment is used, the bases shall be extended to support the isolation system.

All vibration isolation systems exposed to a corrosive environment shall be weatherproofed all steel parts shall be hot-dip galvanised, and bolts shall be cadmium plated and all springs shall be cadmium plated and NEOPRENE - coated.

14.3.2 Double Deflection "Neoprene"-in-Shear Mountings

Double deflection NEOPRENE- in shear mountings shall have a minimum static deflection of 10 mm. The mountings shall each consist of a steel top plate and base plate completely embedded in coded NEOPRENE for easy identification of rated load capacity. The mountings shall be moulded with a non-skid ribbed construction on the top plate and base plate. All mountings shall be equipped with bolt holes in the base plate and tapped holes in the top plate so that may be bolted to the floor and the equipment.

14.3.3 Steel Spring Mountings

Steel spring vibration mountings shall consist of cast telescopic housing containing one or more steel springs of 50 mm minimum diameter as the isolation medium. They shall have built-in levelling bolts, resilient inserts to act as guides for the upper and lower housings and shall incorporate 6 mm thick ribbed NEOPRENE - acoustical pads bonded to the top and bottom. All mountings shall have bolt holes in the base plate.

Horizontal and vertical spring constants shall be equal to ensure mounting stability. All mountings shall have an additional 50% capacity beyond the rated load. Mountings used on equipment likely to undergo mass changes (i.e. cooling towers or boilers when being drained) shall incorporate a resilient vertical limit stop to prevent spring extension.

A minimum clearance of 12 mm shall be maintained between the steel springs and the limit stop housings, and around the restraining bolts so as not to interfere with normal spring performance.

14.3.4 Steel Spring Hangers

Steel spring hangers shall consist of a steel spring in combination with a NEOPRENE-in-shear element.

The minimum total deflection shall be 32 mm.

14.3.5 Double Deflection 'NEOPRENE'-in-Shear Hangers

Double deflection NEOPRENE-in-shear hangers shall have a minimum static deflection of 1Omm. The elements shall be of moulded 'neoprene' and shall be coded for easy identification of rated load capacity.

14.3.6 Flexible Connectors located in Pipework

Flexible connectors shall be of moulded neoprene, nylon reinforced construction. The connectors shall be of the 'twin-sphere' type as detailed on the drawings. Flexible connectors shall be located in the following positions:

1. Pump connections
2. Chiller connections
3. Cooling Tower connections

The connectors shall be oil, weather and ozone resistant. They shall be complete with loose flanges and able to be installed without gaskets.

The connectors shall have a rated working pressure and temperature suitable for the operating conditions.

Connectors shall be installed having axial alignment with the connecting flanges, and shall not be bent, stretched, compressed or subject to torsional forces. They shall, at all times, be installed in accordance with the manufacturer's instructions.

14.3.7 Framed Concrete Bases

Concrete pouring forms shall be of integral structural steel channel construction. The depth of steel channel section shall be $^1/_{12}$ of the longest dimension but in no instance less than 150 mm regardless of the base length.

The pouring form shall include reinforced rods welded in place at 150 mm centres running in both directions in a layer 25 mm to 40 mm above the bottom of the base.

Steel members shall be welded in place to act as a template. These members shall be provided with bolts or bolt holes for anchoring the supported equipment. The concrete shall have a minimum mass equal to the equipment mass or as recommended by the manufacturer of the vibration mountings. Pouring forms for split case pumps shall be extended in width to provide supports for the suction and discharge elbows. Height saving brackets shall be located in all mounting positions.

14.3.8 Type of mountings for Various Types of Equipment

The following types of vibration mountings shall be used for various types of equipment. For each mounting the static deflection shall be based on the equipment and its location in the building and shall be in accordance with the manufacturer's instructions.

EQUIPMENT	VIBRATION MOUNTING
Close coupled pumps of less than 7,5 kW located in the basement.	Double deflection 'neoprene' - in-shear mountings.
All pumps larger than 7,5 kW in the plant rooms and all pumps in locations other than the plant rooms.	Framed concrete base with steel spring mountings under concrete base. Minimum static deflection 20 mm.
Floor mounted packaged air handling units.	Double deflection 'neoprene' - in-shear mountings.
Air Compressors	Structural steel rails with steel spring mountings and limit stops. Minimum static deflection 25 mm.

Flexible connectors shall be installed at the suction and discharge sides of all pumps or other equipment that may generate vibrations.

15. SPLIT TYPE AIR CONDITIONING UNIT SYSTEMS

Supply and install new Dunham Bush, (using Refrigerant R410a), or other approved, type units connected with a refrigerant reticulation system to externally mounted inverter drive condensing units.

The indoor units shall be set to deliver air that is filtered, dehumidified and cooled and heated as dictated by the unit controls.

The indoor units shall be inverter type designed to operate on a single phase 220 volt, 50 Hertz supply. The units shall be heat pump type.

The condensing section shall comprise of a hermetically sealed reluctance DC scroll type compressors, aero spiral condenser fans and motors all mounted on a heavy gauge steel chassis, enclosed in a robust, easily detachable steel casing, with adequate louvres for ventilation of the condenser coil. Operation efficiency shall be improved using sine ware DC inverter control. The outdoor condensing units shall be "Bluechem" Coil Treated and including the complete unit including coils casing and fixing. Certification shall be submitted to verify the "Bluechem" Treatment.

The indoor section shall comprise of an evaporator coil, condensate drip pan, supply air fans, fan scrolls, fan motor, controls and filters, all mounted on a heavy gauge steel chassis, enclosed within an attractive, robust, easily detachable, steel casing.

All parts of the chassis and cabinets shall be suitably treated against corrosion and the exterior of the casings shall be finished in a high quality aesthetically pleasing anti-corrosive material or approved paint finish.

The outgoing (liquid) tubing from the condenser coil and the incoming (suction) tubing to the compressor, shall terminate at suitably mounted quick-coupler type connectors mounted on the exterior of the condensing unit.

The evaporator coil shall be adequately rated for the specified duty of the air conditioning unit. The outgoing (suction) tubing and the incoming (liquid) tubing, from evaporator coil, shall terminate at suitably mounted quick coupler type connectors, mounted within the unit casing.

Both the indoor section and the outdoor section shall be factory precharged with refrigerant. Suitable temperature and current protection shall be provided for the compressor.

The evaporator coil shall consist of a multi-pass coil of heavy gauge, solid drawn copper tubing, mechanically expanded into copper or aluminium cooling fins. The coil shall be provided with an automatic defrost thermostat to prevent excessive frosting. The evaporator coil shall be suitably mounted to the steel chassis and shall be completely sealed off to ensure that maximum supply air flows over the coil.

The indoor section shall be fitted with twin double inlet, silent running, centrifugal fans within properly sized aluminium, or steel fan scrolls. The fan blades shall be of dynamically balanced aluminium or other non-ferrous metal manufacture, mounted on a common shaft and driven by a continuously rated two speed electric motor, resiliently mounted on a suitable cradle. The fan motor is to be fitted with bearing oilers and self aligning bearings.

The condenser fan shall be of the dynamically balanced, propeller type, fitted with a slinger ring to discharge excessive condensate over the condenser coil.

The fan shall be driven by a continuously rated, totally enclosed, electric motor, resiliently mounted on a suitable cradle. The fan motor shall be fitted with bearing oilers an self aligning bearings.

The indoor section shall be of the top, front or angled front air discharge type. The air flow discharge grilles shall be adjustable so that the air- stream may be directed as required. The return air inlet grille must be mounted on the front panel of the casing.

The air filters shall be easily accessible and easily removable and shall be manufactured of material that may be washed with a mild detergent if necessary.

A suitably sized condensate pan is to be installed below the evaporator coil.

The condensate from the pan, shall be piped away to discharge into the nearest drain or gulley. In the case of cassette type units the condensate shall be pumped to the nearest drain or gulley. In the case of mid-wall units a concealed condensate pump will be incorporated.

The condensate drain pipe shall be suitably trapped and be of the best quality copper tubing neatly run and saddled.

Heating shall be provided by means of reverse cycle, heat pump operation.

Cassette type units shall have a fresh air spigot for connection to outside using sheetmetal ductwork.

The air conditioning unit shall generally be fitted with the following controls:

- A main on/off switch to control the unit.
- An adjustable cooling / heating thermostat to control room temperature requirements.
- A variable fan speed control switch.
- Adjustable 'sweep' supply air discharge control
- Time clock control.

These controls shall be mounted on a fixed control module located at ±1500 mm above finished floor level. The wiring from the indoor unit to the controller shall be 'hard' wired in conduit in dry wall partitioning as directed by the Engineer.

An automatic de-ice thermostat is to be fitted to the condenser section to prevent icing up when operating under low ambient conditions.

The air conditioning unit specified above, shall be efficient and extremely quiet in operation and the noise level shall not exceed 33 dB's on the "A" scale at a distance of three metres from the unit.

The air conditioning unit shall be connected to the power supply by a three-core heavy duty flexible cable, the rating of which shall be adequate for the full load current of the unit. The inter-connecting cable between the air handling section and the condensing section shall be of the PVC steel wire armoured type or other approved. Flexible cable is not acceptable.

The HVAC Sub Contractor shall supply and install electrical protection for his equipment against high and low voltage situations.

16. REFRIGERANT PIPING (USING REFRIGERANT 410A) AND DRAIN PIPING

The interconnecting refrigerant tubing, between the condenser section and the air handling section, shall be of the best quality, seamless, dehydrated, deoxidised, refrigeration class copper tubing, suitably sized for the unit installed. All fittings shall be of copper tubing using a good quality Silfos of Silver solder welding rods. Soft soldered joints will not be acceptable.

The suction and discharge lines shall be completely insulated against ambient temperatures, to prevent condensation drip, by using a good quality insulation such as "armaflex", "Thermoflex", or other approved.

The condensate is to be piped away to the nearest drain or gully with copper pipe of suitable size and as per the manufacturers prescriptions.

The pipe runs shall be neat and best quality workmanship shall be employed and exposed piping shall be enclosed in suitably sized PVC trunking.

Factory charged systems shall first be pressure tested and thereafter be vacuum tested. Field charged systems shall only be pressure tested.

Refrigerant pipes and equipment shall be tested under vacuum at a pressure of 0,68kPa absolute, maintained for a period of one hour with the vacuum pump uncoupled. Any leaks under these conditions are not acceptable.

Refrigerant pipes and equipment shall be tested in terms of SABS 0147 - 1978: Code of Practice for Refrigeration and Air Conditioning Installations. All connections shall be inspected for leaks by means of a sensitive leak detector and soap bubble test.

17. AIR CONDITIONING AND VENTILATION DUCTING

17.1 Air conditioning and Ventilation ducting shall be manufactured, installed, tested and balanced in accordance with the following specifications, modified as described.

SABS 1238 - 1979 : AIR CONDITIONING DUCTWORK		
		Relevant SABS 1238 Clause
17.1.1	The specification will apply to Air conditioning & Ventilation	1.1
17.1.2	Material thickness : The nominal thickness of material including coatings such as galvanised but excluding painting - (Refer to ISCOR Specification SPE 140 : Galvanised Slit Strip/Sheets).	2.1
17.1.3	Size (of a duct or fitting) : The nominal sheetmetal diameter (in mm) of a duct or fitting of circular cross section and nominal sheetmetal dimensions (width and height, in mm) of a duct or fitting of rectangular cross- section. The dimensions on drawings are given as follows:	2.1

SABS 1238 - 1979 : AIR CONDITIONING DUCTWORK		Relevant SABS 1238 Clause
17.1.4	**DIMENSIONS SEEN X DIMENSIONS NOT SEEN** e.g. On Plan : Width x Height In Section : Height x Width	
17.1.5	Material Requirements: Mild Steel : Galvanised sheetmetal to ISCOR Specification SPE 140 : Galvanised Slit Strip/Sheets	3
17.1.6	Access Openings, Doors and Covers : Access panels in ductwork adjacent to fire dampers shall be similar or equal to TROX type BS-A The size and location of the panel shall enable resetting of the fire damper.	3.1
17.1.7	Access doors in builders work airhandling units and plenums, shall be TROX type BS-A The size and location of the panel shall enable resetting of the fire damper.	4.4
17.1.8	Access doors in builders work air handling units and plenums, shall be TROX types ST or ST-D, in the positions shown on the drawings.	
17.1.9	Flexible joints exposed to the weather, shall be protected by means of a galvanised sheetmetal cover.	4.6
17.1.10	Sealants An approved sealant shall be applied to each longitudinal and transverse joint prior to assembling in ductwork for use in low, medium and high pressure systems.	4.7.1 4.8
17.1.11	The liner at heaters shall be asbestos insulation board of 9 or 12mm thick of which the asbestos fibres cannot come loose.	4.9.3
17.1.12	Since 40 x 40 x 4 angle iron is not available, 40 x 40 x 3 shall be used.	Table 4
17.1.13	Where the following minimum sheet thickness is specified, the following shall be used: 0.6mm nominal = 24 SWG (0.56) 0.8mm nominal = 22 SWG (0.71) 1,0mm nominal = 20 SWG (0.914) 1,2mm nominal = 18 SWG (1,22) 1,6mm nominal = 16 SWG	
17.1.14	Medium and High negative pressure systems shall have inward cross breaking.	

SABS 1238 - 1979 : AIR CONDITIONING DUCTWORK		Relevant SABS 1238 Clause
17.1.15	Figure 4: The edge of nosings in contact with insulation shall be bent over and glue shall be applied below the nosing prior to fixing. Nosings may be spot welded or pop riveted at a maximum pitch of 200 mm or 50 mm from the ends.	Fig. 4
17.1.16	Figure 16: A Drive Slip (Fig 11) together with a 25 x 25 x 3 angle iron stiffener within 74 from the joint, will also be acceptable.	Fig. 16
17.1.17	Splitters in bends of which the throat radius exceeds 100 mm, shall be selected using CHART 6 in CARRIER SYSTEMS DESIGN MANUAL Part 2.	Fig. 28, 29, 30
17.1.18	Spigots to grilles shall have 100 mm, 45~ shoes unless the Engineer approved straight spigots.	Fig. 35
17.1.19	**SABS 0173 - 1980 : The Installation, Testing and Balancing of Airconditioned Ductwork**	
17.1.20	The specification will apply to Air conditioning and Ventilation Installations	1.1
17.1.21	The use of steel straps for hanging ducting up to 450 mm will only be accepted if approved by the Engineer for the particular application.	
17.1.22	Pressure tests and certificates are normally only required for medium and high pressure ducting unless the Engineer suspects abnormal leakage in which case he may insist on pressure tests of low pressure ducting until he is fully satisfied with the results.	7
17.1.23	SMACNA : Low Pressure Duct Construction Standard - 1976 This specification will apply in cases where SABS 1238 and/or SABS 0173 are silent with regard to ducting, fittings and other low pressure air handling equipment.	
17.1.24	Externally Insulated Ductwork All supply air ductwork shall be externally insulated using 40 mm aluminium foil faced fibreglass securely fixed.	

17.2 Air Grilles, Diffusers and Dampers

17.2.1 General

Sizes of grilles and diffusers, the respective air quantities and the required finish are indicated on the relevant drawings.

THROW and SPREAD must ensure complete air distribution in the rooms without drafts. Air velocity in the region of the occupants of the room should be between 0, 1 to 0,25 meter per second.

Samples of all air distribution equipment must be submitted to the Engineer for approval.

Finish of equipment exposed to view shall be subject to approval by the Engineer.

Air grilles shall be neat in their appearance and shall be manufactured of stamped, extruded or rolled steel or aluminium sections, welded and ground flush at the corners or provided with a neat trim.

All air grilles and diffusers shall be fixed airtight to the ducts with felt or foam rubber sealing strips.

17.2.2 Air Grilles

Supply air grilles shall be provided with adjustable opposed blade dampers and have two sets of individually adjustable vanes so that the direction of air supply can be adjusted both horizontally and vertically.

Vanes shall not be spaced more than 25 mm apart.

Return air grilles shall be provided with adjustable opposed blade dampers and a single set of face bars or vanes fixed at 30°C to the horizontal.

Grilles shall be removable to allow adjustment of dampers or provision allowed to adjust the damper with the grille in position.

Wall grilles shall be suitable for screw fixing to wooden frames. The wooden frames will be supplied and built in by the Main Contractor. A gasket of 6 mm thick polyethylene foam or equal shall be fixed to each supply grille to prevent leakage between the grille and the wall.

For dark room applications grilles shall be light proof and finished in matt black.

Grilles shall be factory painted or anodised as specified, and volume dampers shall be factory finished in baked black enamel or other suitable finish.

All air grilles shall have a free area of not less than that shown on the drawing.

Door grilles shall be of the double sided extruded colour anodized aluminium type, with vanes fixed at 45° to the horizontal. The exact colour shall be specified at a later date.

17.2.3 Diffusers

Air diffusers of the type and number shown on the drawings shall be provided and installed. Each diffuser shall be capable of passing the specified air quantity without creating undue resistance, noise and local draughts.

Diffusers shall be rigidly constructed and all edges of metal exposed to view shall be rolled or otherwise stiffened and rounded. All internal parts of each diffuser shall be removable as a unit to permit cleaning of the diffuser and provide access to the duct.

Balancing dampers shall be provided for each diffuser either directly behind the diffuser on in the branch duct behind the diffuser plenum box as detailed on the drawings. The diffusers shall be finished in a matt epoxy finish. The exact colour shall be specified at a later date.

18. ELECTRICAL EQUIPMENT AND INSTALLATION

18.1 General Electrical Installation

The provision of power to each of the individual condensing units location will be by others as will power outlets adjacent to each indoor evaporator unit and individual supply and extract fans.

The Contractor responsible for all work related to this section of the Contract shall provide all necessary wiring and switchgear for the power and operational control of the condensing units. Power cabling from the power outlet by others for each supply and extract fan and indoor evaporator unit shall be supplied and installed by the Air conditioning Sub Contractor.

The above control panel, all wiring and equipment, with associated wire ways, cable trays, etc. (including moors) are to comply with this specification.

18.2 Compliance with Regulations

The Installation shall be erected and carried out in compliance with :

(a) SASS 0142 - 1981 : Code of Practice for Wiring of Premises, as amended;

(b) Occupational Health and Safety Act No. 85 of 1993, as amended;

(c) The Mines and Works Regulations, Government Notice No R1609 of the 28th September 1962, as amended;

(d) The Local Municipal By-Laws and Regulations as well as the Regulations of the Local Supply Authority;

(e) The Local Fire Regulations;

(f) The Regulations of the Post Office, and;

(g) The Regulations of the Local Gas Board where applicable.

In addition, the Contractor shall indemnify the Employer against all losses, costs or expenditures which may arise as a result of the Contractor's negligence to comply with the requirements of the regulations enumerated above.

It shall be assumed that the Contractor is conversant with the abovementioned 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, bye-law or regulation shall overrule the requirements of this Document and the Contractor shall immediately inform the Engineer of such contradiction.

Under no circumstances shall the Contractor carry out any variations to the Installation in terms of such contradiction without obtaining the written permission to do so from the Engineer.

19. WINDOW / WALL AND DUCT MOUNTED FANS

These fans shall be as stated in the Equipment Schedules.

NATIONAL DEPARTMENT OF PUBLIC WORKS

NTUZUMA POLICE STATION, KWAZULU-NATAL

NEW CCTV BUILDING

AIR CONDITIONING & VENTILATION INSTALLATION SPECIFICATION

PART 2 : INFORMATION SCHEDULES
(To Be Completed by Tenderer)

1. GENERAL

Information Schedules for the air conditioning and ventilation installation at the Ntuzuma Police Station for the National Department of Public Works.

1.1 It is a requirement of this document that tenderers shall complete, in full, the Equipment Schedules contained in this specification.

1.2 Failure to complete this schedule may lend to tender disqualification.

1.3 The words "or other approved " are always implied whether following the description of equipment or not.

1.4 The equipment manufacturers' names appearing in the schedules are those around which the design has been based and all equipment so scheduled is complementary Where information is not indicated in the Schedules, the Tenderer shall provide the details.

1.5 All tenderers shall submit their tenders based on equipment scheduled under the heading, "Main Offer".

1.6 The tenderer may offer alternative makes providing that such alternatives are of equal quality to those "selected" by the Mechanical Engineer and form part of an alternative tender offer to the tenderers main offer. Approval Mechanical Engineer for alternative equipment shall be obtained before the tender closing date.

1.7 The Mechanical Engineer shall be the sole judge of the equipment offered and his decision shall be final.

1.8 As stated above all equipment selections are complementary and it is the responsibility of the successful tenderer to ensure that:

1.9 His alternative offer can be housed within the space provided, leaving sufficient clearance surrounding the unit as laid down by local regulations and for ease of maintenance. Should the alternative have to be replaced by that as listed in order to met these requirements, it shall be at no additional cost to the Contract.

1.10 All openings in the structure meet with the requirements of his alternative offers, or ensure that timely details of any relevant amendments are requested to prevent any abortive work on site.

1.11 If there are any monetary benefits which can be offered to the Head : Works through an alternative item of equipment, the Tenderer must incorporate all secondary cost variations into that saving reflected (e.g. the price reduction offered for an alternative chiller shall incorporate any additional costs in upgrading a pump and/or it's motor size which could result from an increase in resistance through it's heat exchangers). Further, all relevant technical data, especially as regards energy consumption, rated output, capacity, variations in resistances, etc., must also be submitted in order that the Head : Works' Representative (Mechanical Engineer) may evaluate savings in capital costs against any increases in operating costs prior to accepting that particular alternative offer.

2. EQUIPMENT SCHEDULES

2.1 A/C Split Unit Systems

Area	Make	Model No.	Type	Cooling Cap Kw
CCTV Room	Dunham-Bush or other approved	HP60HNI/HHS60HPNI	In Ceiling Ducted	17.2
IT-Core Room	Dunham-Bush or other approved	HP18MNI/WHS06HNI	Mid Wall	5.3
Electronic Equip. Room	Dunham-Bush or other approved	HP18MNI/WHS06HNI	Mid Wall	5.3
UPS Room	Dunham-Bush or other approved	HP09MNI/WHS03HNI	Mid Wall	2.6
Radio Tech Workshop	Dunham-Bush or other approved	HP12CNI/CS50MNI	Cassette	3.6
Records Room	Dunham-Bush or other approved	HP12CNI/CS50MNI	Cassette	3.6
Commander	Dunham-Bush or other approved	HP12CNI/CS50MNI	Cassette	3.6
Rest Room / Kitchen	Dunham-Bush or other approved	HP24CNI/CS70MNI	Cassette	7.1
Office	Dunham-Bush or other approved	HP12CNI/CS50MNI	Cassette	3.6
Parade Room	Dunham-Bush or other approved	HP18CNI/CS60MNI	Cassette	5.3
Reception	Dunham-Bush or other approved	HP18CNI/CS60MNI	Cassette	5.3
Evidence Room	Dunham-Bush or other approved	HP24CNI/CS70MNI	Cassette	7.1

2.2 Extraction Fans

Area	Make	Model No.	Type
Electronic Equip Room	Luft / Vitro	Vitro6 / 150 AL	Window / Wall
IT Core Room	Luft / Vitro	Vitro6 / 150 AL	Window / Wall
UPS Room	Luft / Vitro	Vitro6 / 150 AL	Window / Wall
Rest Room / Kitchen	Luft / Vitro	Vitro6 / 150 AH	Window / Wall
Storer o o m	Luft / Vitro	Vitro9 / 230 A	Window / Wall
Male Toilet	Luft / elicient	AXC 200	In-line Tube
Female Toilet	Luft / elicient	AXC 200	In-line Tube
CCTV	Luft	LPA 315 / 41F	Plate Axial

2.3 Fresh Air Fan

Area	Make	Model No.	Type
Main Fan	Luft	560 mm diameter	Axial (including sound attenuators inlet and outlet)

2.4 Diffusers I Grilles

Area	Make	Model No.	Type
Supply Diffusers	Trax	4 Way	ADLQ-DQ
Return Air Grilles	Trax	RAFF	Return Air and Filters
Door Grilles	Trox	AGS-T	Non Vision

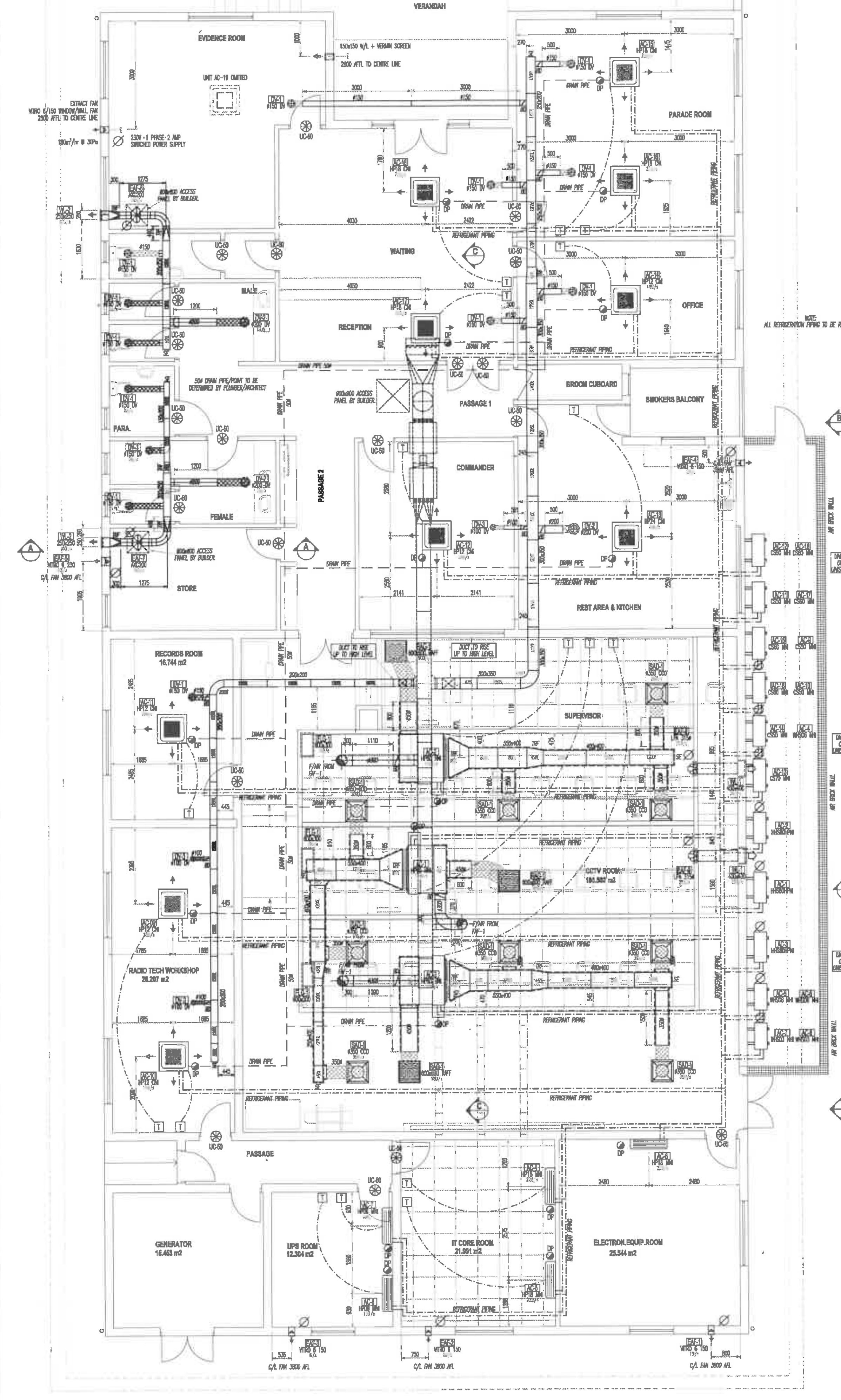
NATIONAL DEPARTMENT OF PUBLIC WORKS

NTUZUMA POLICE STATION, KWAZULU-NATAL

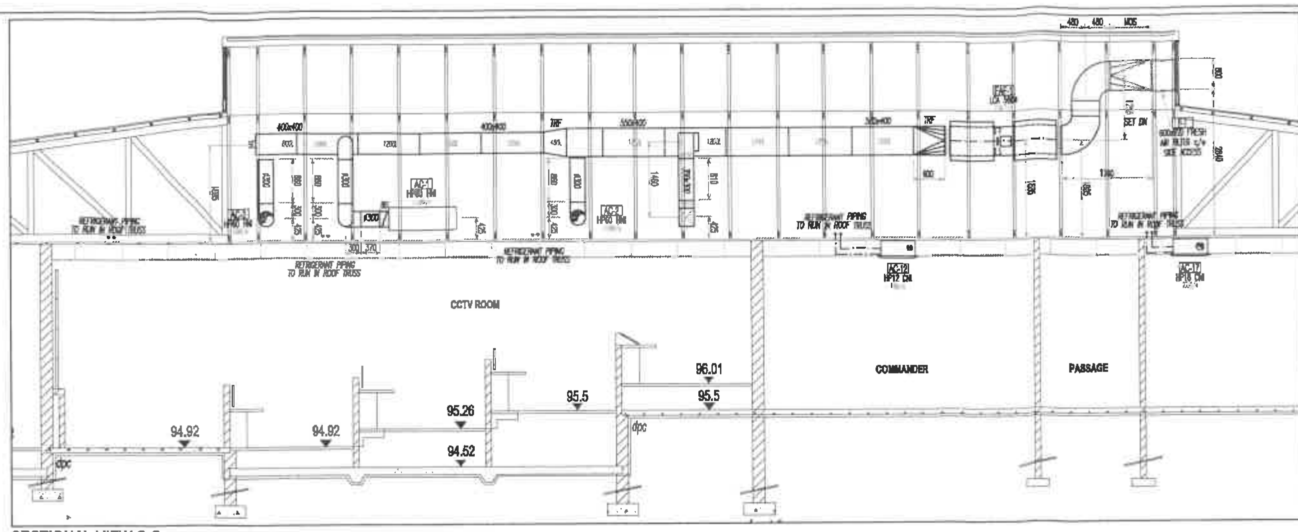
NEW CCTV BUILDING

AIR CONDITIONING & VENTILATION INSTALLATION SPECIFICATION

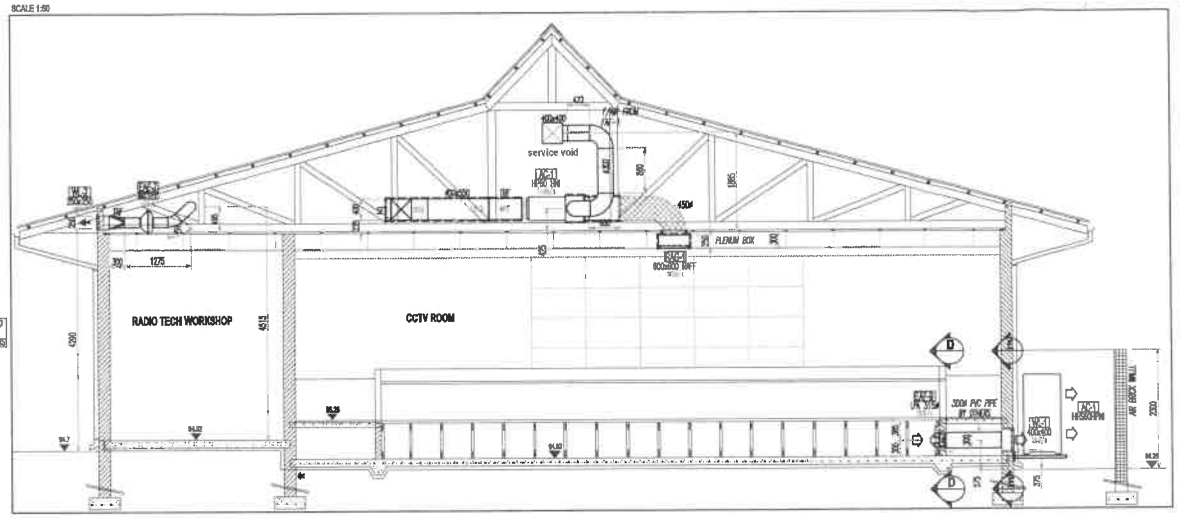
PART 3 : DRAWING



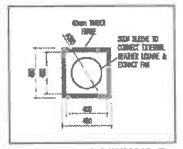
PLAN VIEW HVAC AT LOW LEVEL
SCALE 1:50



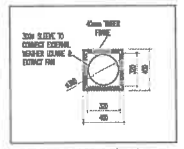
SECTIONAL VIEW C-C
SCALE 1:50



SECTIONAL VIEW A-A
SCALE 1:50



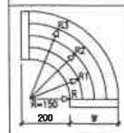
SECTIONAL VIEW E-E
SCALE 1:25



SECTIONAL VIEW D-D
SCALE 1:25

DUCTWORK NOTES:

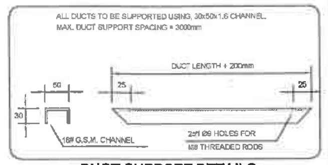
1. ALL DUCT WORK TO BE MANUFACTURED TO S.A.N.S 1238/05 STANDARDS, WITH FLANGED JOINTS ON DUCTS EXCEEDING 600 SEMI PERIMETER OR ONE SIDE EXCEEDS 750 AND S&D JOINTS ON SMALLER DUCTS.
2. ALL A.C DUCTING TO BE EXTERNALLY INSULATED WITH 25mm FOIL FACED FIBREGLASS INSULATION.
3. ALL VENTILATION DUCTING TO BE UNINSULATED.
4. ALL FLEXIBLE DUCTING TO BE FACTORY PRE-INSULATED. ALL FLEXIBLE DUCTING TO BE FIXED TO SPIGOTS WITH JUBILEE CLAMPS AND STRAPPED WITH DUCT TAPE
5. SPIGOTS TO BE EXTERNALLY INSULATED WITH 25 FOIL FACED FIBREGLASS.
6. ALL HANGERS AND BRACKETS TO BE GALVANISED.
7. ALL DUCTWORK TO BE HUNG ON 30x50x1.6 G.S.M CHANNEL TRAPEZE HANGERS WITH 8Ø RODS.
8. FLEXIBLE CONNECTIONS TO BE FITTED TO ALL DUCTING BETWEEN AIRHANDLING AND PACKAGE UNITS, FANS, ETC.



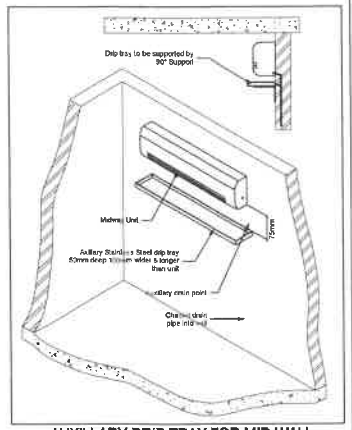
SUPPLY AIR ONLY

DUCT WIDTH (W) IN MM	R1	R2	R3
300 TO 600	350		
601 TO 900	300	555	
901 TO 1200	250	450	750
1201 TO 2400	300	550	950
	SPLITTER RADII		

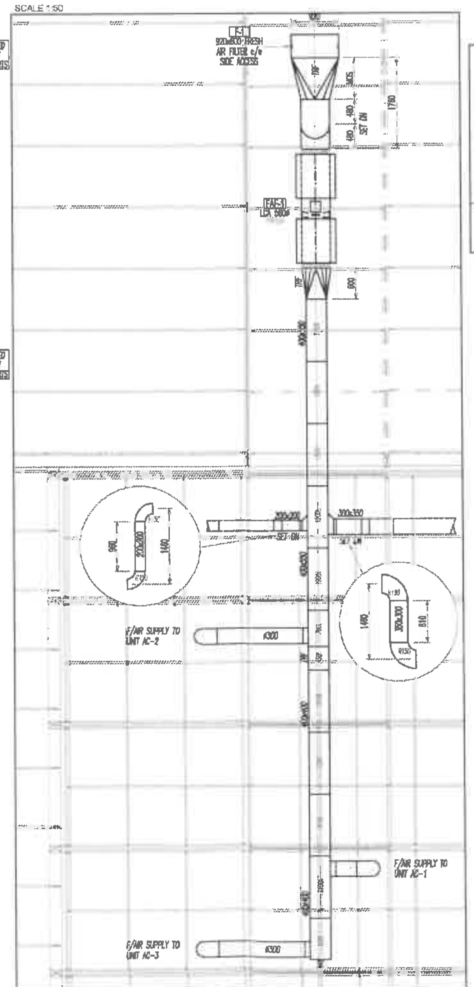
DUCT SPLITTERS



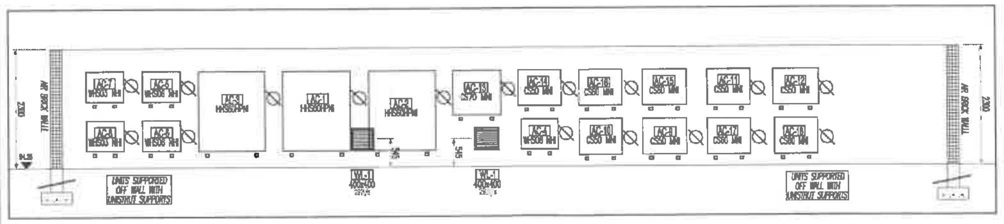
DUCT SUPPORT DETAILS



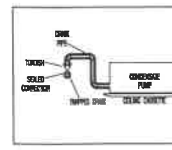
AUXILLARY DRIP TRAY FOR MID WALL
SCALE N.T.S



PLAN VIEW HVAC AT HIGH LEVEL
SCALE 1:50



SECTIONAL VIEW B-B
SCALE 1:50



VERTICAL TUNG DISH DETAIL
SCALE 1:25

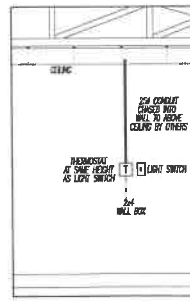
AHU & FAN SCHEDULES

Ref	Area	Make	Model	Indoor weight	T Cool Cap Kw	Air Qty l/s	Volts/Isolator	FLA/START AMPS
AC-1	CCTV Room	Midea	MHD-60HRDN1	Ducted Unit - 53kg	16.3	1041	400	10/25
AC-2	CCTV Room	Midea	MHD-60HRDN2	Ducted Unit - [illegible]	16.3	1041	400	10/25
AC-3	CCTV Room	Midea	MHD-60HRDN3	Ducted Unit - 53kg	16.3	1041	400	10/25
AC-4	IT Core Room	Midea	MSADC-18HRDN1 / MOBA30-18HRDN1	Midwall - 14kg	5.6	231	230	9.2/18
AC-5	IT Core Room	Midea	MSADC-18HRDN1 / MOBA30-18HRDN2	Midwall - 14[illegible]	5.6	231	230	9.2/18
AC-6	Electronic Equipment Room	Midea	MSADC-18HRDN1 / MOBA30-18HRDN3	Midwall - 14kg	5.6	231	230	9.2/18
AC-7	UPS Room	Midea	MSAFAU-09HRDN1 / MOBA30-09HRDN1	Midwall - 9kg	2.6	147	230	4.4/8
AC-8	UPS Room	Midea	MSAFAU-09HRDN1 / MOBA30-09HRDN2	Midwall - 9kg	2.6	147	230	4.4/8
AC-9	Radio Tec Room	Midea	MCA-12HRDN1-Q / MOU-12HRDN1	Cassette - 17.5kg	4	238	230	6.5/12
AC-10	Radio Tec Room	Midea	MCA-12HRDN1-Q / MOU-12HRDN2	Cassette - 17.5kg	4	238	230	6.5/12
AC-11	Records Room	Midea	MCA-12HRDN1-Q / MOU-12HRDN3	Cassette - 17.5kg	4	238	230	6.5/12
AC-12	Commander	Midea	MCA-12HRDN1-Q / MOU-12HRDN4	Cassette - 17.5kg	4	238	230	6.5/12
AC-13	Rest Room / Kitchen	Midea	MCD-24HRDN1-Q	Cassette - 23kg	7.9	347	230	13.8/22.5
AC-14	Office	Midea	MCA-12HRDN1-Q / MOU-12HRDN1	Cassette - 17.5kg	4	238	230	6.5/12
AC-15	Parade Room	Midea	MCA-18HRDN1 / MOU-18HRDN1	Cassette - 20kg	5.6	238	230	10/19
AC-16	Parade Room	Midea	MCA-18HRDN1 / MOU-18HRDN2	Cassette - 20kg	5.6	238	230	10/19
AC-17	Reception	Midea	MCA-18HRDN1 / MOU-18HRDN3	Cassette - [illegible]	5.6	238	230	10/19
AC-18	Reception	Midea	MCA-18HRDN1 / MOU-18HRDN4	Cassette - [illegible]	5.6	238	230	10/19

Fans	Area	Make	Model/Weight	Air Qty l/s	Volts	FLA/START AMPS
EAF-1	Electronic Equipment Room	AMS	HV 150 AE	15	230	1/2.5
EAF-2	IT Core Room	AMS	HV 150 AE	30	230	1/2.5
EAF-3	UPS Room	AMS	HV 150 AE	8	230	1/2.5
EAF-4	Rest Room / Kitchen	AMS	HV 150 AE	72	230	1/2.5
EAF-5	Store Room	AMS	HV 230 AE	140	230	1/2.5
EAF-6	Male Toilet	LUFT	OX 200	165	230	3/7.1
EAF-7	Female Toilet	LUFT	OX 200	165	230	3/7.1
EAF-8	CCTV Room	Donlen	Bellar 315/150/5	293	230	3/7.4
EAF-9	CCTV Room	Donlen	Bellar 315/150/5	293	230	3/7.4
FAF-1	-	LUFT	LCA 500 / 10 / 1440- 27kg	1047	400	5/11.1

AIR TERMINALS

Ref	Qty	Type	Make & Model	Size	Air Qty l/s
SAD 1	9	Supply air Diffuser	Rickard - CCD	Diameter 350	368
RAG 1	3	Return Air Grille + Filter	NAI - RAFF	595 x 595 O/F	900
FLG 1	3	Floor Grille	NAI - SGS	595 x 295 O/F	195
WL 1	2	Weather Louvre	NAI - N-WLB	400 x 400	292
WL 2	2	Weather Louvre	NAI - N-WLB	250 x 250	165
DV 1	13	Disc Valve	NAI - DV	Diameter 150	30
DV 2	3	Disc Valve	NAI - DV	Diameter 200	
DV 3	3	Disc Valve	NAI - DV	Diameter 100	
F 1	1	Washable Pleat Filter	50mm - 85% @ 5 micron	920 x 600	1047



TYPICAL REMOTE SECTION
SCALE 1:50

HVAC NOTES:

1. ALL DUCTING TO BE MANUFACTURED TO SMACNA HVAC DUCT SPECIFICATION.
2. ALL VENTILATION DUCTS TO BE UN-INSULATED.
3. ALL AIR-CONDITIONING DUCTS TO BE EXTERNALLY INSULATED USING 25mm FRK INSULATION.
4. DUCT JOINTING METHOD:-
   LONGEST SIDE 0 – 600 S & D
   LONGEST SIDE 601 – 1200 MEZZ FLANGE
5. DUCT SUPPORTS – AS PER TECHNICAL SPECIFICATION
6. ALL CHILLED WATER PIPES TO BE STEEL WITH POLYSTYRENE INSULATION. SEE TECHNICAL SPECIFICATION FOR DETAILS.
8. ALL PIPING TO BE ADEQUATELY SUPPORTED
9. ALL A/C DRAIN PIPING TO BE TRAPPED & FITTED WITH 13mm THICK CLOSED CELL INSULATION.

SYMBOLS LEGEND

- Door Grille, opening by builder
- Three phase power supply to A.C. equipment terminated with isolator within 1.5m of A.C. equipment by electrical sub-contractor
- Single phase power supply to A.C. equipment terminate with isolator within 1.5m of A.C. equipment by electrical sub-contractor
- Indicates door to be undercut 50mm by builder
- Indicates wired remote on/off switch 50Ø Wall box c/w 25Ø conduit to above ceiling by others To be mounted next to light switch
- DP Indicates TunDish & Trapped drain point by builder.

No	DESCRIPTION	BY	DATE
0	ISSUED FOR TENDER	A.B.	2022-08-01

REVISIONS

PARSONS & LUMSDEN
CONSULTING ENGINEERS

PROJECT
NTUZUMA POLICE STATION
NEW CCTV BUILDING

DRAWING TITLE
AIRCONDITIONING AND VENTILLATION LAYOUT

DRAWING NUMBER				REVISION
D0721-AC-01				0
DESIGNED	DRAWN	DATE	SCALE	
G.A.	A.B.	22-08-01	1:50	

NATIONAL DEPARTMENT OF PUBLIC WORKS

NTUZUMA POLICE STATION, KWAZULU-NATAL

NEW CCTV BUILDING

GAS SUPPRESSION INSTALLATION

PART 1

TECHNICAL SPECIFICATION

1. TECHNICAL SPECIFICATION

The following specification covers the required Gas Suppression System.

An FM200 Gas Suppression System will be installed in the following room in the CCTV Complex:

- IT Core Room

Measurements : 21.99 m² x 3.9 m high + 350 mm void below floor

An FM 200 Gas Bottle System would discharge the gas through the system of high pressure steel pipework terminating in specially designed nozzles located to ensure an even distribution in the IT Core Room and the void below the room.

In order to facilitate isolation of the automatic discharge sequence of the installation when the protected area is occupied, a key operated lock off unit will be positioned at the entrance of the protected area. This unit incorporates the following indications:

- Green System Manual
- Amber System Automatic
- Red System Discharge

The control equipment will comprise of a 2-zone control panel, each zone having "fire" and "fault" indications plus the individual zones are controlled from a plug in module incorporating solid state circuitry which also provides continuous fault monitoring.

A blue strobe will be installed above the door frame to the entrance of the protected area plus a red strobe. In the event of the Fire Detection System activating, the red strobe will operate. In the event of 2 detectors activating, the blue strobe will indicate that the gas has been released.

Installation is to be undertaken in accordance with NFPA Standards and SABS Codes of Practice using fire retardant cable throughout the installation.

A 24-lead calcium battery plus the battery charging facilities will be provided to maintain the system in full operation in the event of a mains power failure. The 220 AC power supply to the battery charger will be supplied by others.

The system shall be designed that in the event of the first detector being activated, the fire alarm bell will sound. In the event of the two ionisation detectors being activated while the system state unit is switched into an automatic position a siren warning to evacuate occupants will sound before the FM 200 extinguishing agent is released into the area within 30 seconds.

NATIONAL DEPARTMENT OF PUBLIC WORKS

NTUZUMA POLICE STATION, KWAZULU-NATAL

NEW CCTV BUILDING

GAS SUPPRESSION INSTALLATION

PART 2

INFORMATION SCHEDULES
(To be completed by Tenderer)

2 INFORMATION SCHEDULES
(To be completed by Tenderer)

2.1 Capacity of FM200 Gas Cylinder .....

2.2 Name and manufacturer of Control Equipment .....

2.3 Name and Manufacturer of Fire Detection System .....

2.4 Manufacturer of Strobe Light .....

2.5 Manufacturer of Audio Alarm System .....

2.6 Name of Installing Sub Contractor .....

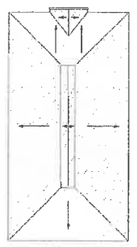
NATIONAL DEPARTMENT OF PUBLIC WORKS

NTUZUMA POLICE STATION, KWAZULU-NATAL

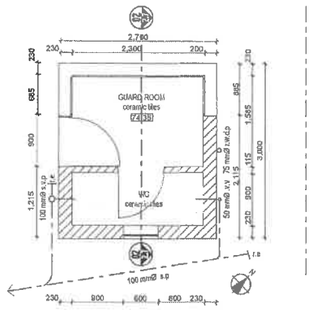
NEW CCTV BUILDING

GAS SUPPRESSION INSTALLATION

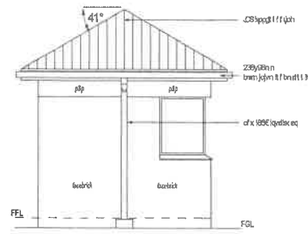
PART 3 : DRAWING



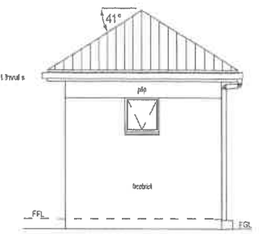
1. Roof Plan
SCALE 1:500



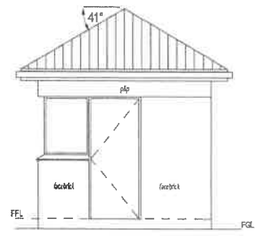
2.1 Guard House Plan
SCALE 1:50



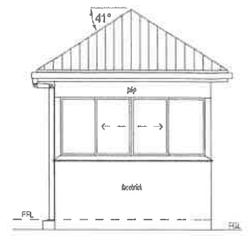
2.2. NORTH ELEVATION
SCALE 1:50



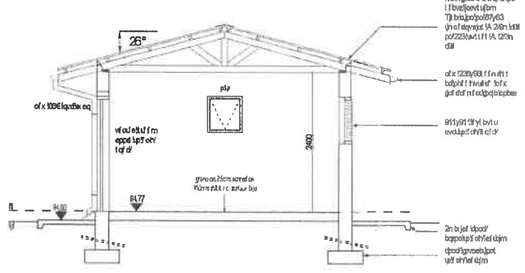
2.3 EAST ELEVATION
SCALE 1:50



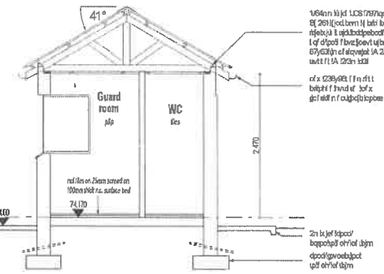
2.5 SOUTH ELEVATION
SCALE 1:50



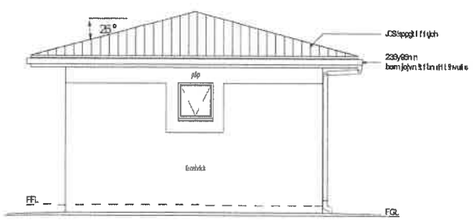
2.6 WEST ELEVATION
SCALE 1:50



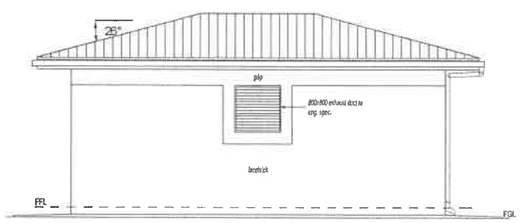
3.1 SECTION
SCALE 1:50



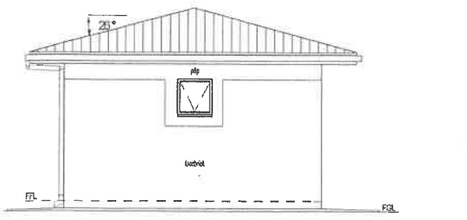
2.7 SECTION
SCALE 1:50



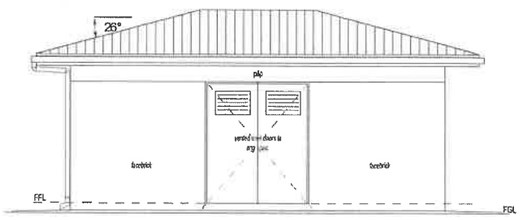
3.1 EAST ELEVATION
SCALE 1:50



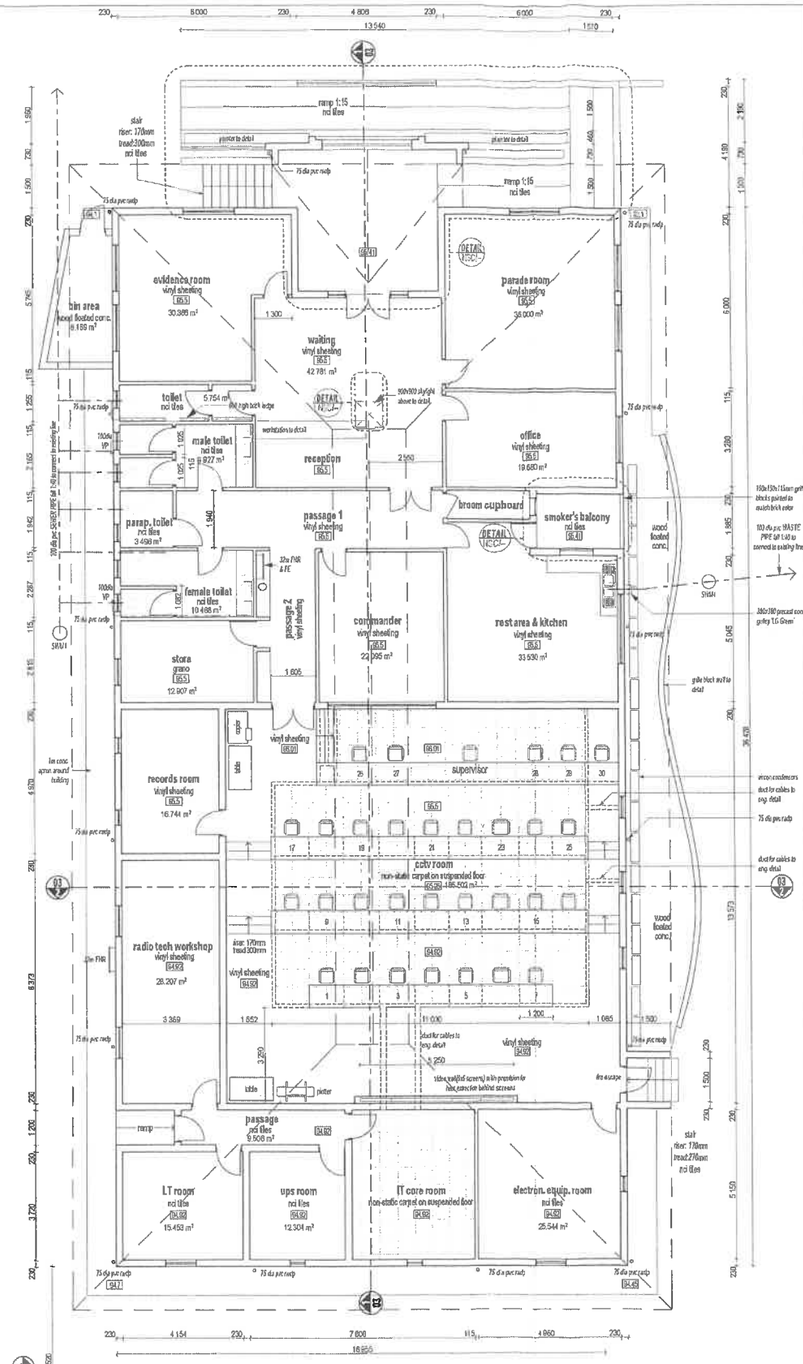
3.2 SOUTH ELEVATION
SCALE 1:50



3.3 WEST ELEVATION
SCALE 1:50



3.4 NORTH ELEVATION
SCALE 1:50



3. CCTV Room & Generator Room Floor Plan
SCALE 1:100

NO.	DATE	AMENDMENT	D.P.W.
A	30.12.2010	Toilet added, evidence room size increased, front adjusted	T.S
C	17.06.2011	Ramp adjusted, changes made to parking area & ramps	T.S
D	07.07.2011	Helipad removed, generator room added outside, L1 room added, parking layout behind building revised, boundary walls revised. Site area added, guard house details added, drawing no's revised	T.S

cad file name

public works
Department:
Public Works
REPUBLIC OF SOUTH AFRICA

DIRECTOR-GENERAL
MR. M. MORDKA

consultant
G M KHAN ARCHITECT
P. O. BOX 19138 DORPSPRUIT 4015 REG. NO. :
TELEPHONE : 2073131 FAX : 2073133 S. A. C. A. P. : 2243

discipline
ARCHITECTURAL

service

NTUZUMA SAPS: NEW CCTV BUILDING
on PORTION 1 of ERF 2132 NTUZUMA C

WCS number
046 725

drawing title
WORKING DRAWING
SITE, LOCALITY & FLOOR PLAN
NEW CCTV BUILDING

ref.no 6313/0078/26/5
scale 1:100
drawn TS
date 12-04-2011
checked G.M.K
type number
drawing number nsc/wd/02 rev D

DPW-23 (EC): SCHEDULE FOR IMPORTED MATERIALS AND EQUIPMENT

Project title:	***Ntuzuma SAPS: Completion of CCTV Control Room(003)***		
Tender no:	*DBN22/11/02*	**Reference no:**	*6310/1220/26/1*

This schedule should be completed by the tenderer. *(Attach additional pages if more space is required)*

Item	Material / Equipment	Rand (R) (Excluding VAT)
1.		**R**
2.		**R**
3.		**R**
4.		**R**
5.		**R**
6.		**R**

The Contractor shall list imported items, materials and/or equipment which shall be excluded from the Contract Price Adjustment Provisions (if applicable) and shall be adjusted in terms of currency fluctuations only. Copies of the supplier's quotations for the items, materials or equipment (provided that such costs shall not be higher than the relevant contract rate as listed above) should be lodged with the Principal Agent / Engineer of the Department of Public Works and Infrastructure within 60 (sixty) days from the date of acceptance of the tender. No adjustment of the local VAT amount, nor the contractor's profit, discount, mark-up, handling costs, etc. shall be allowed.

These net amounts will be adjusted as follows:

FORMULA:

The net amount to be added to or deducted from the contract sum:

$$A = V\left(\frac{Z}{Y} - 1\right)$$

A = the amount (R) of adjustment

V = the net amount (supplier's quotation) (R) of the imported item

Y = exchange rate at the closing date of tender submission

Z = exchange rate on the date of payment.

Name of Tenderer	Signature	Date

REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF PUBLIC WORKS

BILLS OF QUANTITIES

FOR

NTUZUMA SAPS:

COMPLETIONTION OF CCTV CONTROL ROOM

WCS NO.: 046725

T2.2: RETURNABLE SCHEDULES: OTHER DOCUMENTS TO BE INCORPORATED INTO THE CONTRACT

PART 4: RETURNABLE SCHEDULES

ITEM 1: ELECTRICAL WORK - MATERIAL SCHEDULE

The contractor shall complete the following schedules and submit them with his tender.

The schedules will be scrutinised by the Representative/Agent and should any material offered not comply with the requirements contained in the specification, the Contractor will be required to supply material in accordance with the contract at no additional cost.

NB: **Only one manufacturer's name to be inserted for each item.**

Item	Material	Make or trade name	Supplier
1.	Distribution boards		
2.	Circuit breakers 1P, 2P, 3P		
3.	On load isolators without trips		
4.	Contactors 1P, 2P, 3P		
5.	Earth leakage relays 2 & 3 phase		
6.	Current transformers		
7.	Voltmeter		
8.	Maximum demand ammeter		
9.	Daylight sensitive switch		
10.	Conduit		
11.	Conduit boxes		
12.	Power skirting		
13.	Ducting		
14.	Surface switches		
15.	Watertight switches		
16.	16A flush socket outlets		
17.	16A surface socket outlets		
18.	16A watertight socket outlets		
19.	Internal surface mounted isolators		
20.	External surface mounted isolators		
21.	Fluorescent luminaries		
.	Type A		
	Type B		
	Type C		
	Type D		
	Type E		
	Type F		
	Type G		
	Type H		
.			
22	PVC cables		
23	Fire Detection system		
24	Fire Cabling		

NOTE:

Should the contractor wish to supply materials other than that originally offered, prior written approval must be obtained from the Representative/Agent before any orders are placed

CONTRACTOR: _____

SIGNED: _____

DATE: _____

ITEM 2: DIESEL PLANT INSTALLATION

SCHEDULE OF INFORMATION
(To be completed by Tenderer)

A: ENGINE

NO	ITEM	REMARKS
1.	Manufacturer's Name	
2.	Country of Origin	
3.	Manufacturer's model No. and year of manufacture	
4.	Continuous sea level rating after allowing for ancillary equipment : a) In b.h.p. b) In kW	
5.	Percentage derating for site conditions, in accordance with BS 551.4 a) For altitude b) For temperature c) For humidity d) Total derating	
6.	Nett output on site in kW	
7.	Nominal speed in r.p.m.	
8.	Number of cylinders	
9.	Strokes per working cycle	
10.	Stroke in mm	
11.	Cylinder bore in mm	
12.	Swept volume in cm^3	
13.	Mean piston speed in m/min	
14.	Compression ratio	
15.	Cyclic irregularity	
16.	Fuel consumption of the complete generating set on site in l/h of alternator output at : a) Full load b) ¾ load c) ½ load NOTE : A tolerance of 5% shall be allowed above the stated value of fuel consumption.	
17.	Make of fuel injection system.	
18.	Capacity of fuel tank in litres	
19.	Is gauge glass fitted to tank ?	

20.	Is electric pump for filling the fuel tank included?	
21.	Method of starting	
22.	Voltage of starting system	
23.	Method of cooling	
24.	Type of radiator if water-cooled	
25.	Type of heater for warming cylinder heads	
26.	Capacity of heater in kW	
27.	Method of protection against high temperature	
28.	Method of protection against low oil pressure	
29.	Type of governor	
30.	Speed variation in % a. Temporary b. Permanent	
31.	Minimum time required for as assumption of full load in seconds	
32.	Recommended interval in running hours for : a. Lubricating oil change b. Oil filter element change c. Decarbonising	
33.	Type of base	
34.	Can plant be placed on solid concrete floor?	
35.	Are all accessories and ducts included?	
36.	Is engine naturally aspirated/	
37.	Are performance curves attached?	
38.	Diameter of exhaust pipe	
39.	Noise level in plant room in dBA	N/A
40.	Noise level at tail of exhaust pipe in dBA	
41.	BMEP (4 stroke) at continuous rating (kPA)	
42.	% Load acceptance to BS 5514, Part 4, with 10% transient speed droop	

B: ALTERNATOR

NO	ITEM	REMARKS
1.	Maker's name and model no.	
2.	Country of Origin and year of manufacture	
3.	Type of enclosure	
4.	Nominal speed in r.p.m.	
5.	Number of bearings	
6.	Terminal voltage	
7.	Sea level rating kVA at 0.866 power factor	
8.	Derating for site conditions	
9.	Input required in kW	
10.	Method of excitation	
11.	Efficiency at 0,8 power factor and : a) Full load b) ¾ load c) ½ load	
12.	Maximum permanent voltage variation in %	
13.	Transient voltage dip on full load	
14.	Voltage recovery on full load application in milli-seconds	
15.	Is alternator brush less?	
16.	Class of insulation of windings	
17.	Is alternator tropicalised?	
18.	Symmetrical short circuit current at terminals n Ampere	
19.	Type of Coupling	

C: SWITCHBOARD

NO	ITEM	REMARKS
1.	Maker's Name	
2.	Country of Origin	
3.	Is board floor mounted?	
4.	Finish of board	
5.	Make of volt, amp, and frequency meters	
6.	Dial size of meters in mm	
7.	Scale range of voltmeter	
8.	Scale range of ammeters	
9.	Ration of current transformers	
10.	Make of hour meter	
11.	Range of cyclometer counter	
12.	Smallest unit shown on counter (Item 11)	
13.	Make of circuit breaker	
14.	Type of circuit breaker	
15.	Rating of circuit breaker in Amp and fault level in kA	
16.	Setting range of overload trips	
17.	Setting range of instantaneous trips	
18.	Make of change-over equipment	
19.	Make of voltage relay	
20.	Is control and protection equipment mounted on a small removable panel?	
21.	Type of control equipment	
22.	Make of mains isolator	
23.	Type of indicators for protective devices	
24.	Make of rectifier	
25.	Type of rectifier	
26.	Is battery charging	
27.	Are volt- and ammeters provided for charging circuit?	
28.	Is the alarm hooter of the continuous duty type?	
29.	Rating in Amps of : a. Circuit breaker to outgoing feed	

D: BATTERY

NO	ITEM	REMARKS
1.	Maker's Name	
2.	Country of Origin	
3.	Type of battery	
4.	Voltage of battery	
5.	Number of cells	
6.	Capacity in cold crank amp	

E: DIMENSIONS

NO	ITEM	REMARKS
	Overall dimensions of set in mm	
	Overall mass	
	Is the generator room adequate for the installation of the set	

F: DEVIATION FROM THE SPECIFICATION (State briefly)

NO	DESCRIPTION

G: GUARANTEE

NO	ITEM	REMARKS
1.	Guarantee period in months	
2.	State conditions of guarantee	

H: SPARE PARTS AND MAINTENANCE FACILITIES

NO	ITEM	REMARKS
1.	Approximate value of spares carried in stock for this particular diesel engine and alternator	
2.	Where are these spares held in stock	
3.	What facilities exist for the servicing of the equipment offered	
4.	Where are these facilities available	

I: SWITCHBOARD

NO	ITEM	REMARKS
1.	Is manufacture of switchboard/control panel to be sub-let?	
2.	If yes, state name and address of specialist	

	manufacturer	

ITEM 3 – UNINTERRUPTED POWER SUPPLY INSTALLATION

SCHEDULE OF INFORMATION

A. SYSTEM PARAMETERS

1	Net output power of inverter system	.....kVA
2	Power factor for which the system is rated	...Lagging
3	Nominal input voltage	.....Volts
4	Maximum input voltage tolerated	.....Volts
5	Minimum input voltage tolerated	.....Volts
6	Maximum input frequency deviation tolerated	.....Hz
7	Maximum and minimum input power factor at rated KVA	.....kVA
8	Maximum harmonic input tolerated for successful operation	.....%
9	Nominal output voltage	.....Volts
10	Steady state output voltage regulation	.....Volts
11	Dynamic output voltage regulation:	
	1. Step load of 25% between 10% and 100% of full load	.....%
	2. 150% overload for 1 sec	.....%
	3. Input voltage step variation of ± 15%	.....%
11	Time for voltage recovery to steady state:	
	1. 25% step load	.....mS
	2. 100% step load	.....mS
3.	150% step load for 1 sec and then returned to 100%	.....mS

13.	Relative output phase angles at 100% unbalanced load (in degrees)		...Degrees
14.	Maximum harmonic content of output voltage		.....%
15.	Overload capacity		
	1.	One hour	.....%
		One minute	.....%
	3.	Ten seconds	.....%
	4.	One second	.....%
	5.	Five msec	.....%
	6.	One msec	.....%
16.	Total input required with batteries charged for rated full load		.....kVA
17.	Total input required at full load and and battery discharged		.....kVA
8.	Allowable temperature rise across equipment at input air temperature of:		
	1.	25 C	 C
	2.	30 C	 C
	3.	32 C	 C
	4.	35 C	 C
	5	40 C	 C
19.	Heat dissipation under normal full load running conditions:		
	1.	Converter	.....kW
	2.	Battery	.....kW

20. Efficiency of the complete UPS system

		1,0p.f.	0.8p.f
1.	Full load	.....%	.....%
2.	80% load	.....%	.....%
3.	75% load	.....%	.....%
4.	65% load	.....%	.....%
5.	50% load	.....%	.....%
6.	40% load	.....%	.....%

21. R.M.S. value of the A.C. **current** component through the batteries for:

1. Discharged battery .....Amp
2. Charged battery .....Amp

22. R.M.S. value of the A.C. **voltage** component through the batteries for:

1. Discharged battery .....Volts
2. Charged battery .....Volts

3. Total number of cubicles .....

24. Total floor space required .....m^2

25. Dimensions of cubicle in mm .....W.....H.....L

B. BATTERY CHARGER

1. Type.....

2. Output voltage for trickle charge .....Volts

3. Steady state regulation of output voltage trickle to full load ±.....%

4. Output voltage for input voltage fluctuation

1. ± 10% .....%
2. ± 15% .....%

5. Ripple content (%) .....%

6. Current limit value .....Ampere

7. Input voltage at which battery charger switches off

   1. Maximum .....Volts

   2. Minimum .....Volts

8. Maximum switch on inrush current .....Ampere

9. Battery charger overload protection (type) .....

10. Efficiency .....%

11. How is the effect of harmonics on input voltage minimised ?

C. OSCILLATOR

1. Type of oscillator (RC, crystal, etc.) .....

2. Stability:
   1. With oscillator supply fluctuation ±.....%

   2. Temperature variation ±..... C

   3. Number of power supplies in parallel redundancy .....

3. Number of batteries from which oscillator is fed

4. Minimum time synchronise to mains frequency .....sec

D. INVERTER

1. Maximum continuous power output (kVA) .....kVA

2. Nominal output voltage .....Volts

3. Maximum harmonic content .....%

4. Nominal input voltage:

   1. Maximum .....Volts

   2. Nominal .....Volts

   3. Minimum .....Volts

5. Input current at full load ..... Ampere

6. Input power factor at full load ..... Lagging

7. Efficiency at full load .....%

8. Overload protection .....
.....

E. STATIC SWITCH

Does switch comply to clause 3.2.2.12 .....

1. Describe electronic switch
.....

2. Minimum power factor at which switches will operate satisfactorily .....

3. How does switch derive operating signal ?
.....

4. Maximum break time for switchover .....mS

F. BATTERIES

1. Manufacturer .....

2. Country of origin .....

3. Type .....

4. Type No .....

Total number of cells .....

6. Number of cells per inverter .....

7. Battery voltage (float conditions) .....Volts

8. Battery voltage (Boost charge) .....Volts

9. Capacity (rated for time required) ....Ah at...hrs

10. Battery time offered under load conditions specified in Clause 2.17 (Part 2) and

	Clause 3.2.2.5 (Part 3)	.....Minutes
11.	Maximum output current	.....Ampere
12.	Cell voltage under float conditions	.....Volts
13.	Cell conditions under boost conditions	.....Volts
14.	Cell voltage at start of discharge and full inverter load	.....Volts
15.	Cell voltage at end of discharge period	.....Volts
16.	Expected lifetime of batteries	.....Years
17.	Time to charge to 90% capacity	.....Hrs
18.	Total time to charge to 100% capacity	.....Hrs
19.	Material of supporting framework	.....

20.	Finish of framework	.....
21.	Dimensions of each cell	W....H....L....
22.	Design of positive plate of cell	.....
23.	Rating of fused isolator	.....Ampere
24.	Cell configuration	

SYSTEMS ABOVE 200kVA

1.	No of shelves	.....
2.	No of rows/shelves	.....
3.	No of tiers/shelves	.....
4.	Shelf length	.....
5.	Shelf height (incl. batteries)	.....

NOTE : ALL BATTERY CALCULATIONS INCLUDING CURVES SHALL BE INCLUDED IN THE TENDER

G. DETAILS OF MANUFACTURE OF UPS

1. Manufacturer .....
2. Address.....
3. Country of origin .....
4. Make or trade name of equipment .....
5. Manufacture's type no. .....
6. Is tenderer an accredited agent ? ....YES/NO.....
7. Furnish details of maintenance and repair service facilities which can be rendered.
   .....

ITEM 4: FIRE DETECTION SYSTEM

SCHEDULE OF INFORMATION

ITEM	PARTICULARS	INFORMATION FROM TENDERER
1	**MAIN FIRE CONTROL PANEL**	
	Manufacturer	
	Country of origin	
	Type and model	
	Is the equipment acceptable to the Department of Public Work?	Yes/No
	Has the equipment previously been installed for the Department of Public Works?	Yes/No
	State where	a) b)
	Are there any deviations from the specification?	Yes/No
	Furnish particulars	
2	**ALARM AND EVACUATION PANEL**	
	Manufacturer	
	Country of origin	
	Type and model	
	Is the equipment acceptable to the Department of Public Works?	Yes/No
	Has the equipment previously been installed for the Department of Public Works?	Yes/No
	State where	a) b)
	Are there any deviations from the specification?	Yes/No
	Furnish particulars	
3	**LOG PRINTER**	
	Manufacturer	
	Country of origin	
	Type and model	
	Is the printer compatible with the MFCP.	Yes/No
	Is the equipment acceptable to the Department of Public Works?	Yes/No
	has the equipment previously been installed for the Department of Public Works?	Yes/No
	State where	a) b)
	Are there any deviations from the specification?	Yes/No
	Furnish particulars	

4	**LIGHTNING AND SURGE ELECTRONIC PROTECTION**	
	Manufacturer	
	Country of origin	
	Sound output at 1 metre	dB
	Is the equipment acceptable to the Department of Public Works?	Yes/No
	Has the equipment previously been installed for the Department of Public Works?	Yes/No
	State where	a) b)
5	**SOUNDERS**	
	Manufacturer	
	Country of origin	
6	**BREAK GLASS UNITS**	
	Manufacturer	
	Country of origin	
	Method of resetting	
	Is the equipment acceptable to the Department of Public Works?	Yes/No
	Has the equipment previously been installed for the Department of Public Works?	Yes/No
	State where	a) b)
	Are there any deviations from the specification?	Yes/No
	Furnish particulars	
7	**BATTERY CHARGERS**	
	Make	
	Country or origin	
	Type of charger offered	
	Maximum charging capacity	amps
	Recharging time for batteries supplied	hours
	Have all the specified meters been provided?	Yes/No
	Is the equipment acceptable to the Department of Public Works?	Yes/No
	Has the equipment previously been installed for the Department of Public Works?	Yes/No
	State where	a) b)
	Are there any deviations from the specification?	Yes/No
	Furnish particulars	
	(The recharging should reach approximately 80% of battery capacity within 8 hours. Tenderers are reminded that the chargers should be of the constant potential type design to limit the charging current to meet the specification of the battery supplier).	

8	**BATTERIES**	
	Make	
	Battery type	
	Country of origin	
	Guarantee period	years
	Number of batteries	
	Total capacity	amp hours
9	**CIRCUIT WIRING**	
	Manufacturer	
	Country of origin	
	Type	
	Does it bear the SABS mark?	Yes/No
	Does it bear the BS mark?	Yes/No
10	**STEEL CONDUITS**	
	Manufacturer	
	Country of origin	
	Type	

TENDERER DETAILS

A. SCHEDULE OF HISTORY AND EXPERIENCE OF TENDERER

ITEM	PARTICULARS	INFORMATION FROM TENDERER
1	**Company Details:**	
	Name:	
	Address:	
	Type of Company:	
	Directors/Owners:	
	Established:	
	Staff Skilled	
	Staff Labour:	
	Staff Professional:	
	Bank:	
	Bank Manager:	
	Bank Manager Phone No:	
	Credit Rating:	
2	**Experience with this type of work over the last 12 months:**	
	Fire contracts: and size:	
	Security contracts and size:	
	Current contracts and their value:	
3	**List of contracts completed and reference contact person**	
	1	
	2	
	4	
	5	
	6	
4	**List of experienced skilled personnel proposed for this contract:**	
	1 Name and phone No	
	2 Name and phone No	
	3 Name and phone No	

SUB-CONTRACTOR WITNESS

DATE

B. SPECIALIST SUB-CONTRACTORS

Tenderers shall list all specialist Sub-Contractors that are proposed for this project:

ITEM	SERVICE PROVIDED	NAME OF FIRM
1.	Fire Detection	.....
2.	DA set	.....
3.	UPS sytems	.....

CONTRACTOR **WITNESS**

DATE

C. MAJOR RATES FOR COSTING VARIATIONS

The following rates may be applicable for costing alterations by the issue of revised drawings and instructions

1. **Labour Rates**

   Day work rates (including profit, overheads, design and drawing office time, etc)

   Artisan and two assistants : R...../h

   Labourer : R...../h

   Multiplier factor for: weekend rates .....
   night rates .....

2. **Vehicle Rates**

   i) Mileage rate for vehicles not exceeding 1 tonne capacity R...../km

   ii) Mileage rate for vehicles exceeding 1 tonne capacity R...../km

   The above are to include all profit, overheads etc. but excluding VAT

3. **Bought-Out Items** (including all costs and profit etc)

   Nett cost plus .....% (excl. VAT)

SUB-CONTRACTOR WITNESS

DATE

D. DEVIATIONS FROM SPECIFICATION

Any proposed deviations from the specification or drawings shall be outlined below giving full details of any such proposals. Unless items are specified below, then it is assumed that Tenderer's offers are fully conforming with the tender documents.

Paragraph No **Deviation**

SUB-CONTRACTOR WITNESS

DATE

NATIONAL DEPARTMENT OF PUBLIC WORKS

NTUZUMA POLICE STATION, KWAZULU-NATAL

NEW CCTV BUILDING

GAS SUPPRESSION INSTALLATION

PART 2

INFORMATION SCHEDULES
(To be completed by Tenderer)

2 INFORMATION SCHEDULES
(To be completed by Tenderer)

2.1 Capacity of FM200 Gas Cylinder .....

2.2 Name and manufacturer of Control Equipment .....

2.3 Name and Manufacturer of Fire Detection System .....

2.4 Manufacturer of Strobe Light .....

2.5 Manufacturer of Audio Alarm System .....

2.6 Name of Installing Sub Contractor .....

NATIONAL DEPARTMENT OF PUBLIC WORKS

NTUZUMA POLICE STATION, KWAZULU-NATAL

NEW CCTV BUILDING

AIR CONDITIONING & VENTILATION INSTALLATION SPECIFICATION

PART 2 : INFORMATION SCHEDULES
(To Be Completed by Tenderer)

1. GENERAL

Information Schedules for the air conditioning and ventilation installation at the Ntuzuma Police Station for the National Department of Public Works.

1.1 It is a requirement of this document that tenderers shall complete, in full, the Equipment Schedules contained in this specification.

1.2 Failure to complete this schedule may lend to tender disqualification.

1.3 The words "or other approved " are always implied whether following the description of equipment or not.

1.4 The equipment manufacturers' names appearing in the schedules are those around which the design has been based and all equipment so scheduled is complementary Where information is not indicated in the Schedules, the Tenderer shall provide the details.

1.5 All tenderers shall submit their tenders based on equipment scheduled under the heading, "Main Offer".

1.6 The tenderer may offer alternative makes providing that such alternatives are of equal quality to those "selected" by the Mechanical Engineer and form part of an alternative tender offer to the tenderers main offer. Approval Mechanical Engineer for alternative equipment shall be obtained before the tender closing date.

1.7 The Mechanical Engineer shall be the sole judge of the equipment offered and his decision shall be final.

1.8 As stated above all equipment selections are complementary and it is the responsibility of the successful tenderer to ensure that:

1.9 His alternative offer can be housed within the space provided, leaving sufficient clearance surrounding the unit as laid down by local regulations and for ease of maintenance. Should the alternative have to be replaced by that as listed in order to met these requirements, it shall be at no additional cost to the Contract.

1.10 All openings in the structure meet with the requirements of his alternative offers, or ensure that timely details of any relevant amendments are requested to prevent any abortive work on site.

1.11 If there are any monetary benefits which can be offered to the Head : Works through an alternative item of equipment, the Tenderer must incorporate all secondary cost variations into that saving reflected (e.g. the price reduction offered for an alternative chiller shall incorporate any additional costs in upgrading a pump and/or it's motor size which could result from an increase in resistance through it's heat exchangers). Further, all relevant technical data, especially as regards energy consumption, rated output, capacity, variations in resistances, etc., must also be submitted in order that the Head : Works' Representative (Mechanical Engineer) may evaluate savings in capital costs against any increases in operating costs prior to accepting that particular alternative offer.

2. EQUIPMENT SCHEDULES

2.1 A/C Split Unit Systems

Area	Make	Model No.	Type	Cooling Cap Kw
CCTV Room	Dunham-Bush or other approved	HP60HNI/HHS60HPNI	In Ceiling Ducted	17.2
IT-Core Room	Dunham-Bush or other approved	HP18MNI/WHS06HNI	Mid Wall	5.3
Electronic Equip. Room	Dunham-Bush or other approved	HP18MNI/WHS06HNI	Mid Wall	5.3
UPS Room	Dunham-Bush or other approved	HP09MNI/WHS03HNI	Mid Wall	2.6
Radio Tech Workshop	Dunham-Bush or other approved	HP12CNI/CS50MNI	Cassette	3.6
Records Room	Dunham-Bush or other approved	HP12CNI/CS50MNI	Cassette	3.6
Commander	Dunham-Bush or other approved	HP12CNI/CS50MNI	Cassette	3.6
Rest Room / Kitchen	Dunham-Bush or other approved	HP24CNI/CS70MNI	Cassette	7.1
Office	Dunham-Bush or other approved	HP12CNI/CS50MNI	Cassette	3.6
Parade Room	Dunham-Bush or other approved	HP18CNI/CS60MNI	Cassette	5.3
Reception	Dunham-Bush or other approved	HP18CNI/CS60MNI	Cassette	5.3
Evidence Room	Dunham-Bush or other approved	HP24CNI/CS70MNI	Cassette	7.1

2.2 Extraction Fans

Area	Make	Model No.	Type
Electronic Equip Room	Luft / Vitro	Vitro6 / 150 AL	Window / Wall
IT Core Room	Luft / Vitro	Vitro6 / 150 AL	Window / Wall
UPS Room	Luft / Vitro	Vitro6 / 150 AL	Window / Wall
Rest Room / Kitchen	Luft / Vitro	Vitro6 / 150 AH	Window / Wall
Storer o o m	Luft / Vitro	Vitro9 / 230 A	Window / Wall
Male Toilet	Luft / elicient	AXC 200	In-line Tube
Female Toilet	Luft / elicient	AXC 200	In-line Tube
CCTV	Luft	LPA 315 / 41F	Plate Axial

2.3 Fresh Air Fan

Area	Make	Model No.	Type
Main Fan	Luft	560 mm diameter	Axial (including sound attenuators inlet and outlet)

2.4 Diffusers I Grilles

Area	Make	Model No.	Type
Supply Diffusers	Trax	4 Way	ADLQ-DQ
Return Air Grilles	Trax	RAFF	Return Air and Filters
Door Grilles	Trox	AGS-T	Non Vision

REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF PUBLIC WORKS

BILLS OF QUANTITIES

FOR

NTUZUMA SAPS:

COMPLETION OF CCTV CONTROL ROOM

WCS NO.: 046725

C2.2: BILLS OF QUANTITIES

QUANTITY SURVEYOR:

EDGECOMBE & HAYES-HILL
P O Box 25178
Gateway
4320

TEL: 031 566 2977

EMAIL: ianhill@mitsol.co.za

ARCHITECT:

DEPARTMENT OF PUBLIC WORKS
DURBAN REGIONAL OFFICE
Private Bag X54315
Durban
4000
TEL : 031 207 3131

EMAIL: sumesh.govender@dpw.gov.za

STRUCTURAL ENGINEERS:

TGC ENGINEERS
P.O. Box 446
Pavilion
3611

TEL: 031 265 1777

EMAIL: tgc@tgcengineers.co.za

CIVIL CONSULTING ENGINEERS:

BVI CONSULTING ENGINEERS
P.O.BOX 889
Westville
3630

TEL: 031 266 8382

EMAIL: dbn@bvikn.co.za

ELECTRICAL ENGINEERS:

AA POWER
55 Road 718
Chatsworth
4092

TEL: 031 404 3810

EMAIL: aapower@gmail.com

MECHANICAL ENGINEERS:

PARSONS & LUMSDEN
P O Box 800
Kloof
3640

TEL: 031 764 7727

EMAIL: nigel@parsonsandlumsden.com

DEPARTMENT OF PUBLIC WORKS
DURBAN REGIONAL OFFICE
Private Bag X54315
Durban
4000
TEL: 031 314 7105

EMAIL: nkosinathi.mchunu@dpw.gov.za

NOVEMBER 2022

Item No		Quantity	Amount R
	SECTION 1		
	BILL NO 1		
	PRELIMINARIES		
	(WORK GROUP 190)		
	For preambles see "Model Preambles for Trades"		
	Unless otherwise stated herein, all items in this bill shall be deemed to fall into Work Group No 190 for Haylett formula purposes		
	MEANING OF TERMS "TENDER / TENDERER"		
	Any reference to the words "Tender" or "Tenderer" herein and/or in any other documentation shall be construed to have the same meaning as the words "Bid" or "Bidder"		
	BUILDING AGREEMENT AND PRELIMINARIES		
	The **JBCC** Principal Building Agreement (Edition 6.2 - May 2018) prepared by the Joint Building Contracts Committee shall be the applicable building agreement, amended as hereinafter described		
	The **JBCC** Principal Building Agreement **contract data** form an integral part of this **agreement**		
	The **JBCC** General Preliminaries (May 2018) published by the Joint Building Contracts Committee for use with the **JBCC** Principal Building Agreement (Edition 6.2 - May 2018) shall be deemed to be incorporated in these **bills of quantities**, amended as hereinafter described		
	The **contractor** is deemed to have referred to the abovementioned documents for the full intent and meaning of each clause		
	The clauses in the abovementioned documents are hereinafter referred to by clause number and heading only		
	Where any item is not relevant to this **agreement** such item is marked N/A signifying "not applicable"		
	Where standard clauses or alternatives are not entirely applicable to this **agreement** such amendments, modifications, corrections or supplements as will apply are given under each relevant clause heading and such amendments, modifications, corrections or supplements shall take precedence notwithstanding anything to the contrary contained in the abovementioned documents		
	Carried to Collection	R	

Bill No. 1
Preliminaries

PREAMBLES FOR TRADES

The Model Preambles for Trades 2008 published by the Association of South African Quantity Surveyors shall be deemed to be incorporated in these **bills of quantities** and no claims arising from brevity of description of items fully described in the said Model Preambles will be entertained

Supplementary preambles and/or specifications are incorporated in these **bills of quantities** to satisfy the requirements of this project. Such supplementary preambles and/or specifications shall take precedence over the provisions of the Model Preambles

The **contractor's** prices for all items throughout these **bills of quantities** shall take account of and include where applicable for all of the obligations, requirements and specifications given in the Model Preambles and in any supplementary preambles and/or specifications

STRUCTURE OF THIS PRELIMINARIES BILL

Section A : A recital of the headings of the individual clauses in the aforementioned **JBCC** Principal Building Agreement

Section B : A recital of the headings of the individual clauses in the aforementioned **JBCC** General Preliminaries

Section C : Any special clauses to meet the particular circumstances of the project

PRICING OF PRELIMINARIES

Should the **contractor** select Option A in the **contract data** for the adjustment of **preliminaries**, the amounts entered against the relevant items in these **preliminaries** are to be divided into one or more of the three categories provided namely fixed (F), value related (V) and time related (T)

SECTION A: PRINCIPAL BUILDING AGREEMENT

Interpretation (A1-A7)

1 Clause 1.0 - Definitions and interpretation

Pricing of bills of quantities

Carried to Collection R

Bill No. 1
Preliminaries

	The **contractor** is to allow opposite each item for all costs in connection therewith. All prices to include, unless otherwise stated, for all materials, fabrication, conveyance and delivery, unloading, storing, unpacking, hoisting, labour, setting, fitting and fixing in position, cutting and waste (except where to be measured in accordance with the standard system of measurement), patterns, models and templates, plant, temporary works, returning of packaging, duties, taxes (other than Value Added Tax), imposts, establishment charges, overheads, profit and all other obligations arising out of this **agreement**. Value Added Tax (VAT) is to be separately stated on the summary page of these **bills of quantities** Items left unpriced will be deemed to be covered in prices against other items throughout these **bills of quantities** and no claim for any extras arising out of the **contractor's** omission to price any item will be entertained Prices for all **construction equipment**, temporary works, services and other items shall include for the supply, maintenance, operating cost and subsequent removal and making good as necessary **Abbreviated descriptions** The items in these **bills of quantities** utilise abbreviated descriptions. It is the intention that the abbreviated descriptions be fully described when read with the applicable measuring system and the relevant preambles and/or specifications. However, should the full intent and meaning of any description not be clear, the **contractor** shall, before submission of his tender, call for a written directive from the **principal agent**, failing which it shall be assumed that the **contractor** has allowed in his pricing for materials and workmanship in terms of international best practice **Legal status of contractor** If the **contractor** constitutes a joint venture, consortium or other unincorporated grouping of two or more persons then: 1. These persons are deemed to be jointly and severally liable to the **employer** for the performance of this **agreement** 2. These persons shall notify the **employer** of their leader who has assigned authority to bind the **contractor** and each of these persons 3. The **contractor** shall not alter its composition or legal status without the prior written consent of the **employer**		
	F:..... V:..... T:.....	Item	
2	Clause 2.0 - **Law**, regulations and **notices**		
	F:..... V:..... T:.....	Item	
	Carried to Collection	R	

Bill No. 1
Preliminaries

3	Clause 3.0 - Offer and acceptance F:..... V:..... T:.....	Item	
4	Clause 4.0 - Cession and assignment F:..... V:..... T:.....	Item	
5	Clause 5.0 - Documents **Value Added Tax** Provision is made in the summary page of these **bills of quantities** for the inclusion of Value Added Tax (VAT) F:..... V:..... T:.....	Item	
6	Clause 6.0 - **Employer's agents** **Delegated authority** The authority of the **principal agent** to issue **contract instructions** [17.1] and perform duties for specific aspects of the **works** is delegated to **agents** as follows [6.2]. This does not preclude the **principal agent** from issuing such **contract instructions**: 1. Architect 1.1 Duties [6.2] : The architect is responsible for the architectural design, functional design and quality inspection of the **works** 1.2 **Contract instructions** [6.2; 17.1] : 1.2.1 Rectification of discrepancies, errors in description or quantity or omission of items in the **agreement** other than in the **JBCC** Principal Building Agreement 1.2.2 Alteration to design, standards or quantity of the **works** provided that such **contract instructions** shall not substantially change the scope of the **works** 1.2.3 The **site** [13.0] 1.2.4 Compliance with the **law**, regulations and bylaws [2.1] 1.2.5 Provision and testing of samples of **materials and goods** and/or of finishes and assemblies of elements of the **works**		
	Carried to Collection	R	

Bill No. 1
Preliminaries

1.2.6 Opening up of work for inspection, removal or re-execution [23.2.4; 26.4.2]

1.2.7 Removal or re-execution of work

1.2.8 Removal or substitution of any **materials and goods**

1.2.9 Protection of the **works**

1.2.10 Making good physical loss and repairing damage to the **works** [23.2.2]

1.2.11 Rectification of **defects** [21.2]

1.2.12 A **list for practical completion** specifying outstanding or defective work to be rectified to achieve **practical completion**, a **list for completion** and a **list for final completion** specifying outstanding or defective work to be rectified to achieve **final completion**

1.2.13 Expenditure of **budgetary allowances**, **prime cost amounts** and **provisional sums**

1.2.14 Appointment of a **subcontractor** [14.0; 15.0]

1.2.15 Work by **direct contractors** [16.0]

1.2.16 On suspension or termination, protection of the **works**, removal of **construction equipment** and surplus **materials and goods** [29.0]

2. Quantity Surveyor

2.1 Duties [6.2] :

The quantity surveyor is responsible for all measurements, valuations, financial assessments and all other quantity surveying and cost control functions of the **works**

2.2 **Contract instructions** [6.2; 17.1] :

2.2.1 No **contract instructions** delegated to the quantity surveyor

3. Civil and Structural Engineer

3.1 Duties [6.2] :

The civil and structural engineer is responsible for all aspects of civil and structural engineering design and quality inspection of the **works**

3.2 **Contract instructions** [6.2; 17.1] :

Carried to Collection R

Bill No. 1
Preliminaries

3.2.1 Rectification of discrepancies, errors in description or quantity or omission of items in the **agreement** other than in the **JBCC** Principal Building Agreement

3.2.2 Alteration to design, standards or quantity of the **works** provided that such **contract instructions** shall not substantially change the scope of the **works**

3.2.3 The **site** [13.0]

3.2.4 Compliance with the **law**, regulations and bylaws [2.1]

3.2.5 Provision and testing of samples of **materials and goods** and/or of finishes and assemblies of elements of the **works**

3.2.6 Opening up of work for inspection, removal or re-execution [23.2.4; 26.4.2]

3.2.7 Removal or re-execution of work

3.2.8 Removal or substitution of any **materials and goods**

3.2.9 Protection of the **works**

3.2.10 Making good physical loss and repairing damage to the **works** [23.2.2]

3.2.11 Rectification of **defects** [21.2]

3.2.12 A **list for practical completion** specifying outstanding or defective work to be rectified to achieve **practical completion**, a **list for completion** and a **list for final completion** specifying outstanding or defective work to be rectified to achieve **final completion**

3.2.13 Expenditure of **budgetary allowances**, **prime cost amounts** and **provisional sums**

5. Electrical Engineer

5.1 Duties [6.2] :

The electrical engineer is responsible for all aspects of electrical engineering design and quality inspection of the **works** and, where appointed by the **employer** for quantity surveying services in respect of the electrical installations, for all measurements, valuations, financial assessments and all other quantity surveying and cost control functions

5.2 **Contract instructions** [6.2; 17.1] :

Carried to Collection R

Bill No. 1
Preliminaries

5.2.1 Rectification of discrepancies, errors in description or quantity or omission of items in the **agreement** other than in the **JBCC** Principal Building Agreement

5.2.2 Alteration to design, standards or quantity of the **works** provided that such **contract instructions** shall not substantially change the scope of the **works**

5.2.3 Compliance with the **law**, regulations and bylaws [2.1]

5.2.4 Provision and testing of samples of **materials and goods** and/or of finishes and assemblies of elements of the **works**

5.2.5 Opening up of work for inspection, removal or re-execution [23.2.4; 26.4.2]

5.2.6 Removal or re-execution of work

5.2.7 Removal or substitution of any **materials and goods**

5.2.8 Protection of the **works**

5.2.9 Making good physical loss and repairing damage to the **works** [23.2.2]

5.2.10 Rectification of **defects** [21.2]

5.2.11 A **list for practical completion** specifying outstanding or defective work to be rectified to achieve **practical completion**, a **list for completion** and a **list for final completion** specifying outstanding or defective work to be rectified to achieve **final completion**

5.2.12 Expenditure of **budgetary allowances**, **prime cost amounts** and **provisional sums**

8. Health and safety consultant

8.1 Duties [6.2] :

The health and safety consultant is responsible for all aspects of health and safety of the **works**. Without derogating from the generality thereof, the health and safety consultant will perform the following specific functions and duties in respect of the health and safety aspects of the **works**. He shall:

8.1.1 Act as the **employer's agent** in terms of the Construction Regulations issued in terms of the Occupational Health and Safety Act,1993 as amended

8.1.2 Prepare and update the health and safety specification for the **works**

8.1.3 Agree with the **contractor** the health and safety plan for the **works**

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	8.1.4 Carry out regular audits to ensure adherence to the safety plan and compliance with the act and regulations		
	8.1.5 Stop the execution of the **works** where the agreed specification or plan is not adhered to		
	F:..... V:..... T:.....	Item	
7	Clause 7.0 - Design responsibility		
	F:..... V:..... T:.....	Item	
	Insurances and securities (A8-A11)		
8	Clause 8.0 - **Works** risk		
	F:..... V:..... T:.....	Item	
9	Clause 9.0 - Indemnities		
	F:..... V:..... T:.....	Item	
10	Clause 10.0 - Insurances		
	F:..... V:..... T:.....	Item	
11	Clause 11.0 - **Securities**		
	Retention in lieu of Construction Guarantee		
	The **contractor can opt for a retention all as per clause** 11.14.1 in lieu of providing a construction guarantee		
	Extension of waiver of lien		
	The **contractor** shall ensure that a waiver of lien is included in all subcontracts and that the **works** executed on the **site** are kept free of all liens and other encumbrances at all times [11.10]		
	F:..... V:..... T:.....	Item	
	Execution (A12 - A17)		
12	Clause 12.0 - Obligations of the **parties**		
	Office accommodation		
	An area for a site camp will be provided at the site handover. An office suitable for site meetings must be provided with a table and chairs.		
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	Notice board The **contractor** shall erect in a position approved by the **principal agent**, maintain and remove on **practical completion** a notice board recommended by the South African Institute of Architects and as approved by the **principal agent** listing the names and logos of the **employer**, the **contractor** and the professional consultants. No subcontractor or supplier notice boards may be erected unless permission is granted by the **principal agent** for such notice boards to be erected [12.2.18] **Statutory and other notices** The **contractor** shall submit and/or comply with all statutory and other notices that may be required by any local or other authority in order not to cause any delay to the commencement of the **works** by the **contractor**. The **contractor** shall pay all deposits or fees in this regard It is, however, specifically recorded that the **employer** shall be responsible for the timeous approval of building plans by any local or other authorities and the payment of any fees or charges related thereto F:..... V:..... T:.....	Item	
13	Clause 13.0 - Setting out F:..... V:..... T:.....	Item	
14	Clause 14.0 - Nominated **subcontractors** F:..... V:..... T:.....	Item	
15	Clause 15.0 - Selected **subcontractors** F:..... V:..... T:.....	Item	
16	Clause 16.0 - **Direct contractors** **Attendance on direct contractors** In respect of **direct contractors** the **contractor** shall: 1. Designate an area for the **direct contractor** to establish a temporary office and workshop and storage of equipment and materials 2. Allow the use of personnel welfare facilities, where provided 3. Provide water, lighting and single phase electric power to a position within 50m of the place where the direct contract work is to be carried out, other than fuel or power for commissioning of any installation		
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	4. Permit the **direct contractor** to use erected scaffolding, hoisting facilities, etc provided by the **contractor**, in common with others having the like right, while it remains erected on the **site** [16.1]		
	F:..... V:..... T:.....	Item	
17	Clause 17.0 - **Contract instructions**		
	Site instructions		
	Instructions issued on **site** are to be recorded in a site instruction book which is to be supplied and maintained on **site** by the **contractor**		
	F:..... V:..... T:.....	Item	
	Completion (A18 - A24)		
18	Clause 18.0 - Interim completion	N/A	
19	Clause 19.0 - **Practical completion**		
	F:..... V:..... T:.....	Item	
20	Clause 20.0 - Completion in **sections**		
	F:..... V:..... T:.....	Item	
21	Clause 21.0 - **Defects** liability period and **final completion**		
	F:..... V:..... T:.....	Item	
22	Clause 22.0 - **Latent defects** liability period		
	F:..... V:..... T:.....	Item	
23	Clause 23.0 - Revision of the date for **practical completion**		
	Substitution of materials and goods		
	The removal or substitution of any **materials and goods** which do not conform to the specification or the **contract drawings** shall not constitute grounds for the extension of the **construction period** nor for the adjustment of the **contract value** [17.1.8; 23.1 & 2]		
	F:..... V:..... T:.....	Item	
24	Clause 24.0 - **Penalty** for late or non-completion		
	F:..... V:..... T:.....	Item	
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	Payment (A25 - A27)		
25	Clause 25.0 - Payment		
	Prices submitted		
	Where prices are submitted by the **contractor** or **subcontractor** during the progress of the **works** in respect of **contract instructions** or in regard to a claim under the terms of this **agreement** and notwithstanding the fact that such prices may be used in an interim **payment certificate**, there is to be no presumption of acceptance. Should the **principal agent** wish to accept any such prices prior to the issue of the **certificate of final completion**, it shall be in writing		
	F:..... V:..... T:.....	Item	
26	Clause 26.0 - Adjustment of the **contract value** and **final account**		
	Fluctuations in costs		
	N/A		
	Cost of claims		
	All costs incurred by the **contractor** in the preparation of claims shall be borne by the **contractor**. This provision shall not preclude an adjudicator or an arbitrator appointed in terms of this **agreement** [30.6 & 7] from making a determination on costs		
	Claims from subcontractors		
	The **contractor** shall review, assess and adjudicate any claims received by him from any **subcontractor** and thereafter submit same to the **principal agent** with a recommendation in order to assist the **principal agent** in adjudicating the claim [26.6]		
	F:..... V:..... T:.....	Item	
27	Clause 27.0 - Recovery of expense and/or loss		
	F:..... V:..... T:.....	Item	
	Suspension and termination (A28 - A29)		
28	Clause 28.0 - Suspension by the **contractor**		
	F:..... V:..... T:.....	Item	
29	Clause 29.0 - Termination		
	F:..... V:..... T:.....	Item	
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	Dispute resolution (A30)		
30	Clause 30.0 - Dispute resolution		
	F:..... V:..... T:.....	Item	
31	**Agreement**		
	The required information of the **parties** and the amount of the **contract sum** shall be inserted in the **agreement** for signature of the **agreement** by the **parties**		
	F:..... V:..... T:.....	Item	
32	**Contract data**		
	Tenderer's selections		
	Before submission of his tender the **contractor** is to complete the tenderer's selections in the **contract data**		
	F:..... V:..... T:.....	Item	
	SECTION B: GENERAL PRELIMINARIES		
	Definitions and interpretation (B1)		
33	Clause 1.1 - Definitions		
	F:..... V:..... T:.....	Item	
34	Clause 1.2 - Interpretation		
	F:..... V:..... T:.....	Item	
	Documents (B2)		
35	Clause 2.1 - Checking of documents		
	F:..... V:..... T:.....	Item	
36	Clause 2.2 - Provisional **bills of quantities**		
37	Clause 2.3 - Availability of **construction information**		
	F:..... V:..... T:.....	Item	
38	Clause 2.4 - Ordering of **materials and goods**		
	F:..... V:..... T:.....	Item	
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	Previous work and adjoining properties (B3)		
39	Clause 3.1 - Previous work - dimensional accuracy		
	F:..... V:..... T:.....	Item	
40	Clause 3.2 - Previous work - **defects**		
	F:..... V:..... T:.....	Item	
41	Clause 3.3 - Inspection of adjoining properties		
	F:..... V:..... T:.....	Item	
	The site (B4)		
42	Clause 4.1 - Handover of **site** in stages		
	F:..... V:..... T:.....	Item	
43	Clause 4.2 - Enclosure of the **works**	Item	
	F:..... V:..... T:.....		
44	Clause 4.3 - Geotechnical and other investigations		
	F:..... V:..... T:.....	Item	
45	Clause 4.4 - Encroachments		
	F:..... V:..... T:.....	Item	
46	Clause 4.5 - Existing premises occupied		
	F:..... V:..... T:.....	Item	
47	Clause 4.6 - Services - known		
	F:..... V:..... T:.....	Item	
	Management of contract (B5)		
48	Clause 5.1 - Management of the **works**		
	F:..... V:..... T:.....	Item	
49	Clause 5.2 - Progress meetings		
	F:..... V:..... T:.....	Item	
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50	Clause 5.3 - Technical meetings		
	F:..... V:..... T:.....	Item	
	Samples, shop drawings and manufacturer's instructions (B6)		
51	Clause 6.1 - Samples of materials		
	F:..... V:..... T:.....	Item	
52	Clause 6.2 - Workmanship samples		
	F:..... V:..... T:.....	Item	
53	Clause 6.3 - Shop drawings		
	F:..... V:..... T:.....	Item	
54	Clause 6.4 - Compliance with manufacturer's instructions		
	F:..... V:..... T:.....	Item	
	Deposits and fees (B7)		
55	Clause 7.1 - Deposits and fees		
	F:..... V:..... T:.....	Item	
	Temporary services (B8)		
56	Clause 8.1 - Water		
	F:..... V:..... T:.....	Item	
57	Clause 8.2 - Electricity		
	F:..... V:..... T:.....	Item	
58	Clause 8.3 - Ablution and welfare facilities		
	F:..... V:..... T:.....	Item	
59	Clause 8.4 - Communication facilities		
	F:..... V:..... T:.....	Item	
	Prime cost amounts (B9)		
60	Clause 9.1 - Responsibility for **prime cost amounts**		
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	Attendance on subcontractors (B10)		
61	Clause 10.1 - General attendance		
	F:..... V:..... T:.....	Item	
62	Clause 10.2 - Special attendance		
	General (B11)		
63	Clause 11.1 - Protection of the **works**		
	F:..... V:..... T:.....	Item	
64	Clause 11.2 - Protection/isolation of existing **works** and **works** occupied in **sections**		
	F:..... V:..... T:.....	Item	
65	Clause 11.3 - Security of the **works**		
	The tenderer is to allow for 24 hour security 7 days a week for the duration of the contract.		
	F:..... V:..... T:.....	Item	
66	Clause 11.4 - Notice before covering work		
	F:..... V:..... T:.....	Item	
67	Clause 11.5 - Disturbance		
	Disturbance		
	All work is to be carried out in such a manner as to cause no unacceptable or unreasonable dust, noise, vibrations, nuisance, inconvenience, annoyance and the like to the public, others, other properties and traffic in so far as they exceed the permissible limitations set by government legislation or by the local authority. Any delays, stoppages and the like arising from or in order to comply with the above will not constitute grounds for an adjustment to the **construction period** or **contract value** whatsoever		
	F:..... V:.....T:.....	Item	
68	Clause 11.6 - Environmental disturbance		
	Controlling all forms of pollution		
	The **contractor** shall be responsible for and take all precautions in controlling by whatever means necessary all forms of pollution emanating from the **site** during the **construction period** due inter alia to noise, artificial light, wind-blown sand, dust, deposits of mud, etc		
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	The **contractor** is to ensure that all roads which border the **site** and are used by the **contractor** during the execution of the **works** are kept clean and free of any dirt or debris caused by the execution of the **works**		
	Environmental management plan		
	The contractor shall execute the works without unreasonable adverse effect on the environment		
	F:..... V:.....T:.....	Item	
69	Clause 11.7 - **Works** cleaning and clearing		
	F:..... V:..... T:.....	Item	
70	Clause 11.8 - Vermin		
	F:..... V:..... T:.....	Item	
71	Clause 11.9 - Overhand work		
	F:..... V:..... T:.....	Item	
72	Clause 11.10 - Tenant installations		
	F:..... V:..... T:.....	Item	
73	Clause 11.11 - Advertising		
	F:..... V:..... T:.....	Item	
	SECTION C: SPECIFIC PRELIMINARIES		
74	Warranties for materials and workmanship		
	Where warranties for materials and/or workmanship are called for, the **contractor** shall obtain a written warranty, addressed to the **employer**, from the entity supplying the materials and/or executing the work and shall deliver same to the **principal agent** on **final completion** of the contract		
	The warranty shall state that workmanship, materials and installation are warranted for a specific period from the date of **practical completion** and that any **defects** that may arise during the specified period shall be made good at the expense of the entity supplying the materials and/or doing the work, upon written **notice** to do so		
	The warranty will not be enforced if the work is damaged by **defects** in the execution of the **works**, in which case the responsibility for replacement shall rest entirely with the **contractor**		
	F:..... V:..... T:.....	Item	
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75	Overtime Should overtime be required to be worked for any reason whatsoever, the cost of such overtime is to be borne by the **contractor** unless the **principal agent** has specifically authorised, prior to execution thereof, that costs for such overtime are to be borne by the **employer** F:..... V:.....T:.....	Item	
76	Cooperation of the **contractor** for cost management It is specifically agreed that the **contractor** accepts the obligation of assisting the **principal agent** in implementing proper cost management. The **contractor** will be advised by the **principal agent** of all cost management procedures which will be implemented to ensure that the **contract value** does not exceed the budget F:..... V:.....T:.....	Item	
77	Overloading The **contractor** shall take all necessary steps to ensure that no damage occurs due to overloading of any portion of the **works** or temporary works eg scaffolding, etc. The **contractor** shall submit details of his proposed loading, storage, plant erection, etc to the **principal agent** for approval prior to proceeding with such loading, storing or erecting and shall comply with and pay for the **principal agent's** requirements in connection with the provision of temporary support work, etc. Any damage caused to the **works** by overloading shall be made good by the **contractor** at his sole expense F:..... V:.....T:.....	Item	
78	Propping of floors below The **contractor** is advised that propping of floors below may be required if he wishes to use any areas of completed suspended reinforced concrete slabs for vehicle access, storage of **materials and goods** and location of plant, scaffolding, etc. The location of these areas and any necessary propping shall be approved by the **principal agent** and the cost thereof shall be borne by the **contractor** F:..... V:.....T:.....	Item	
79	Testing of flat roof waterproofing for watertightness Flat roof waterproof areas shall be flooded and kept "ponded" for at least forty eight (48) hours as a test to ensure the watertightness of the waterproofing and before any further construction work is carried out above the waterproofing F:..... V:.....T:.....	Item	
80	Health and safety		
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	Without limiting the generality of the provisions of clause 2.0, the **contractor's** attention is drawn to the provisions of the Construction Regulations issued in terms of the Occupational Health and Safety Act, 1993 as amended. It is specifically stated that the **employer** shall prepare a documented health and safety specification for the **works** and that the **employer** shall ensure that the **contractor** has made provision for the cost of health and safety measures during the execution of the **works.** The **contractor** shall price opposite this item for compliance with the act and the regulations and the reasonable provisions of the aforementioned health and safety specification [2.1]			
	F:..... V:..... T:.....		Item	
81	**Broad based black economic empowerment (BBBEE)**			
	F = ... V = ... T = ...		Item	
82	Business Forum			
	The **Tenderer** is referred to PA-16.2 (EC) with regards tender and contract conditions pertaining to contract participation goal.			
	The tenderer is to allow for any additional costs associated with the above clause and no claims for delays caused by business forums will be entertained			
	F:..... V:.....T:.....		Item	
	Tenders submitted will be evaluated taking into account their empowerment rating			
	The **employer** will be monitoring the black economic empowerment status of the **contractor** throughout the execution of the **works**			
	The **contractor** is to submit to the **principal agent** on an annual basis a schedule of spend, split into vendors engaged as **subcontractors** and suppliers indicating their BBBEE rating, including proof of the said rating			
83	**Advertising rights**			
	F = ... V = ... T = ...		Item	
	The **employer** may elect to contract with advertising agencies for the erection of advertising hoardings, banners, wraps or the like for the duration of the contract. The **contractor** shall not prevent such an arrangement and will assist in the facilitation of same. Position and type of advertising structure to be agreed with the **principal agent** so as not to hinder the **contractor** in the meeting of his obligations under this **agreement**			
84	**Confidentiality**			
	F = ... V = ... T = ...		Item	
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	The **contractor** undertakes to maintain in confidence any and all information regarding this project and shall obtain appropriate similar undertakings from all **subcontractors** and suppliers. Such information shall not be used in any way except in connection with the execution of the **works** No information regarding this project shall be published or disclosed without the prior written consent of the **employer**			
85	**Media releases** F = ... V = ... T = ...		Item	
	All rights of publication of articles in the media, together with any advertising relating thereto or in any way connected with this project, shall vest with the **employer** The **contractor** together with his **subcontractors** shall not, without the prior written consent of the **employer**, cause any statement or advertisement to be printed, screened or aired by the media SUMMARY OF CATEGORIES			
86	Category : Fixed R 0.00 Category : Value R 0.00 Category : Time R 0.00		Item	
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Item No		Quantity	Rate	Amount R
	SECTION 2			
	BILL NO 1			
	ALTERATIONS			
	For preambles see "Model Preambles for Trades"			
	(WORK GROUP 102)			
	SUPPLEMENTARY PREAMBLES			
	View site			
	Before submitting his tender the tenderer shall visit the site and satisfy himself as to the nature and extent of the work to be done and the value of the materials salvageable from the alterations. No claim for any variations of the contract sum in respect of the nature and extent of the work or of inferior or damaged materials will be entertained			
	Explosives			
	No explosives whatsoever may be used for alteration purposes unless otherwise stated			
	General			
	The contractor shall carry out the whole of the work with as little mess and noise as possible and with a minimum of disturbance to adjoining premises and their occupants. He shall provide proper protection and provide and erect any temporary tarpaulins that may be necessary during the progress of the works, all to the satisfaction of the principal agent, and remove when directed			
	The contractor will be required to take all dimensions affecting the existing building on the site and he will be held solely responsible for the accuracy of all such dimensions			
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	Bill No. 1 Alterations			

Where existing screeds are described to be prepared for new floor finishes, the screeds are to be scraped clean of loose materials and glue and must be dry, dust free, clean, not contaminated with traces of grease or oils and primed with one coat "FloorworX No 33" bonding liquid and levelled with two coats "FloorworX Pavelite" smoothing compound all in accordance with the manufacturer's technical specifications

Any water supply pipes and other piping that may be met with and found necessary to disconnect or cut, shall be effectually stopped off or grubbed up and removed, and any new connections that may be necessary shall be made with proper fittings, to the satisfaction of the principal agent

Prices

Prices to take out and remove doors and frames shall be deemed to include for removing door stops, cabin hooks, etc and making good of holes

Prices for doors, windows, etc with frames where described as to be taken out shall be deemed to include for the removal of all beads, architraves, ironmongery, etc. Doors with frames which are to be re-fixed are to be provided with new architraves (architraves measured elsewhere)

Prices for doors, fanlights, fittings, frames, linings, etc which are to be re-used shall be deemed to include for thorough overhauling before refixing, including taking off, easing and rehanging, cramping up, re-wedging as required and making good cramps, dowels, etc, and easing, oiling, adjusting and repairing ironmongery if necessary, replacing any glass damaged in removal or subsequently and stopping up all nail and screw holes with tinted plastic wood to match the timber

Prices for building up of openings in existing walls shall be deemed to include for levelling and preparing of cement screeds, pavings, granolithic, etc, for raising of masonry

Prices for making good of finishes shall be deemed to include making good of the masonry and concrete surfaces onto which the new finishes are applied

REMOVAL OF EXISTING WORK

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Alterations

	Break down and remove masonry				
1	Brick on edge coping 220mm wide	m	5		
	Hack up/off and remove granolithic, screeds or plaster from concrete or masonry and prepare surfaces for new screeds or plaster				
2	Internal plaster from walls and columns	m2	20		
3	External plaster from walls, columns and beams	m2	20		
	Take down and remove roofs, floors, panelling, ceilings, partitions, etc				
4	Panelled suspended ceilings, including cornices, suspension grid, hangers, etc	m2	488		
5	Nutec ceilings, including cornices, timber brandering, etc	m2	23		
6	Plaster board ceilings, including cornices, timber brandering, etc	m2	36		
7	Sheet metal roof coverings including sisalation from timber purlins to remain	m2	306		
	Carefully take down and set aside for re-fix in similar or new position				
8	Timber roof structure to generator room	m2	51		
	Taking out and remove doors from timber frames to remain				
9	Timber single door and frame not exceeding 2,5m²	No	11		
	Take out and remove doors, windows, etc, including thresholds, sills, etc and preparing openings in masonry walls for new doors, windows, etc (new doors, windows, etc elsewhere), including making good cement plaster on both sides (making good paintwork elsewhere)				
10	Timber single door and timber frame 0.813 x 2.032m high overall from 230mm brick wall for new timber single door and timber frame (measured elsewhere)	No	12		
	Take out and remove sundry joinery work, fittings, etc				
11	Timber skirtings including quadrant bead	m	307		
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Alterations

12	Timber shelving 300mm wide including steel brackets fixed to walls at approximately 900mm centres	m	19		
13	Timber shelving 450mm wide including steel brackets fixed to walls at approximately 900mm centres	m	29		
14	Workstation counters 600mm wide including steel brackets bolted to brickwork and capping screwed to brickwork fixed at 1200mm centres	m	39		
15	Floor cupboards to Kitchen L-shaped on plan 3,8m long x 0,6m wide including 30mm thick Rustenberg black granite top	No	1		
16	Wall cupboards to Kitchen 1,25m long x 0,5m high	No	1		
17	Reception Desk 2,485 x 0,87m wide	No	1		
18	Radio tech workshop floor unit and worktop 8,0 x 0,76m wide	No	1		
	Take up and remove wood block floor coverings, vinyl floor coverings, carpeting, etc and prepare screeds for new floor finishes				
19	Vinyl sheet floor coverings	m2	345		
	Take out and remove sanitary fittings, including cutting off, disconnecting and blanking off short lengths of pipes and making good floor and wall finishes (making good tiling and paintwork elsewhere)				
20	Vitreous china cistern	No	4		
21	Vitreous china wash hand basin	No	1		
	Take out/off and remove sundry metalwork				
22	Access flooring pedestals bolted to floors including making good floors on completion	m2	21		
23	Steel single gate from concrete grill blocks to remain	No	1		
24	Steel sliding gate size 5375 x 3030mm high including posts (track to remain)	No	1		
25	Substation single door 0,9 x 2.4m high and frame bolted to 230mm brick wall	No	1		
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26	Substation double door 1,8 x 2,4m high and frame bolted to 230mm brick wall	No	1		
	Taking out and removing piping, gutters, etc. including disconnecting piping from fittings and making good floor and wall finishes (making good tiling and paintwork elsewhere)				
27	Aluminium eaves gutter and brackets	m	39		
	CLEANING TO EXISTING SURFACES				
	Cleaning work to existing surfaces with suitable polish all to the Architects approval				
28	Clean down floor tiles	m2	172		
29	Clean down wall tiles	m2	113		
30	Clean down skirting tiles 75mm high	m	122		
	SERVICE EXISTING WORK				
	Service existing roof				
31	Specialist inspection of existing roof installation to detect and seal all leaks		Item		
	Service existing sanitary ware				
32	Inspect, service and clean down all existing sanitary ware fixtures to remain		Item		
	Service existing sectional steel water tank and replace steelwork where required				
33	110 000 Litre Pressed steel sectional water tank on 8m high galvanised steel stand including all fittings, valves, pump switches and sterilisation of the tank with 1.6 kilograms of chlorine before handover all in accordance with the manufacturer's instructions		Item		
	REPAIRS TO EXISTING WORK				
	Galvanized structural steekwork				
34	Replace missing galvanized steel fixing plates and bolts to existing carport and water tower structural steelwork		Item		
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Alterations

Section No. 2

Bill No. 1

Alterations

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Item No			Quantity	Rate	Amount R
	BILL NO 2				
	PRECAST CONCRETE				
	For preambles see "Model Preambles for Trades"				
	(WORKGROUP 112)				
	SUPPLEMENTARY PREAMBLES				
	Sizes				
	Blocks, sills, etc measured linear shall be made in suitable lengths. Large size setting out drawings shall be prepared where necessary and submitted to the architect for approval before moulds are made				
	General				
	Where kerbstones, blocks, etc are laid in ground, descriptions shall be deemed to include necessary excavation, filling in and ramming				
	PRECAST CONCRETE				
	Precast concrete finished smooth on exposed surfaces, including bedding, jointing and pointing				
1	300 x 100mm Thick overall copings, weathered on top to 50mm thick along one edge and with drip groove in bottom along one edge	m	6		
	Carried Forward to Summary of Section No. 2			R	
	Bill No. 2 Precast Concrete				

Item No		Quantity	Rate	Amount R
	BILL NO 3			
	MASONRY			
	For preambles see "Model Preambles for Trades"			
	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			
	Reinforced brick lintels			
	Lintels shall bear at least 160mm onto adjacent walling. Where such bearing cannot be obtained due to the proximity of adjacent openings the lintel shall be continuous			
	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			
	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			
	(WORK GROUP 116)			
	Carried to Collection		R	

	FACE BRICKWORK				
	"Corobrik Firelight Satin" face bricks pointed with recessed horizontal and vertical joints				
1	Inspect existing face brickwork and make good pointing including filling all holes, make good joints, etc to face brickwork in foundations (Provisional)	m2	189		
2	Inspect existing face brickwork and make good pointing including filling all holes, make good joints, etc to face brickwork externally	m2	458		
3	Inspect existing face brickwork and make good pointing including filling all holes, make good joints, etc to face brickwork internally	m2	811		
	Brick-on-edge header course copings, sills, etc of "Corobrik Firelight Satin" face bricks, pointed with recessed joints on all exposed faces				
4	220mm Copings on top of half brick walls	m	5		
	Carried to Collection			R	

Bill No. 3
Masonry

Section No. 2

Bill No. 3

Masonry

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Bill No. 3
Masonry

Item No			Quantity	Rate	Amount R
	BILL NO 4				
	WATERPROOFING				
	For preambles see "Model Preambles for Trades"				
	SUPPLEMENTARY PREAMBLES				
	Waterproofing				
	Waterproofing of roofs, basements, etc shall be laid under a ten year guarantee. 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				
	(WORK GROUP 120)				
	WATERPROOFING TO ROOFS, BASEMENTS, ETC				
	4mm "Derbigum SP" fully bonded waterproofing				
1	On flat roofs	m2	3		
	Five coat fibre reinforced heavy duty maintenance free acrylic waterproofing				
2	Bandage cover flashing strips 500mm girth at parapet walls, including sealing top edge with mastic in and including groove in brickwork	m	2		
	PROTECTIVE ROOFING PAINT				
	Two coats bituminous aluminium paint				
3	On waterproofing to roofs	m2	3		
	Carried Forward to Summary of Section No. 2			R	
	Bill No. 4 Waterproofing				

Item No			Quantity	Rate	Amount R
	BILL NO 5				
	ROOF COVERINGS ETC				
	For preambles see "Model Preambles for Trades"				
	SUPPLEMENTARY PREAMBLES				
	Straight cutting				
	Descriptions of all roof coverings are deemed to include for all straight cutting				
	(WORK GROUP 122)				
	PROFILED METAL SHEETING AND ACCESSORIES				
	0,53mm Thick IBR 686 AZ150 Zincal painted troughed sheet steel roof sheeting in single lengths and accessories, fixed to timber purlins				
1	Roof coverings with pitches not exceeding 25 degrees	m2	231		
2	Roof coverings with pitches exceeding 25 degrees	m2	24		
3	Barge flashings	m	12		
4	Narrow and broad flute closers	m	73		
5	Moulded narrow and broad fluted polyethelene closer	m	73		
	ROOF AND WALL INSULATION				
	"Sisalation 420" heavy industrial grade aluminium foil based insulation				
6	Insulation laid taut over purlins (at approximately 1,80m centres) and fixed concurrent with roof covering, including taped laps and nylon straining wires	m2	255		
	Carried Forward to Summary of Section No. 2			R	
	Bill No. 5 Roof Coverings				

Item No		Quantity	Rate	Amount R
	BILL NO 6			
	CARPENTRY AND JOINERY			
	For preambles see "Model Preambles for Trades"			
	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			
	Joinery			
	Descriptions of frames shall be deemed to include frames, transomes, mullions, rails, etc			
	Descriptions of hardwood joinery shall be deemed to include pelleting of bolt holes			
	Fixing			
	Items described as "nailed" shall be deemed to be fixed with hardened steel nails or shot pins to brickwork or concrete			
	Decorative laminate finish			
	Laminate finish shall be glued under pressure. Edge strips shall be butt jointed at junctions with adjacent similar finish			
	(WORK GROUP 126)			
	PREFABRICATED ROOF TRUSSES			
	Provisional sum			
1	Allow the provisional sum of R50,000.00 for repairs to existing trusses	Item		
2	Builders profit and attendance at 10%	Item		
	Carried to Collection		R	

	(WORK GROUP 126)				
	EAVES, VERGES, ETC				
	'Everite Nutec' medium density sheets				
3	12 x 220mm Fascia or barge board countersunk screwed to roof timbers (elsewhere) with brass screws and jointed with and including standard half-round aluminium cover strips at all junctions	m	118		
	(WORK GROUP 126)				
	DOORS, ETC				
	NOTE:				
	All framed and ledged batten doors and combination doors, where battens are utilised, shall only be of construction acceptable to the Department, i.e. mortice and tennon where the tennon is exposed on the outside edges of styles and where the tennon is wedged to form a dovetailed shape.				
	Wrot meranti				
4	44mm x 813 x 2032mm High framed and ledged batten door	No	2		
	Semi-solid flush panel doors with hardboard face suitable for paint both sides and two Wrot Meranti concealed vertical edge strips				
5	40mm x 762 x 2032mm Door	No	3		
6	40mm x 813 x 2032mm Door	No	9		
7	40mm x 1000 x 2032mm Door	No	1		
	Solid flush panel doors with hardboard face suitable for paint both sides and two Wrot Meranti concealed vertical edge strips				
8	40mm x 813 x 2032mm Door	No	7		
	FRAMED FRAMES ETC				
	Wrought meranti				
9	68 x 108mm Rebated frames, plugged	m	68		
	Carried to Collection			R	

Bill No. 6
Carpentry and Joinery

	BEADS, ARCHITRAVES, ETC				
	Wrought meranti				
10	19mm Quadrant beads	m	68		
11	19 x 44mm Architraves, plugged	m	68		
12	19 x 270mm Architraves, plugged	m	2		
	FITTINGS				
	SUPPLEMENTARY PREAMBLES				
	General				
	The following cupboard fittings have been given as complete units i.e. the components of the units have not been given separately. Descriptions of such units shall, therefore, be deemed to include all components, assembling, housing, notching, glueing, blocking, planting-on and screwing with countersunk screws, edge strips, thermosetting plastic laminate, glass, ironmongery, metalwork, paint or varnish finishes, etc				
	Prices are to include for all necessary filler pieces against walls etc				
	References				
	References given in descriptions refer to the respective types of fittings detailed on the architect's drawing accompanying these bills of quantities for tender purposes				
	Joinery				
	Heads of screws and nails in exposed faces of joinery shall be countersunk and pelleted. All pelleting shall be done with material to suit the exposed face of the component in which it occurs.				
	Laminated timber				
	Laminated timber for fittings shall be specially selected timber in accordance with SABS-CKS 5, free from knots or other defects.				
	Carried to Collection			R	

Bill No. 6
Carpentry and Joinery

	Interior composite boards, doors, etc. Unless otherwise described, all interior composite boards are to have veneer suitable for painting both sides.Concealed edge strips shall be 10mm thick matching solid timber edge strips for the full thickness of the composite board, glued and planted on.Unless otherwise described, the edges of all composite board doors shall be concealed with edge strips all round as follows and prices for doors are to allow accordingly.1. Edge strips to flush edges shall be 10mm thick matching solid timber edge strips for the full thickness of the door, glued and planted on including mitres, etc.2. Edge strips to rebated matching solid timber edge strips for the full thickness of the door, glued and planted on including mitres, etc. Plastic laminate finish and edges Plastic laminate finish shall be 1,2mm thick decorative plastic laminate of approved colour and pattern.Where so described, all boards with plastic laminate finish to one side, shall be finish on the other side with a high pressure plastic laminate backing without decorative finish and with a nominal thickness of 0,8mm.Plastic laminate edge strips shall be 1,2mm thick decorative plastic laminate of approved colour and pattern glued on under pressure with waterproof synthetic resin adhesive. Varnish finish to timber All timber and veneer to receive two coats polyurethane sealer and one finishing coat "Plascon Ultra" interior varnish with each coat sanded between coats. Tenderers are to allow for this in their rates. ---oOo--- **THE FOLLOWING IN COMPUTER WORKSTATIONS TO CCTV ROOM**				
13	Workstations including counter on steel brackets bolted to brickwork and capping screwed to brickwork all as per the Architects drawing nsc/dd/01 revision E detail 1	m	39		
	THE FOLLOWING IN FIXED WALL SHELVING TO STORE AND BROOM CUPBOARD				
14	Fixed shelving 300mm wide all as per Architect's drawing nsc/dd/01 revision E detail 4	m	19		
	Carried to Collection			R	
	Bill No. 6 Carpentry and Joinery				

15	Fixed shelving 450mm wide all as per Architect's drawing nsc/dd/01 revision E detail 4	m	27		
	THE FOLLOWING IN VANITES TO TOILETS				
16	30mm Thick Rustenberg black granite vanity top 2,29 x 0,6m wide including purpose made steel brackets bolted to brickwork all as per Architect's drawing nsc/dd/01 revision E detail 2 (basins elsewhere measured)	No	2		
	THE FOLLOWING IN CUPBOARDS TO KITCHEN				
17	Floor cupboards to Kitchen L-shaped on plan 3,8m long x 0,6m wide including 30mm thick Rustenberg black granite top all as per Architect's drawing nsc/dd/01 revision E detail 5 (sink elsewhere measured)	No	1		
18	Wall cupboards to Kitchen 1,25m long x 0,5m high all as per Architect's drawing nsc/dd/01 revision E detail 5	No	1		
	THE FOLLOWING IN RECEPTION DESK				
19	Reception Desk 2,485 x 0,87m wide all as per Architect's drawing nsc/dd/01 revision E detail 3	No	1		
	THE FOLLOWING IN FITTINGS TO RADIO TECH WORKSHOP				
20	Worktop 8,0 x 0,76m wide all as per Architect's drawing nsc/dd/03 revision E detail 2	No	1		
21	"Vitrex 2000 System" pinning board size 1200 x 1200mm high as model 2300 code 2316	No	2		
22	Fixed shelving 450mm wide all as per Architect's drawing nsc/dd/03 revision E detail 2	m	6		
	THE FOLLOWING IN WALL PANELLING TO CCTV ROOM				
23	16mm Sapele veneered chipboard panel size 1,68 x 2,32m high with solid edging all round and counter sunk screwed to brickwork	No	2		
	Carried to Collection			R	

Bill No. 6
Carpentry and Joinery

Section No. 2

Bill No. 6

Carpentry and Joinery

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Bill No. 6
Carpentry and Joinery

Item No			Quantity	Rate	Amount R
	BILL NO 7				
	CEILINGS, PARTITIONS AND ACCESS FLOORING				
	For preambles see "Model Preambles for Trades"				
	SUPPLEMENTARY PREAMBLES				
	Descriptions				
	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 have been given elsewhere				
	Bulkheads				
	Bulkheads are those areas of ceilings which are at a level differing from the general ceilings in a particular room or area and which generally occur along the perimeter of the room or area. Their purpose is either to conceal services or to create an architectural feature by changing levels				
	Bulkheads will only be measured as such when they conform with the above description and when the horizontal or vertical dimensions do not exceed 1200mm. Should these dimensions be more than 1200mm then the horizontal or vertical ceilings will be included in the general ceiling measurements				
	(WORK GROUP 126)				
	NAILED UP CEILINGS				
	9mm 'Everite Nutec' plain boards with white PVC H-profile jointing strips over joint:				
1	Horizontal ceilings including 38 x 50mm sawn softwood brandering at 450mm centres with cross brandering at joints, ends of sheets and at light fittings, etc.	m2	23		
	Carried to Collection			R	
	Bill No. 7 Ceilings, Partitions and Access Flooring				

2	Extra over ceiling for 600 x 600mm trap door of 38 x 50mm wrought softwood rebated framing with one 38 x 50mm sawn softwood cross brander covered with ceiling board and fitted flush in opening.	No	1		
	9,5mm Taper-edge gypsum plasterboard with taped joints and the whole finished with gypsum plaster trowelled to a smooth polished surface to the thickness recommended by the manufacturer				
3	Horizontal ceilings including 38 x 50mm sawn softwood brandering at 450mm centres with cross brandering at joints, ends of sheets and at light fittings, etc.	m2	54		
4	Raking ceilings including 38 x 50mm sawn softwood brandering at 450mm centres with cross brandering at joints, ends of sheets and at light fittings, etc.	m2	3		
5	Vertical cladding including 38 x 50mm sawn softwood brandering at 450mm centres with cross brandering at joints, ends of sheets, etc.	m2	8		
	"Rhino" gypsum plasterboard cornices				
6	75mm Coved cornices, nailed	m	37		
	SUSPENDED CEILINGS				
	SUPPLEMENTARY PREAMBLES				
	Proprietary suspended ceilings				
	Hangers, suspension grids, "lay-in" panels, etc are to be in accordance with the manufacturers' recommendations				
	Flush plastered gypsum plasterboard suspended bulkheads				
	Bulkheads shall comprise galvanised steel studding of 63,5mm top and bottom tracks with vertical studs at maximum 400mm centres, pop-riveted to the top and bottom tracks with similar additional vertical studs as necessary at abutments, ends, etc and covered as described with plasterboard screwed to studding with drywall screws at maximum 300mm centres. Boards shall be butt jointed and finished with tape and jointing compound and the whole finished with gypsum plaster trowelled to a smooth polished surface to the thickness recommended by the manufacturer				
	Carried to Collection			R	
	Bill No. 7 Ceilings, Partitions and Access Flooring				

	Descriptions shall be deemed to include any additional studs at ends and intersections, corner beads, cornices at junctions with ceilings, jointing compound, tape, etc				
	9.5mm Taper-edge gypsum plasterboard with taped and skimmed flush joints				
7	Rectangular bulkhead against wall, 200mm wide x 400mm high, including standard steel brandering at 450mm centres, joined with joiner sections and hung with suspension brackets (supporting framework elsewhere)	m	14		
	600 x 600 x 15mm "Owacoustic Futura Premium" pre-painted acoustic panels on exposed suspension grid system including hangers, necessary hold-down clips and wedges, etc				
8	Ceilings suspended not exceeding 1m below timber tie beams	m2	488		
	"Donn" cornices, perimeter trims, etc to suspended ceilings				
9	Type SM25 pre-painted wall angles, plugged	m	392		
	ACCESS FLOORING				
	"Solidfeel 25" Class B access flooring including all air flow grilles, lifting panels, etc. and vacuum cleaning the void area on completion				
10	600 x 600mm Modular and interchangeable "Solidfeel 25" board panel access flooring including pedestals and panels finished with factory bonded "Nexus Zig Zag Nexbac" carpet tiles (access flooring to finish 400mm above concrete sub-floor)	m2	47		
11	600 x 600mm Modular and interchangeable "Solidfeel 25" board panel access flooring including pedestals and panels finished with factory bonded "Nexus Zig Zag Nexbac " carpet tiles (access flooring to finish 510mm above concrete sub-floor)	m2	21		
12	600 x 600mm Modular and interchangeable "Solidfeel 25" board panel access flooring including pedestals and panels finished with factory bonded "Nexus Zig Zag Nexbac" carpet tiles (access flooring to finish 740mm above concrete sub-floor)	m2	25		
	Carried to Collection			R	
	Bill No. 7 Ceilings, Partitions and Access Flooring				

13	600 x 600mm Modular and interchangeable "Solidfeel 25" board panel access flooring including pedestals and panels finished with factory bonded "Nexus Zig Zag Nexbac" non-static carpet tiles (access flooring to finish 980mm above concrete sub-floor)	m2	25		
14	Junctions against walls and columns	m	100		
15	Hole for 50mm diameter pipe through floor panel including sealing	No	30		
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Bill No. 7
Ceilings, Partitions and Access Flooring

Section No. 2

Bill No. 7

Ceilings, Partitions and Access Flooring

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Bill No. 7
Ceilings, Partitions and Access Flooring

Item No			Quantity	Rate	Amount R
	BILL NO 8				
	IRONMONGERY				
	For preambles see "Model Preambles for Trades"				
	SUPPLEMENTARY PREAMBLES				
	Finishes to ironmongery				
	Where applicable finishes to ironmongery are indicated by suffixes in accordance with the following list: BS Satin bronze lacquered CH Chromium plated SC Satin chromium plated SE Silver enamelled GE Grey enamelled AS Anodised silver AB Anodised bronze AG Anodised gold ABL Anodised black PB Polished brass PL Polished and lacquered PT Epoxy coated SD Sanded SS Stainless Steel				
	(WORK GROUP 132)				
	HINGES, BOLTS, ETC				
	"Union" or other approved				
1	102 x 76mm Ball bearing hinge reference JH-BB-STD-2-SS	No	60		
2	Stainless steel falling butt hinge reference B3552FRH	No	6		
	"Howick" or other approved				
3	Aluminium flush bolt 180 x 20mm with keep fixed to metal	No	3		
4	Aluminium flush bolt 180 x 20mm with keep let into concrete	No	3		
	CATCHES, CABIN HOOKS, ETC				
	Carried to Collection			R	
	Bill No. 8 Ironmongery				

	"Erebus" or other approved				
5	Heavy duty mortise roller catch - stainless steel	No	1		
	LOCKS				
	"Union" or other approved				
6	50mm Padlock reference UN355070200010M	No	2		
7	Aluminium Facility Indicator Bolt reference 37651RH	No	1		
8	Bathroom WC dead lock reference 21314-76SS	No	3		
9	Bathroom WC upright lock reference 2226-78SS	No	1		
10	Oval cylinder lock case reference L-2241-78SS	No	14		
11	Oval cylinder dead lock case reference L-2241-78SS	No	2		
12	Oval double cylinder reference 2X6SCMKD	No	12		
13	Oval single cylinder reference 2X8SCMKD	No	3		
14	Euro profile single cylinder reference 2X20SCMKD	No	1		
15	Euro profile double cylinder reference 2X18SCMKD	No	3		
16	Mul-t-lock double cylinder reference M2X6AISC	No	1		
17	Escutcheon on Rose Bathroom reference SS5305-73SS	No	3		
18	Escutcheon on Rose reference PZ-05SS	No	2		
19	Roller latch and deadbolt lock reference QR35X85MM-SS	No	3		
20	Panic latch for single doors reference J-881 SIL	No	1		
21	Outside access Device reference J-885 SIL	No	1		
	HANDLES				
	"Union" or other approved				
22	Lever handle reference SS6166-13SS	No	12		
23	Bathroom lever handle reference SS6166TL-73SS	No	2		
	Carried to Collection			R	

Bill No. 8
Ironmongery

24	Dove pull handle reference SS5D66-06SS	No	3		
25	Sandpiper stainless steel pull handle reference 5206BBSS	No	4		
26	150mm Pull handle reference SS5515-150BTSS	No	6		
27	300mm Pull handle reference AL5515-300FLAS	No	1		
	PUSH PLATES AND KICK PLATES				
	Satin finished stainless steel plates countersunk screwed				
28	Push plate oval pierced reference SS5066R-13SS	No	1		
29	Push plate oval pierced reference SS5066L-13SS	No	2		
	DOOR CLOSERS				
	"Union" or other approved				
30	Regular Arm door closer reference En3-6	No	2		
31	Floor spring reference 749 En3 Non-ho Da Al	No	4		
32	Floor spring reference 751 En3 Non-ho Lh Ti	No	1		
33	Floor spring reference 753 En3 Non-ho Rh Al	No	1		
	SUNDRIES				
34	6mm Diameter steel dowel 150mm long in and including mortice in timber and brickwork or concrete	No	44		
	"Union" or other approved				
35	Door stop reference 87001SS, plugged	No	26		
36	Hat and coat hook reference 87025SS	No	4		
37	Hat and coat hook reference AL8721AS	No	1		
	LETTERS, NAMEPLATES, ETC				
	"Union" or other approved				
38	Anodised aluminium plate with paraplegic symbol reference AL5066-06ASE14	No	1		
	Carried to Collection			R	

Bill No. 8
Ironmongery

39	Stainless steel plate with female symbol reference SS5066-06SSE11	No	1		
40	Stainless steel escape route symbol reference SS5066-06SSE15	No	1		
41	Stainless steel cleaner mop and bucket symbol reference SS5066-06SSE17	No	1		
	BATHROOM FITTINGS				
	"Franke" or other approved				
42	Double toilet roll holder STRX672	No	5		
43	Soap dispenser BS 618	No	4		
44	Paper towel dispenser STRX	No	4		
45	Waste bin STRX 605	No	4		
	"Chairman Industries" or other approved				
46	32mm Stainless steel side grab rail (codeDL2)	No	1		
47	32mm Stainless steel rear grab rail around cistern (code SR2A)	No	1		
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Bill No. 8
Ironmongery

Section No. 2

Bill No. 8

Ironmongery

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Bill No. 8
Ironmongery

Item No		Quantity	Rate	Amount R
	BILL NO 9			
	METALWORK			
	For preambles see "Model Preambles for Trades"			
	(WORK GROUP 136)			
	SUPPLEMENTARY PREAMBLES			
	Aluminium doors, windows, etc			
	Doors and windows shall comply with AAAMSA design criteria			
	Glazing shall comply with SAGGA regulations. Glass shall be type 4mm clear glass or 4mm armour plate safety glass as shown on the window schedules/drawings appended to these bills of quantities as described in the headings to window descriptions. Glass thickness shall comply with SAGGA regulations irrespective of thicknesses shown on the schedules/drawings			
	Doors and windows shall be supplied with protective tape and plastic and shall be removed only once surrounding trades have been completed			
	For purpose made windows and doors, refer to drawings annexed to issued separately with these bills of quantities			
	The following certificates shall be provided prior to commencement of site work:			
	1 A copy of the relevant AAAMSA Performance Test Certificate from the manufacturer/contractor supplying the architectural aluminium product			
	2 A Certificate of Conformance confirming that anodising or powder coating has been processed in accordance with SANS 999 and SANS 1796 respectively			
	Carried to Collection		R	
	Bill No. 9 Metalwork			

	3 A powder guarantee of not less than 15 years issued by the powder manufacturer. The specific conditions contained in this guarantee shall form part of the powder coating process				
	4 A Certificate of Conformance confirming that glazing has been installed in accordance with SANS 0137, ensuring that safety glazing materials have been installed in the mandatory areas and that each individual pane of safety glazing materials has been permanently marked				
	5 A warranty from the manufacturer of the laminated safety glass and/or hermetically sealed glazing units guaranteeing the products against delamination and colour degredation for a period of not less than five years				
	Descriptions of bolts shall be deemed to include nuts and washers				
	Descriptions of expansion anchors and bolts and chemical anchors and bolts shall be deemed to include nuts, washers and mortices in brickwork or concrete				
	Metalwork described as "holed for bolt(s)" shall be deemed to exclude the bolts unless otherwise described				
	ALUMINIUM WINDOWS, DOORS, ETC				
	Powder coated fixed pane window units, complete with subframes, ironmongery, 4mm clear armour plate safety glass, sealing, etc including fixing to brickwork or concrete				
1	Purpose made window in one opening size 3600 x 1200mm high	No	1		
	Powder coated casement window units, complete with subframes, ironmongery, 4mm clear glass, sealing and all opening sections to have suitable burglar guards, etc including fixing to brickwork or concrete				
2	Purpose made window in one opening top hung opening out size 600 x 600mm high overall (WT9)	No	1		
3	Purpose made window in two equal openings with top opening fixed pane and bottom opening top hung opening out section size 600 x 1100mm high overall (WT7)	No	6		
	Carried to Collection			R	

4	Purpose made window in two equal openings top opening fixed pane and bottom opening with top hung opening out section size 900 x 1100mm high overall (WT8)	No	1		
5	Purpose made window in one opening top hung opening out section, size 750 x 750mm high overall (WT6)	No	3		
6	Purpose made window in one opening side hung opening out section size 600 x 1200mm high overall (WT5)	No	5		
7	Purpose made window in one opening with two side hung opening out sections, size 1050 x 1200mm high overall (WT5)	No	5		
8	Purpose made window in three openings with two side hung opening out sections and one fixed pane, size 1600 x 1200mm high overall (WT2)	No	8		
9	Purpose made window in five equal openings with two side hung opening out sections and two fixed panes, size 2400 x 1200mm high overall (WT3)	No	1		
10	Purpose made window in four equal openings with two top hung opening out sections, size 2400 x 600mm high overall (WT6)	No	1		
	Powder coated entrance doors, sidelights and fanlights, 4mm clear armour plate safety glass to the doors and 4mm clear glass to the sidelights and fanlights, complete with subframes, ironmongery, glass, sealing, etc and all opening sections to have suitable burglar bars including fixing to brickwork or concrete				
11	Double door 1600 x 2100mm high side hung to open out, each leaf having two openings, the doors fitted with two barrel bolts and lock elswhere measured (WT13)	No	1		
12	Double door 1600 x 2100mm high side fitted to swing both ways, each leaf having two openings, the doors fitted with floor springs, two barrel bolts and lock elswhere measured (WT12)	No	1		
	Carried to Collection			R	

Bill No. 9
Metalwork

13	Double door, sidelight and fanlight size 2700 x 2760mm high overall, the sidelight 600 x 2100mm high with one horizontal glazing bar and bottom opening to receive fixed pane and top opening to receive two top hung opening out windows, the fanlight 2700 x 600mm high with three mullions and double door size 1600 x 2100mm high fitted to swing both ways with each leaf having two openings, the doors fitted with floor springs, two barrel bolts and lock elsewhere measured (WT11)	No	1		
	GALVANIZED STEEL BURGLAR BARS				
	Welded 40 x 6mm mild steel flat bar frame with 32 x 2.5mm round tube bars equally spaced at 100mm centres bolted to brickwork all as per Architects detail drawing number nsc/dd/11				
14	Purpose made burglar bars to window opening size 600 x 600mm high overall (WT9)	No	1		
15	Purpose made burglar bars to window opening size 600 x 1100mm high overall (WT7)	No	6		
16	Purpose made burglar bars to window opening size 900 x 1100mm high overall (WT8)	No	1		
17	Purpose made burglar bars to window opening size 750 x 750mm high overall (WT6)	No	3		
18	Purpose made burglar bars to window opening size 600 x 1200mm high overall (WT5)	No	5		
19	Purpose made burglar bars to window opening size 1050 x 1200mm high overall (WT5)	No	5		
20	Purpose made burglar bars to window opening size 1600 x 1200mm high overall (WT2)	No	8		
21	Purpose made burglar bars to window opening size 2400 x 1200mm high overall (WT3)	No	1		
	Carried to Collection			R	

Bill No. 9
Metalwork

22	Purpose made burglar bars to window opening size 2400 x 600mm high overall (WT6)	No	1		
23	Hole through 6mm steel for bolt	No	78		
24	"Hilti" HLC 16 x 60/10 expansion anchor and bolt	No	78		
	THE FOLLOWING IN FRAMED AND WELDED HOT DIPPED GALVANISED MILD STEEL SECURITY GATES				
25	Single gate size 850 x 1955mm formed of 50 x 25mm hollow section frame and 12 x 12 galvanised mild steel bars equally spaced at 170mm centre horizontally and 245mm centres vertically complete with hinges bolted to face brickwork and lock suitable for padlock (elsewhere measured) all as per Architect's detail drawing nsc/sch/01 revision E (GT1)	No	2		
	THE FOLLOWING IN STAINLESS STEEL BALUSTRADING				
26	Raking balustrading 1m high fixed to top of balustrade wall all as per Architect's drawing nsc/dd/02 revision E detail 2.3	m	3		
27	Balustrading to semi-circular opening 2,55m long and 0,9m high all as per Architect's drawing nsc/dd/02 revision E detail 2.4	No	1		
28	Balustrading to semi-circular opening 3,8m long and 0,915m high all as per Architect's drawing nsc/dd/02 revision E detail 2.4	No	1		
	GALVANISED STEEL POST				
	Welded posts in single lengths with flat bearer and connection plates, bolted to concrete				
29	120 x 120 x 3.0mm x 11.1kg/m Square hollow section post (In No 1)	t	0.03		
	GALVANISED BOLTS, FASTENERS, ETC				
30	"Hilti" HVU/HAS-(E)F M16x125 chemical anchor and bolt	No	4		
	Carried to Collection			R	

Bill No. 9
Metalwork

Section No. 2

Bill No. 9

Metalwork

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Bill No. 9
Metalwork

Item No		Quantity	Rate	Amount R
	BILL NO 10			
	PLASTERING			
	For preambles see "Model Preambles for Trades"			
	(WORK GROUP 142)			
	SUPPLEMENTARY PREAMBLES			
	GRANOLITHIC			
	Method			
	The method to be used shall be either the monolithic or bonded method			
	Preparation			
	For granolithic applied monolithically, the concrete floor shall be swept clean after bleeding of the concrete has ceased and the slab has begun to stiffen; any remaining bleed water shall be removed and the granolithic shall then be applied immediately afterwards. For granolithic to be bonded to the floor slab after it has hardened, the slab surface shall be hacked (preferably by mechanical means) until all laitance, dirt, oil, etc is dislodged and swept clean of all loose matter. The slabshall then be wetted and kept damp for at least six hours before applying the finish			
	Mix			
	Granolithic shall attain a compressive strength of at least 41MPa. The coarse aggregate shall comply with SABS 1083 and be capable of passing a 10mm mesh sieve. Where the thickness of the granolithic exceeds 25mm, the size of the coarse aggregateshall be increased to the maximum size compatible with the thickness of the granolithic			
	Carried to Collection		R	

	Panels Granolithic shall be laid in panels not exceeding 14m2 for granolithic finishes, not exceeding 9,5m2 for bonded finishes and not exceeding 6m2 for all external granolithic. Wherever possible, panels shall be square but at no time should the length of the panel exceed 1,5 times its width. Joints between panels shall be positioned, where possible, over joints in the floor slab and shall be at least 3mm wide through the full thickness of the finish, separated by strips of wood or fibreboard andfinished with small V-joints Laying Monolithic granolithic shall be applied to the partially set slab and thoroughly compacted and lightly wood floated to the required levels Bonded granolithic shall be applied to the slab after applying a 1:1 sand and cement slurry brushed over the surface and allowed to partially set before applying the granolithic, thoroughly compacted and lightly wood floated to the required levels After wood floating, the monolithic and bonded granolithic shall remain undisturbed until bleeding has ceased and the surface has stiffened, any remaining bleed water and laitance shall then be removed and the surface steel trowelled or power floated Curing, seasoning and protection Granolithic shall be covered with clean hessian with waterproof building foil over and kept wet for at least seven days after laying Colour Coloured granolithic shall be tinted with an approved colouring pigment mixed into a true and even colour				
	INTERNAL PLASTER				
	Cement plaster steel trowelled, on brickwork				
1	On walls in patches	m2	20		
	Patching cement plaster steel trowelled, on brickwork				
2	On narrow widths	m2	15		
	Carried to Collection			R	
	Bill No. 10 Plastering				

	EXTERNAL PLASTER				
	Cement plaster wood floated, on brickwork				
3	On walls in patches	m2	20		
	Patching cement plaster wood floated, on brickwork				
4	On narrow widths	m2	16		
	Patching cement plaster textured, on brickwork				
5	On surrounds of windows and doors 115mm wide	m	61		
	Carried to Collection			R	

Bill No. 10
Plastering

Section No. 2

Bill No. 10

Plastering

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Bill No. 10
Plastering

Item No			Quantity	Rate	Amount R
	BILL NO 11				
	TILING				
	For preambles see "Model Preambles for Trades"				
	(WORKGROUP NO. 144)				
	WALL TILING				
	240 x 240 x 9mm glazed NCI tiles fixed with an approved tile adhesive to a 4:1 cement plaster backing finished (elsewhere)				
1	To walls in patches	m2	20		
	FLOOR TILING				
	240 x 240 x 9mm "NCI ref. 6002 slate grey" or equal and approved ceramic floor tiles fixed with adhesive to screed (screed elsewhere) and flush pointed with epoxy grout				
2	On floors in patches	m2	20		
	Porcelain floor tiles (PC R 250/m²) fixed with adhesive to screed (screed elsewhere) and flush pointed with grout				
3	On floors	m2	333		
4	On ramps	m2	7		
5	On treads and risers of stairs	m2	5		
6	100mm High skirtings of cut tiles	m	295		
7	100mm High skirtings of cut tiles stepped over treads and risers	m	6		
	SUNDRIES				
	"Kirk Marketing" or similar approved aluminium corner protectors, stair nosings, expansion joint strips, etc				
8	23 x 10mm Capping strip (Code ACS230)	m	17		
9	30 x 20mm Aluminium retro-fit stair nosings for all stair types (Code ARN300)	m	14		
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	Bill No. 11 Tiling				

Item No			Quantity	Rate	Amount R
	BILL NO 12				
	PLUMBING AND DRAINAGE (PROVISIONAL)				
	For preambles see "Model Preambles for Trades"				
	(WORK GROUP 146)				
	RAINWATER DISPOSAL				
	Seamless aluminium prepainted gutters and rainwater pipes				
1	125 x 115mm Ogee eaves gutters	m	117		
2	125 x 115mm Ogee eaves gutters including brackets fixed to steel	m	33		
3	Extra over eaves gutter for 90° angle.	No	6		
4	Extra over eaves gutter for stop end	No	4		
5	Extra over for outlet for 75mm diameter pipe	No	18		
	uPVC rainwater pipes				
6	75mm Diameter rainwater pipes	m	98		
7	Extra over for 1500mm eaves offset	No	18		
8	Extra over for shoe	No	18		
	(WORK GROUP 148)				
	SANITARY FITTINGS				
	'Vaal Sanitaryware' ceramic fireclay WC's				
9	Vaal "Hibiscus" cistern complete with lid and fitments (code 7116CCWH)	No	4		
10	Vaal "Pearl Paraplegic" 9 litre cistern complete with lid, fitments & purpose made CP side flush lever (right or left) (Code 7300LPWH)	No	1		
	Carried to Collection			R	
	Bill No. 12 Plumbing and Drainage (Provisional)				

	'Vaal Sanitaryware' ceramic fireclay wash hand basins				
11	Vaal Vitreous China 510 x 405mm rounded "Hibuscus" basin (code 7023) with three semi punched tapholes, bolted to the wall using two 110mm bolts (code 8448Z0)	No	2		
12	Vaal ceramic fireclay 595 x 455mm rounded "Cameo" oval self-rimming vanity basin with three semi punched tap-holes and chainstay hole through centre semi-punched taphole	No	4		
	'Vaal Sanitaryware' vitreous china urinals				
13	Vaal wall hung "Lavatera" urinal with top inlet (code 705426), supplied with 38mm CP domical grating, CP top inlet spreader and two hanger brackets	No	2		
	Stainless steel basins, sinks, wash troughs, urinals, etc				
14	"Franke Trendline" Model double end bowl DEB sink and drainer size 1200 x 535mm (code 312081)	No	1		
	WASTE UNIONS ETC				
	"Cobra Watertech" or other approved				
15	32mm 301 CP basin waste union	No	2		
16	32mm 308 CP basin waste union and 309CP anti-theft plug	No	5		
17	40mm 316 CP bath or sink waste union	No	2		
	TRAPS ETC				
	"Flexi" rubber				
18	40 x 600mm Sink combination for double bowl with reseal "P" trap	No	1		
	"Cobra Watertech" or other approved				
19	32mm 335 CP bottle trap	No	5		
20	40mm 360 CP bottle trap	No	2		
	TAPS, VALVES, ETC				
	Carried to Collection			R	

Bill No. 12
Plumbing and Drainage (Provisional)

	"Cobra Watertech" or other approved				
21	15mm Ball-O-stop	No	16		
22	15mm "Star" heavy patterned pillar tap (111-15CP)	No	10		
23	15mm Chrome plated medical elbow pillartap (code 505.21B)	No	1		
24	15mm Chrome plated code "Star" pillarl-type sink mixer with overarm swivel outlet (171/041)	No	1		
25	28mm Fullway gate valve	No	1		
26	15mm Hose bib-tap	No	2		
27	22mm Non-return valve	No	1		
28	PB1.10RB vacuum breaker	No	1		
29	FJ6.000CP "Flushmaster Junior" urinal flush valve	No	2		
30	PA3.522 "Masterflo 1" pressure control valve with vacuum breaker	No	1		
	(WORK GROUP 146)				
	SANITARY PLUMBING				
	uPVC, soil and vent pipes				
31	50mm Pipes	m	8		
	Extra over uPVC, soil and vent pipes for fittings				
32	50mm Bend	No	4		
	(WORK GROUP 148)				
	WATER SUPPLIES				
	Class O copper pipes with brass compression couplings				
33	15mm Pipes	m	40		
34	22mm Pipes	m	20		
	Extra over class O copper pipes for capillary fittings				
35	15mm Fittings	No	25		
	Carried to Collection			R	
	Bill No. 12 Plumbing and Drainage (Provisional)				

36	22mm Fittings	No	15		
	ELECTRIC WATER HEATERS				
	"Kwikot" or other approved				
37	150 Litre "Dual 600" horizontal electric water heater complete including drip tray	No	1		
	FIRE APPLIANCES ETC				
	"Chubb" or other approved				
38	Hose reel complete with 30m plastic hose, chromium plated stopcock, shut-off nozzle and wall bracket	No	3		
39	9kg DCP dry powder portable fire extinguisher complete with suitable hardwood backing board and hook plugged to wall	No	3		
	(WORK GROUP 148)				
	WATER SUPPLIES TO FIRE APPLIANCES				
	Class O copper pipes with brass compression couplings				
40	28mm Pipes	m	75		
41	40mm Pipes	m	20		
	Extra over class O copper pipes for capillary fittings				
42	28mm Fittings	No	8		
43	40mm Elbow	No	10		
44	40mm Reducer	No	2		
45	40mm Reducing tee	No	1		
	Class 10 HDPE pipes				
46	50mm Pipes laid in ground including trenches	m	45		
	Extra over class 10 HDPE pipes for "Plasson" fittings				
47	50mm Bend	No	4		
48	50mm Reducer	No	1		
	Carried to Collection			R	

Bill No. 12
Plumbing and Drainage (Provisional)

49	40mm HDPE to iron connector	No	2		
	Valves, etc				
50	50mm Non-return valve	No	1		
51	50mm Isolating valve	No	1		
	Sundries				
52	Located and cut into existing 75mm diameter HDPE pipe and insert new reducing tee	No	1		
	TESTING				
53	Allow for testing of all the abovementioned items as described to the complete satisfaction of the Representative and for replacing any defective work at the Contractor's expense and re-testing until found to be perfect		Item		
54	Allow for pressure testing the existing water main line		Item		
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Bill No. 12
Plumbing and Drainage (Provisional)

Section No. 2

Bill No. 12

Plumbing and Drainage (Provisional)

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Bill No. 12
Plumbing and Drainage (Provisional)

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	BILL NO 13				
	GLAZING				
	For preambles see "Model Preambles for Trades"				
	(WORK GROUP 150)				
	TOPS, SHELVES, DOORS, MIRRORS, ETC				
	5mm Silvered float glass copper backed mirrors with polished edges, fixed with double sided adhesive tape and silicone				
1	Mirror size 300 x 400mm	No	5		
2	Mirror size 900 x 350mm	No	1		
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Bill No. 13
Glazing

Item No		Quantity	Rate	Amount R
	BILL NO 14			
	PAINTWORK			
	For preambles see "Model Preambles for Trades"			
	SUPPLEMENTARY PREAMBLES			
	DESCRIPTIONS			
	Descriptions of paintwork shall be deemed to include for all cutting in			
	PAINT SPECIFICATIONS			
	All painting shall be done in accordance with "Plascon-Evans" specifications			
	SABS Specifications			
	Matt or eggshell decorative paint for interior works : SABS 515			
	High gloss enamel paint : SABS 630 Grade I			
	Oil gloss enamel paint : SABS 631			
	Primers for wood for external work : SABS 678 Type I			
	Primers for wood for internal work : SABS 678 Type III			
	Zink chromate primers for steel : SABS 679 Type !			
	Undercoats for paint (except emulsion paint) : SABS 681 Type I			
	Aluminium paint : SABS 682 Grade II			
	Roof paints : SABS 683 Type B			
	Structural steel paint : SABS 684 Type B			
	Wash primer (metal etch) : SABS 723			
	Varnish for interior use : SABS 887 Type I			
	Emulsion paints : SABS 1586			
	(WORK GROUP 152)			
	Carried to Collection		R	

Bill No. 14
Paintwork

	FLOATED PLASTER SURFACES WITH				
	One coat alkali resistant plaster primer and two coats PVA acrylic emulsion paint on				
1	Internal walls	m2	20		
	One coat alkali resistant plaster primer and two coats modified acrylic fine textured emulsion paint on				
2	External walls	m2	20		
	FIBRE-CEMENT SURFACES WITH				
	Two coats pure acrylic paint on				
3	Ceilings and cornices	m2	23		
4	Fascias and barge boards	m2	52		
	WOOD SURFACES WITH				
	One coat oil wood primer, one coat universal undercoat and two coats "Plascon Velvaglo" paint on				
5	On doors	m2	73		
6	On door frames	m2	2		
7	On bottom and top edges of doors	m2	6		
8	Skirtings, rails, etc not exceeding 300mm girth	m	128		
	METAL SURFACES WITH				
	One coat galvanised iron primer and two coats super universal enamel paint on galvanised steel				
9	Gates, grilles, burglar screens, balustrades, etc (both sides measured over the full flat area)	m2	73		
	PAINTWORK, ETC TO EXISTING SURFACES ON				
	SMOOTH PLASTER OR CONCRETE SURFACES WITH				
	Clean down and apply one coat superior matt acrylic paint on work in sound condition on				
10	Internal walls	m2	476		
	Carried to Collection			R	

Bill No. 14
Paintwork

11	External walls	m2	118		
12	Ceilings	m2	31		
	Sundries				
13	Fill hole not exceeding 50mm diameter with cemflex	No	318		
	BRICK SURFACES WITH				
	Clean down				
14	Face brick walls	m2	1 269		
	WOOD SURFACES WITH				
	Clean down and apply one coat super universal enamel paint on work in sound condition on				
15	Door frames	m2	21		
16	Skirtings, rails, etc not exceeding 300mm girth	m	284		
17	Extra over paint to timber skirtings, rails, etc to seal gap between skirting and wall with a suitable sealer	m	284		
	Carried to Collection				R

Bill No. 14
Paintwork

Section No. 2

Bill No. 14

Paintwork

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Bill No. 14
Paintwork

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Item No			Quantity	Rate	Amount R
	SECTION 3				
	BILL NO 1				
	ROOF COVERINGS ETC				
	For preambles see "Model Preambles for Trades"				
	SUPPLEMENTARY PREAMBLES				
	Straight cutting				
	Descriptions of all roof coverings are deemed to include for all straight cutting				
	(WORK GROUP 122)				
	PROFILED METAL SHEETING AND ACCESSORIES				
	0.5mm Thick IBR 686 profile colourbond AZ 150 zinc-alum 'kalahari red' roofsheeting laid in strict accordance to manufacturers spec.				
1	Roof covering with pitches not exceeding 25 degrees	m2	51		
2	Ridge cappings	m	18		
3	Narrow and broad flute closers	m	29		
4	Moulded narrow and broad fluted polyethelene closer	m	29		
	"Sisalation 420" heavy industrial grade aluminium foil based insulation				
5	Insulation laid taut over purlins (at approximately 1,80m centres) and fixed concurrent with roof covering, including taped laps and nylon straining wires	m2	44		
	SHEET METAL FLASHINGS, LININGS, COPINGS, ETC				
	0.6mm Sheet aluminium				
6	Linings to valleys with riveted and sealed joints 600mm girth	m	2		
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	Bill No. 1 Roof coverings				

Item No			Quantity	Rate	Amount R
	BILL NO 2				
	CARPENTRY AND JOINERY				
	For preambles see "Model Preambles for Trades"				
	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				
	Joinery				
	Descriptions of frames shall be deemed to include frames, transomes, mullions, rails, etc				
	Descriptions of hardwood joinery shall be deemed to include pelleting of bolt holes				
	Fixing				
	Items described as "nailed" shall be deemed to be fixed with hardened steel nails or shot pins to brickwork or concrete				
	Decorative laminate finish				
	Laminate finish shall be glued under pressure. Edge strips shall be butt jointed at junctions with adjacent similar finish				
	(WORK GROUP 126)				
	PREFABRICATED ROOF TRUSSES				
	Take from where set aside and re-fix				
1	Timber roof trusses and purlins to generator room	m2	51		
	DOORS, ETC				
	Carried to Collection			R	

	NOTE: All framed and ledged batten doors and combination doors, where battens are utilised, shall only be of construction acceptable to the Department, i.e. mortice and tennon where the tennon is exposed on the outside edges of styles and where the tennon is wedged to form a dovetailed shape. Wrot meranti				
2	44mm x 813 x 2032mm High framed and ledged batten door	No	1		
3	44mm x 813 x 2032mm High framed and ledged louvred door	No	1		
	Semi-solid flush panel doors with hardboard face suitable for paint both sides and two Wrot Meranti concealed vertical edge strips				
4	40mm x 813 x 2032mm Door	No	1		
	FRAMED FRAMES ETC				
	Wrought meranti				
5	108 x 68mm Rebated frame	m	22		
	BEADS, ARCHITRAVES, ETC				
	Wrought meranti				
6	19mm Quadrant bead	m	11		
7	19 x 44m Architrave	m	20		
8	19 x 44mm Beading	m	12		
	Carried to Collection			R	

Bill No. 2
Carpentry & Joinery

Section No. 3

Bill No. 2

Carpentry & Joinery

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Bill No. 2
Carpentry & Joinery

Item No			Quantity	Rate	Amount R
	BILL NO 3				
	CEILINGS, PARTITIONS AND ACCESS FLOORING				
	For preambles see "Model Preambles for Trades"				
	(WORK GROUP 126)				
	SUPPLEMENTARY PREAMBLES				
	Descriptions				
	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 have been given elsewhere				
	NAILED UP CEILINGS				
	9.5mm Rhinoboard ceiling				
1	Horizontal ceilings including 38 x 50mm sawn softwood brandering at 450mm centres with cross brandering at joints, ends of sheets and at light fittings, etc.	m2	30		
2	Extra over ceiling for 600 x 600mm trap door of 38 x 50mm wrought softwood rebated framing with one 38 x 50mm sawn softwood cross brander covered with ceiling board and fitted flush in opening.	No	2		
	Rhino" gypsum plasterboard cornices				
3	75mm Coved cornices, nailed	m	34		
	Carried Forward to Summary of Section No. 3			R	
	Bill No. 3 Ceilings, etc				

Item No			Quantity	Rate	Amount R
	BILL NO 4				
	IRONMONGERY				
	For preambles see "Model Preambles for Trades"				
	SUPPLEMENTARY PREAMBLES				
	Finishes to ironmongery				
	Where applicable finishes to ironmongery are indicated by suffixes in accordance with the following list: BS Satin bronze lacquered CH Chromium plated SC Satin chromium plated SE Silver enamelled GE Grey enamelled AS Anodised silver AB Anodised bronze AG Anodised gold ABL Anodised black PB Polished brass PL Polished and lacquered PT Epoxy coated SD Sanded SS Stainless Steel				
	(WORK GROUP 132)				
	HINGES, BOLTS, ETC				
	Union or other approved				
1	102 x 76mm Ball bearing hinge reference JH-BB-STD-2-SS	No	12		
2	Rebate set reference 2900SS	No	1		
3	Aluminium flush bolt 150mm reference AL8208-150AS	No	1		
4	Aluminium flush bolt 225mm reference AL8208-225AS	No	1		
	LOCKS				
	"Union" or other approved				
5	Bathroom WC upright lock reference 2226-78SS	No	1		
6	Oval cylinder lock case reference L-2241-78SS	No	2		
	Carried to Collection			R	
	Bill No. 4 Ironmongery				

7	Oval double cylinder reference 2X6SCMKD	No	2		
	HANDLES				
8	Lever handle reference SS6166-13SS	No	2		
9	Bathroom lever handle reference SS6166TL-73SS	No	1		
	SUNDRIES				
	"Union" or other approved				
10	Door stop reference 87001SS, plugged	No	1		
11	Hat & coat hook with buffer reference SS8025SS	No	1		
12	Brass satin chrome cabin hook 150mm reference B2384-150SC	No	2		
	BATHROOM FITTINGS				
	"Franke" or other approved				
13	Double toilet roll holder STRX672	No	1		
14	Soap dispenser BS 618	No	1		
15	Paper towel dispenser STRX	No	1		
16	Waste bin STRX 605	No	1		
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Bill No. 4
Ironmongery

Section No. 3

Bill No. 4

Ironmongery

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Bill No. 4
Ironmongery

Item No		Quantity	Rate	Amount R
	BILL NO 5			
	METALWORK			
	For preambles see "Model Preambles for Trades"			
	SUPPLEMENTARY PREAMBLES			
	Aluminium doors, windows, etc			
	Doors and windows shall comply with AAAMSA design criteria			
	Glazing shall comply with SAGGA regulations. Glass shall be type 4mm clear sheet glass or 4mm clear armour plate safety glass as shown on the window schedules/drawings appended to these bills of quantities as described in the headings to window descriptions. Glass thickness shall comply with SAGGA regulations irrespective of thicknesses shown on the schedules/drawings			
	Doors and windows shall be supplied with protective tape and plastic and shall be removed only once surrounding trades have been completed			
	For purpose made windows and doors, refer to drawings annexed to these bills of quantities			
	The following certificates shall be provided prior to commencement of site work:			
	1 A copy of the relevant AAAMSA Performance Test Certificate from the manufacturer/contractor supplying the architectural aluminium product			
	2 A Certificate of Conformance confirming that anodising or powder coating has been processed in accordance with SANS 999 and SANS 1796 respectively			
	Carried to Collection		R	
	Bill No. 5 Metalwork			

	3 A powder guarantee of not less than 15 years issued by the powder manufacturer. The specific conditions contained in this guarantee shall form part of the powder coating process				
	4 A Certificate of Conformance confirming that glazing has been installed in accordance with SANS 0137, ensuring that safety glazing materials have been installed in the mandatory areas and that each individual pane of safety glazing materials has been permanently marked				
	5 A warranty from the manufacturer of the laminated safety glass and/or hermetically sealed glazing units guaranteeing the products against delamination and colour degredation for a period of not less than five years				
	Descriptions Descriptions of bolts shall be deemed to include nuts and washers Descriptions of expansion anchors and bolts and chemical anchors and bolts shall be deemed to include nuts, washers and mortices in brickwork or concrete Metalwork described as "holed for bolt(s)" shall be deemed to exclude the bolts unless otherwise described				
	(WORK GROUP 136) "Ethekweni Municipality"				
1	Substation double door 1,8 x 2,4m high with frame bolted to 230mm brick wall	No	1		
	ALUMINIUM WINDOWS & DOORS Powder coated casement window units, complete with subframes, ironmongery, 4mm clear glass, sealing and all opening sections to have suitable burglar guards, etc including fixing to brickwork or concrete				
2	Purpose made window in one opening top hung opening out size 600 x 600mm high overall (WT9)	No	3		
	Carried to Collection			R	

Bill No. 5
Metalwork

	Powder coated sliding window units, complete with subframes, ironmongery, 4mm clear glass, sealing, etc including fixing to brickwork or concrete				
3	U-shaped on plan window 4m girth and 1m high with 6 openings, four fixed panes and two sliding panes (WT10)	No	1		
	GALVANIZED STEEL BURGLAR BARS				
	Welded 40 x 6mm mild steel flat bar frame with 32 x 2.5mm round tube bars equally spaced at 100mm centres bolted to brickwork all as per Architects detail drawing number nsc/dd/11				
4	Purpose made burglar bars to window opening size 600 x 600mm high overall (WT9)	No	3		
5	Hole through 6mm steel for bolt	No	24		
6	"Hilti" HLC 16 x 60/10 expansion anchor and bolt	No	24		
	GALVANISED STEELWORK				
	Floor duct covers				
7	6mm Chequer plate	m2	6		
8	Extra over for lifting hole	No	4		
	Carried to Collection			R	

Bill No. 5
Metalwork

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Bill No. 5

Metalwork

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Bill No. 5
Metalwork

Item No		Quantity	Rate	Amount R
	BILL NO 6			
	PLASTERING			
	For preambles see "Model Preambles for Trades"			
	SUPPLEMENTARY PREAMBLES			
	GRANOLITHIC			
	Method			
	The method to be used shall be either the monolithic or bonded method			
	Preparation			
	For granolithic applied monolithically, the concrete floor shall be swept clean after bleeding of the concrete has ceased and the slab has begun to stiffen; any remaining bleed water shall be removed and the granolithic shall then be applied immediately afterwards. For granolithic to be bonded to the floor slab after it has hardened, the slab surface shall be hacked (preferably by mechanical means) until all laitance, dirt, oil, etc is dislodged and swept clean of all loose matter. The slabshall then be wetted and kept damp for at least six hours before applying the finish			
	Mix			
	Granolithic shall attain a compressive strength of at least 41MPa. The coarse aggregate shall comply with SABS 1083 and be capable of passing a 10mm mesh sieve. Where the thickness of the granolithic exceeds 25mm, the size of the coarse aggregateshall be increased to the maximum size compatible with the thickness of the granolithic			
	Carried to Collection		R	

	Panels Granolithic shall be laid in panels not exceeding 14m2 for granolithic finishes, not exceeding 9,5m2 for bonded finishes and not exceeding 6m2 for all external granolithic. Wherever possible, panels shall be square but at no time should the length of the panel exceed 1,5 times its width. Joints between panels shall be positioned, where possible, over joints in the floor slab and shall be at least 3mm wide through the full thickness of the finish, separated by strips of wood or fibreboard andfinished with small V-joints Laying Monolithic granolithic shall be applied to the partially set slab and thoroughly compacted and lightly wood floated to the required levels Bonded granolithic shall be applied to the slab after applying a 1:1 sand and cement slurry brushed over the surface and allowed to partially set before applying the granolithic, thoroughly compacted and lightly wood floated to the required levels After wood floating, the monolithic and bonded granolithic shall remain undisturbed until bleeding has ceased and the surface has stiffened, any remaining bleed water and laitance shall then be removed and the surface steel trowelled or power floated Curing, seasoning and protection Granolithic shall be covered with clean hessian with waterproof building foil over and kept wet for at least seven days after laying Colour Coloured granolithic shall be tinted with an approved colouring pigment mixed into a true and even colour **(WORK GROUP 142)** **INTERNAL PLASTER** Patching cement plaster steel trowelled, on brickwork				
1	On narrow widths	m2	6		
	EXTERNAL PLASTER				
	Carried to Collection			R	

Bill No. 6
Plastering

	Patching cement plaster textured, on brickwork				
2	On surrounds of windows and doors 115mm wide	m	22		
	SPECIALIST PLASTER TYPE FLOOR COATINGS				
	Mechanical preparation, including all necessary anchor grooves, "Flowfresh" primer, "B&E" 1.1mm silica sand layer and "Flowcrete Flowfresh RT" antimicrobial polyurethane resin screeds on concrete				
3	6mm Thick on floors and landings	m2	35		
	Mechanical preparation, including all necessary anchor grooves, "Flowprime" primer, "Flowcrete Flowtex F1" coving mortar and "Flowfresh" coating on concrete				
4	150 x 150 x 6mm Thick skirtings with 50mm radius internal coving	m	25		
	Carried to Collection			R	

Bill No. 6
Plastering

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Bill No. 6

Plastering

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Bill No. 6
Plastering

Item No			Quantity	Rate	Amount R
	BILL NO 7				
	TILING				
	(WORKGROUP NO. 144)				
	SUPPLEMENTARY PREAMBLES				
	PREAMBLES				
	For Preambles refer to "Standard Preambles to all trades - WB20 - 1986"				
	WALL TILING				
	240 x 240 x 9mm glazed NCI tiles fixed with an approved tile adhesive to a 4:1 cement plaster backing finished (elsewhere)				
1	To walls in patches	m2	8		
	FLOOR TILING				
	240 x 240 x 9mm NCI or equal and approved ceramic floor tiles fixed with adhesive to screed (screed elsewhere) and flush pointed with epoxy grout				
2	On floors and landings	m2	7		
3	Skirting 75mm high	m	12		
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Bill No. 7
Tiling

Item No			Quantity	Rate	Amount R
	BILL NO 8				
	PLUMBING AND DRAINAGE (PROVISIONAL)				
	For preambles see "Model Preambles for Trades"				
	(WORK GROUP 146)				
	RAINWATER DISPOSAL				
	Seamless aluminium prepainted gutters and rainwater pipes				
1	125 x 85mm Ogee eaves gutter	m	38		
2	Extra over eaves gutter for angle	No	8		
3	Extra over for stopped end	No	2		
4	Extra over for outlet for 75mm diameter pipe	No	3		
	uPVC rainwater pipes				
5	75mm Diameter rainwater pipes	m	8		
6	Extra over for eaves offset 600mm	No	2		
7	Extra over for eaves offset 300mm	No	1		
8	Extra over for shoe	No	2		
	SANITARY FITTINGS				
	'Vaal Sanitaryware' vitreous china WC suites				
9	Vaal "Hibiscus" close coupled 90 degree outlet open rim front single flush suite complete with lid and fitments (code 772654) and heavy duty seat and cover plate	No	1		
10	Vaal Potteries Vitreous China 510 x405mm rounded "Hibuscus" basin (code 7023) with one taphole, bolted to the wall using two 10mm bolts (code 8448Z0)	No	1		
	WASTE UNIONS ETC				
	Carried to Collection			R	
	Bill No. 8 Plumbing and Drainage				

	"Cobra Watertech"				
11	32mm 308 CP basin waste union and 309CP anti-theft plug	No	1		
	TRAPS ETC				
	'Cobra Watertech' traps etc				
12	32 mm Chrome plated deep seal bottle trap with outlet for 50mm PVC (code 345/50)	No	1		
	TAPS, VALVES, ETC				
	Cobra Watertech or other approved				
13	15mm Ball-O-stop	No	3		
	'Cobra Watertech' 'Star', 'Aquila' and 'Carina' pillar taps				
14	15mm "Star" heavy patterned pillar tap (111-15CP)	No	1		
	WATER SUPPLIES				
	Class O copper pipes with brass compression couplings				
15	15mm Pipes	m	12		
	Extra over class O copper pipes for capillary fittings				
16	15mm Fittings	No	10		
	TESTING				
17	Allow for testing of all the abovementioned items as described to the complete satisfaction of the Representative and for replacing any defective work at the Contractor's expense and re-testing until found to be perfect		Item		
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Bill No. 8
Plumbing and Drainage

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Bill No. 8

Plumbing and Drainage

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Bill No. 8
Plumbing and Drainage

Item No			Quantity	Rate	Amount R
	BILL NO 9				
	GLAZING				
	For preambles see "Model Preambles for Trades"				
	(WORK GROUP 150)				
	TOPS, SHELVES, DOORS, MIRRORS, ETC				
	6mm Silvered float glass copper backed mirrors with 10 mm bevelled and polished edges holed for and fixed with chromium plated dome capped mirror screws with rubber buffers to plugs in brickwork or concrete				
1	Mirror size 900 x 350mm	No	1		
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Bill No. 9
Glazing

Item No		Quantity	Rate	Amount R
	BILL NO 10			
	PAINTWORK			
	For preambles see "Model Preambles for Trades"			
	SUPPLEMENTARY PREAMBLES			
	DESCRIPTIONS			
	Descriptions of paintwork shall be deemed to include for all cutting in			
	PREPARATORY WORK TO EXISTING WORK			
	Previously painted plastered surfaces			
	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			
	Previously painted metal surfaces			
	Surfaces shall be thoroughly rubbed and cleaned down. Blistered or peeling paint shall be completely removed down to bare metal			
	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			
	Carried to Collection		R	

Bill No. 10
Paintwork

	SABS Specifications				
	Matt or eggshell decorative paint for interior works : SABS 515				
	High gloss enamel paint : SABS 630 Grade I				
	Oil gloss enamel paint : SABS 631				
	Primers for wood for external work : SABS 678 Type I				
	Primers for wood for internal work : SABS 678 Type III				
	Zink chromate primers for steel : SABS 679 Type !				
	Undercoats for paint (except emulsion paint) : SABS 681 Type I				
	Aluminium paint : SABS 682 Grade II				
	Roof paints : SABS 683 Type B				
	Structural steel paint : SABS 684 Type B				
	Wash primer (metal etch) : SABS 723				
	Varnish for interior use : SABS 887 Type I				
	Emulsion paints : SABS 1586				
	(WORK GROUP 152)				
	PLASTER BOARD SURFACES WITH				
	One coat alkali resistant plaster primer and two coats PVA acrylic emulsion paint on				
1	Ceilings and cornices	m2	30		
	FIBRE-CEMENT SURFACES WITH				
	Two coats pure acrylic paint on				
2	Fascias and barge boards	m2	13		
	ON WOOD SURFACES				
	Two coats oil wood primer				
3	Backs of frames, linings, etc not exceeding 300mm wide	m	15		
	Carried to Collection			R	

Bill No. 10
Paintwork

	One coat oil wood primer, one coat universal undercoat and two coats "Plascon Velvaglo" paint on				
4	On doors	m2	3		
5	On door frames	m2	4		
	METAL SURFACES WITH				
	One coat galvanised iron primer and two coats super universal enamel paint on galvanised steel				
6	Gates, grilles, burglar screens, balustrades, etc (both sides measured over the full flat area)	m2	2		
	PAINTWORK, ETC TO EXISTING SURFACES ON				
	SMOOTH PLASTER OR CONCRETE SURFACES WITH				
	Clean down and apply one coat superior matt acrylic paint on work in sound condition on				
7	Internal walls	m2	180		
8	External walls	m2	13		
	BRICK OR QUARRY TILE SURFACES WITH				
	Clean down and apply two coats brick and slasto dressing on				
9	Recessed pointed fair faced walls	m2	140		
	Carried to Collection			R	

Bill No. 10
Paintwork

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Bill No. 10

Paintwork

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Bill No. 10
Paintwork

SECTION SUMMARY - Guard House/Generator Room

Item No		Quantity	Rate	Amount R
	SECTION 4			
	BILL NO 1			
	EXTERNAL WORK			
	SUPPLEMENTARY PREAMBLES			
	Stormwater channels Descriptions of channels shall be deemed to include all necessary excavation and disposal of surplus material			
	Exposed concrete surfaces Exposed surfaces of concrete stormwater channels, cover slabs, inspection eye marker slabs, gulley tops, cleaning eye tops, catchpits, inspection chambers, etc shall be finished smooth with plaster and descriptions shall be deemed to include therefor			
	Concrete pipes Pipes shall be jointed with interlocking joints or where so described socket and spigot joints with rubber rings			
	uPVC pipes and fittings Sewer and drainage pipes and fittings shall be jointed and sealed with butyl rubber rings Soil, waste and vent pipes and fittings shall be solvent weld jointed or sealed with butyl rubber rings			
	uPVC pressure pipes and fittings Pipes for water supply shall be of the class stated Pipes of 50mm diameter and smaller shall be plain ended with solvent welded uPVC loose sockets and fittings Pipes of 63mm 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			
	Carried to Collection		R	

HDPe (high density polyethylene) pipes and fittings

Pipes shall be type IV and of the class specified with "Plasson" or "Alprene" compression fittings

Copper pipes

Pipes shall be hard drawn and half-hard pipes of the class described. 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

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

Reducing fittings

Where fittings have reducing ends or branches they are described as "reducing". In the case of pipes with diameters not exceeding 63mm, 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

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

Disinfection of water pipework

All water pipework is to be disinfected in accordance with SABS 1200L

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Bill No. 1
External works

	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" 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 manufacturers' 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 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) **(WORKGROUP NO. 102)** **REMOVAL OF EXISTING WORK** Break up and remove				
1	150mm Thick mesh reinforced concrete pavings, etc	m2	192		
	Carried to Collection				R

Bill No. 1
External works

	Cutting through				
2	Saw cutting through 150mm thick reinforced concrete hardstand	m	18		
	Take out and remove				
3	160mm Diameter uPVC pipe from open trenches	m	140		
	CUTTING THROUGH CONCRETE DRIVEWAY				
	Cutting through:				
4	Saw cutting through 200mm thick reinforced concrete hardstand on both sides for passage for 450mm internal diameter pipe including breaking up and carting away rubble and making good concrete on completion (making good hardstand elsewhere)	m	103		
	(WORKGROUP NO. 104)				
	SITE CLEARANCE, ETC				
	Site clearance				
5	Digging up and removing rubbish, debris, vegetation, hedges, shrubs and trees not exceeding 200mm girth, bush, etc	m2	10 565		
	FILLING, ETC				
	Earth filling supplied by the contractor (not compacted)				
6	In landscape mounds, berms, etc	m3	27		
	LANDSCAPING				
	Ground preparation				
7	Cultivation and preparation of areas to be planted	m2	620		
	Topsoil obtained from prescribed stock piles on site, including spreading and levelling				
8	Take from stockpile and spread topsoil 100mm thick	m2	620		
	Grassing, ground covers, etc				
9	Cynodon Dactylon instant lawn	m2	620		
	Carried to Collection			R	

Bill No. 1
External works

	(WORKGROUP 146)				
	STORMWATER DRAINAGE				
	Spigot and Socket Class D Reinforced Concrete Pipes to SABS 677				
10	450mm Pipes (50D) laid in and including trenches, bedding and backfilling not exceeding 1m deep	m	62		
11	450mm Pipes (50D) laid in and including trenches, bedding and backfilling exceeding 1m and not exceeding 2m deep	m	62		
12	450mm Pipes (50D) laid in and including trenches, bedding and backfilling exceeding 2m and not exceeding 3m deep	m	10		
	The following in catchpits, manholes, etc (grating and frames elsewhere measured)				
13	Excavate in earth for and build catchpit with one brick sides on and including a 250mm thick mass concrete class 25/26 base projecting 250mm all round, including finishing in 3:1 cement plaster on inside and mass concrete class 20/13 benching, with 100mm thick mass concrete class 25/19 slab over finished on all exposed surfaces in untinted granolithic with angles rounded with opening for 450 x 600mm cover and frame; size internally 0,78 x 0,80m x not exceeding 1,0m and not exceeding 2,0m deep	No	3		
14	Excavate in earth for and build catchpit with one brick sides on and including a 250mm thick mass concrete class 25/26 base projecting 250mm all round, including finishing in 3:1 cement plaster on inside and mass concrete class 20/13 benching, with 100mm thick mass concrete class 25/19 slab over finished on all exposed surfaces in untinted granolithic with angles rounded with opening for 450 x 600mm cover and frame; size internally 0,78 x 0,80m exceeding 2,0m and not exceeding 3,0m deep	No	2		
	(WORKGROUP 146)				
	Cast iron covers etc				
15	Saint Gobain Pipelines South Africa (Besaans-du Plessis foundries) heavy duty dished grating (Code: 02898), size 450 x 600mm x 99,5kg	No	8		
	Carried to Collection			R	

Bill No. 1
External works

	Testing				
16	Allow for flushing and jetting the whole of the stormwater line		Item		
	Sundries				
17	Tie into existing manhole	No	2		
	THE FOLLOWING IN SLOT DRAIN				
	(WORK GROUP 136)				
	Galvanised stormwater duct covers				
18	Mentis Rectagrid RS40 ot other approved 60 x 4,5mm pressure locking grating in approximately 300mm widths x 1000m long loose in channel (channel elsewhere)	m	10		
19	65 x 50 x 6mm Angle section framing with R8 L shaped anchors 150mm girth, welded on at not exceeding 300mm centres and cast into concrete	m	20		
	THE FOLLOWING TO HEADWALLS				
	(WORKGROUP NO 104)				
	Excavation in soft excavation not exceeding 2 m deep				
20	Excavate not exceding 2m deep for ground beams.	m3	1		
	Risk of collapse of excavations				
21	Sides of trench and hole excavations not exceeding 1,5m deep	m2	3		
	(WORKGROUP NO 110)				
	Reinforced Concrete Class 20/19				
22	In bases, slabs and upstands.	m3	1		
	(WORKGROUP NO 111)				
	Class F2 formwork to sides				
23	Edges, risers, ends and reveals not exceeding 300mm high or wide	m	6		
	(WORK GROUP 114)				
	Carried to Collection			R	

Bill No. 1
External works

	High tensile steel reinforcement to structural concrete work				
24	Various diameter bars	t	0.02		
	(WORKGROUP NO 116)				
	Brickwork of NFX bricks (14 MPa nominal compressive strength) in class I mortar in: (Bagged & sealed)				
25	One brick walls	m2	2		
	"Corobrik Firelight Satin" face bricks pointed with recessed horizontal and vertical joints				
26	Extra over brickwork for face brickwork	m2	6		
	Brick-on-edge header course copings, sills, etc of "Corobrick Firelight Satin" face bricks, pointed with recessed joints on all exposed faces				
27	220mm Copings on top of one brick walls	m	1		
28	220mm Copings on top of raking one brick walls	m	4		
	Reno mattress filter blanket				
29	200mm Thick including excavations, etc	m2	6		
	(WORKGROUP NO 146)				
	SOIL DRAINAGE.				
	uPVC pipes				
30	160mm Diameter pipe and excavations not exceeding 1m deep	m	80		
31	160mm Diameter pipe and excavations exceeding 1m and not exceeding 2m deep	m	60		
	Extra over uPVC pipe for				
32	110mm Bend	No	2		
33	160mm Bend	No	3		
34	110mm Junction	No	1		
35	160mm Junction	No	1		
	Carried to Collection			R	

	Precast concrete circular inspection chambers including precast concrete cover slabs (covers elsewhere) and channels in benching all in accordance with the Civil Engineers detail B on drawing number C5548/03				
36	1000mm Diameter inspection chamber exceeding 1m and not exceeding 2m deep internally	No	3		
	Precast concrete covers etc				
37	1000mm Diameter cover and frame	No	7		
	Sundries				
38	Tie into existing sewer manhole	No	1		
	SUNDRIES				
39	Earth filling supplied by the contractor as backfilling to trenches	m3	25		
40	Sand filling supplied by the contractor in bedding under and filling around pipes	m3	47		
41	Clean down surfaces and apply abe® bitumen manhole sealer to manhole rings	m	110		
42	Benching existing manholes to falls and currents	No	5		
	Testing				
43	Pressure testing of sewer line		Item		
44	Allow for flushing of the entire soil drainage system		Item		
45	Allow for testing the whole of the soil drainage installation and for any re-testing necessary after taking out and replacing any defective work to the satisfaction of the Employer and Local Authority		Item		
	(WORKGROUP 104)				
	ROADWORK, PARKING AREAS AND PAVING				
	SUPPLEMENTARY PREAMBLES				
	Carried to Collection			R	

Bill No. 1
External works

	Testing of material and filling				
	Descriptions of earth filling, compaction, etc shall be deemed to include for all necessary testing required in accordance with the SABS 1200 series				
	Excavation in earth not exceeding 2m deep				
46	Box cut under pavings to reduce levels and dispose in prescribed stock piles on site	m3	24		
	Keeping excavations free of water				
47	Keeping excavations free of water other than subterranean water		Item		
	Extra over all excavations for carting away				
48	Surplus material from excavations and/or stock piles on site to a dumping site to be located by the contractor	m3	24		
	Earth filling supplied by the contractor under parking areas, roadways, etc				
49	Base course layer of G2 material 150mm thick in accordance with SABS 1200 ME, compacted to 95% Mod AASHTO density	m2	40		
50	Base course layer of G2 material 300mm thick in accordance with SABS 1200 ME, compacted to 95% Mod AASHTO density	m2	40		
	Compaction of surfaces				
51	Compaction of ground surfaces 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	40		
52	Compaction of ground surfaces under pavings etc, including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to 95% Mod AASHTO density	m2	192		
	(WORKGROUP 110)				
	Carried to Collection			R	

Bill No. 1
External works

	30MPa/19mm Reinforced concrete				
53	Paving to parking areas, roadways, etc in panels between construction joints etc	m3	35		
	Finishing top surfaces of concrete with a power float and a coarse hard grass broom				
54	Paving to parking areas, roads, etc to falls	m2	232		
	(WORKGROUP 111)				
	Class F2 formwork				
55	To edges not exceeding 300mm high	m	96		
	(WORK GROUP 110)				
56	Allow for all necessary concrete test cubes size 150 x 150 x 150mm cast from batches of concrete required for the entire contract as specified, made, stored, cured and tested in accordance with SABS Methods 861 and 863, including use of approved cube moulds, transporting to an approved testing laboratory for testing, paying all charges and submitting reports to the Director		Item		
	Expansion joints with 10mm softboard (bitumen impregnated softboard) through concrete paving				
57	Not exceeding 300mm high to edges of surface beds	m	28		
	Saw-cut joints				
58	3 x 50mm Saw cut through mesh within 48 hours of casting and 8 x 20mm reaming of saw cut after curing	m	1 770		
	(WORKGROUP 114)				
	Fabric reinforcement				
59	Type 311 fabric reinforcement in concrete paving, etc	m2	232		
	Mild tensile steel dowel bars				
60	16mm Diameter dowel bar 600mm long with one end embedded 300mm deep in side of concrete at expansion joint and other end greased and wrapped in polythene sheeting, including hole through formwork	No	67		
	(WORKGROUP 112)				
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Bill No. 1
External works

	Precast concrete finished smooth on exposed surfaces, including bedding, jointing and pointing				
61	75/150 x 230mm High kerbs (SANS 927 fig 6) with 150 x 150mm unreinforced concrete continuos haunching at back of kerb, 600 x 80mm thick foundation including excavation, backfilling, etc and 175 x 120mm sett line with 25 x 50mm rebate along top edge	m	34		
62	75/125 x 230mm High kerbs (SANS 927 fig 6) with 150 x 150mm unreinforced concrete continuous haunching at back of kerb, circular on plan not exceeding 4m radius, formed with straight kerbs, including excavation, backfilling, etc	m	13		
63	150 x 150mm unreinforced concrete continuos haunching at back of kerb, including backfilling, etc	m	300		
	(WORKGROUP 120)				
	Two-part grey polysulphide sealing compound, including backing cord, bond breaker, primer, etc				
64	8 x 20mm In saw cut including 10mm diameter bond breaking cord	m	1 770		
65	10 x 10mm In expansion joints, including raking out expansion joint filler as necessary	m	284		
	Sundries				
66	Clean out existing saw cuts using high pressure air	m	2 054		
67	High pressure clean existing concrete roads including removal of weeds and vegetation where necessary	m2	3 307		
	PATCHING HARDSTAND FOR PASSAGE OF PLUMBING TRENCHES				
	Compaction of surfaces:				
68	Compaction of ground surface under pavings, roads, etc. including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to 93% Mod AASHTO density in restricted areas	m2	103		
	Carried to Collection			R	

Bill No. 1
External works

	Base course constructed of filling supplied by the Contractor:				
69	Over site of C2 base course material 150mm thick in accordance with SABS 1200 DM compacted to 98% Mod AASHTO density in restricted areas	m2	103		
70	Over site of G5 material 300mm thick in accordance with SABS 1200 DM compacted to 95% Mod AASHTO density in restricted areas	m2	103		
	30MPa/19mm concrete cast against excavated/filled surfaces				
71	Roadways, etc cast in restricted areas	m3	21		
	Wood float surface treatment to finished face of concrete, including non-slip broom finish				
72	Roadways, etc in restricted areas	m2	103		
	Fabric reinforcement				
73	Type 395 fabric reinforcement in concrete roadways, etc in restricted areas	m2	103		
	High tensile steel dowel bars				
74	Y16 steel dowel bar 400mm long with one end embedded in side of concrete including "Hilti" Hy200 epoxy	No	458		
	Prepare and apply one coat bitumastic paint				
75	150mm High edge of concrete hardstand	m	206		
	THE FOLLOWING IN BOUNDARY WALL				
	(WORK GROUP 152)				
	Precast concrete finished smooth on exposed surfaces, including bedding, jointing and pointing				
76	350 x 350mm Thick overall copings, twice weathered on top to 50mm thick along both edges and with drip groove in bottom along both edges	m	8		
	FACE BRICKWORK				
	Carried to Collection			R	

Bill No. 1
External works

	"Corobrik Firelight Satin" face bricks pointed with recessed horizontal and vertical joints				
77	Inspect existing face brickwork and make good pointing including filling all holes, make good joints, etc to face brickwork externally	m2	3 184		
	Clean down				
78	Existing face brick walls	m2	3 184		
	(WORKGROUP NO. 116)				
	Brickwork of NFX bricks (14 MPa nominal compressive strength) in class 1 mortar				
79	One brick walls	m2	20		
	Brickwork reinforcement				
80	150mm Wide reinforcement built in horizontally	m	87		
	"Corobrik Firelight Satin" face bricks pointed with recessed horizontal and vertical joints				
81	Extra over for face brickwork	m2	40		
	Brick-on-edge header course copings, sills, etc of "Corobrik Firelight Satin" face bricks, pointed with recessed joints on all exposed faces				
82	Double cant coping to top of one brick walls	m	6		
83	Cant brick capping to pier size 460 x 460mm including raking out horizontal joints to falls	No	140		
	(WORKGROUP NO. 120)				
	Approved two-part grey polysulphide sealing compound including backing cord, bond breaker, primer, etc				
84	10 x 10mm In expansion joints vertically to walls	m	432		
85	10 x 10mm In expansion joints horizally to top of walls	m	33		
	(WORKGROUP NO 146)				
	SUBSOIL DRAINAGE				
	Carried to Collection			R	

Bill No. 1
External works

	"Cordrain" slotted uPVC flexible pipes				
86	150mm Pipes laid in stone encasing (encasing elsewhere)	m	60		
	Extra over "Cordrain" slotted uPVC flexible pipes for uPVC fittings				
87	150mm End cap	No	2		
88	150mm 45 Degree junction	No	1		
	Non-woven continuous filament needle punch polyester filter fabric blanket				
89	Around stone filling in sub-soil drain trenches	m2	30		
	Stone filling of 19mm broken stone				
90	In sub-soil drain trenches around pipes	m3	1		
	(WORKGROUP 136)				
	FENCING				
	Galvanised razor wire flat wrap fixed to galvanised mild steel posts with three strands of galvanised barbed wire all to architect's approval including galvanised steel bolts and fixing to top of face brick boundary wall				
91	Continuous razor wire security roll to top of fence flat wrapped in 600mm diameter rings, tied together and to straining wire at 200mm centres	m	44		
92	Extra over for step down not exceeding 400mm high	No	8		
	Galvanised Gates				
93	Sliding gate 5375 x 3030mm high with razor wire 600mm high to top all as per Architect's drawing nsc/wd/04 revision E detail 1.15	No	1		
	THE FOLLOWING TO ATTENUATION TANK				
	(WORK GROUP 104)				
	Extra over all excavations for carting away				
94	Surplus material from excavations and/or stock piles on site to a dumping site to be located by the contractor	m3	115		
	Carried to Collection			R	

Bill No. 1
External works

	Earth filling obtained from the excavations and/or prescribed stock piles on site, compacted to 93% Mod AASHTO density				
95	Backfilling behind retaining walls	m3	37		
	30Mpa/20mm Reinforced concrete				
96	Slabs, including beams and inverted beams	m3	17		
	(WORK GROUP 111)				
	Class F2 formwork to sides				
97	Edges, rises, ends and reveals not exceeding 300mm high or wide	m	27		
	Class F2 formwork to soffits				
98	Of slab not exceeding 3,5m high	m2	44		
	(WORK GROUP 114)				
	Mild and High tensile steel reinforcement to structural concrete work				
99	Varying diameter bars	t	2.04		
	(WORK GROUP 142)				
	Screeds steel trowelled on concrete				
100	30mm Thick on floors to falls	m2	44		
	Cement plaster steel trowelled, on brickwork				
101	On walls	m2	66		
102	On narrow widths	m2	6		
	(WORKGROUP 146)				
	Spigot and Socket Class D Reinforced Concrete Pipes to SABS 677				
103	450mm Pipes (50D) laid in and including trenches, bedding and backfilling not exceeding 1m deep	m	5		
	Carried to Collection			R	

Bill No. 1
External works

	Class 34 uPVC pipes				
104	110mm Pipes laid in and including trenches not exceeding 1m deep	m	1		
	Cast iron covers etc				
105	Saint Gobain Pipelines South Africa (Besaans-du Plessis foundries) heavy duty dished grating (Code: 02898), size 450 x 600mm x 99,5kg	No	2		
	THE FOLLOWING IN BASES FOR TANK STAND				
	(WORKGROUP NO 110)				
	35Mpa Non-shrink grout				
106	Bedding approximately 50mm thick under 350 x 350mm base plate, including chamfered edges all round	No	4		
	TRANSFER PUMP				
	(WORKGROUP 146)				
	"Wilo" or similar approved high pressure multi-stage centrifugal pump				
107	Supply and install 1.5KW 400V multi-stage, non self-priming, vertical high pressure centrifugal pump, in-line design (product code MVI 804-/25//3-400-50-2) all in accordance with the manufacturers specifications	No	1		
	Carried to Collection			R	

Bill No. 1
External works

Section No. 4

Bill No. 1

External works

COLLECTION PAGE

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Carried to Final Summary		R

Bill No. 1
External works

SECTION 5 - ELECTRICAL INSTALLATION

BILL NO 1 - PRELIMINARY AND GENERAL

NTUZUMA CCTV ROOM		ESTIMATE			
Item	Description	UNIT	QTY	UNIT PRICE	TOTAL PRICE
1	**P & G s**				
1.1	Allow for testing and compliance certificate of the entire electrical installation.	Sum			
1.2	Allow for As Built Drawings.	Sum			
1.3	Allow for Site Establishment & Travel	Sum			
1.4	Allow for interface with other contractors	Sum			
1.5	Municipal Electrical Connection Fee	Sum			
1.6	Co-ordination & Attendance Fee	Sum			
1.7	Removal of redundant or damaged electrical equipment	Sum			
	TOTAL CARRIED FORWARD TO SUMMARY				

SECTION 5 - ELECTRICAL INSTALLATION

BILL NO 2 - LV EQUIPMENT

NTUZUMA CCTV ROOM		ESTIMATE			
Item	Description	UNIT	QTY	UNIT PRICE	TOTAL PRICE
	Tenderers are referred to the project specification for full description of materials, etc. to be used. All work shall be done strictly in accordance with specifications and manufacturer's instructions and to be left in perfect working order after completion.				
2.1	**Distribution Boards**				
	Distribution Boards fitted complete with equipment, wired as per Schematic Diagram. Install as shown of drawings. The contractor must take into account all the breakers, fault levels and surge arresters when pricing per DB and also the Main L.T. Panel for the Main Sub, SAP L.V. Panel & CCTV Main Panel.				
2.1.1	Kiosk 1 (Lighting)	ea	1		
2.1.2	Kiosk 2 (Lighting)	ea	1		
2.1.3	Distribution Board DB A	ea	1		
2.1.4	Distribution Board DB A (UPS)	ea	1		
2.1.5	Distribution Board DB B	ea	1		
2.1.6	Distribution Board DB B (UPS) Feed from DB A (UPS)	ea	1		
2.1.7	Distribution Board DB C	ea	1		
2.1.8	Distribution Board DB C (UPS) Feed from DB A (UPS)	ea	1		
2.1.9	Distribution Board DB D - Guard House	ea	1		
2.1.10	Distribution Board DB E - Aircon Plants	ea	1		
2.1.11	Distribution Board DB F- Generator Room	ea	1		
2.1.12	Main Panel in CCTV-Generator Room with all the Breakers and Panel Layout Floor Standing 1.9m x 2.0m x 600 with 3CR1 (1.6) Material & Lightning Arrestors	ea	1		
	TOTAL CARRIED FORWARD TO SUMMARY				

SECTION 5 - ELECTRICAL INSTALLATION

BILL NO 3 - LV CABLES SLEEVES AND EXCAVATIONS

NTUZUMA CCTV ROOM		ESTIMATE			
Item	Description	UNIT	QTY	UNIT PRICE	TOTAL PRICE
3.1	**Excavation, etc.**				
	Excavations" for trenching and including backfilling compacting and danger tape.				
3.1.1	Cable or sleeves trenches not exceeding 1m deep Soft.	m	0		
3.1.2	Cable or sleeves trenches not exceeding 1m deep Hard.	m	0		
3.1.3	Cable or sleeves trenches not exceeding 1m deep Rock.	m	0		
3.1.4	Back Fill River Sand	m3	0		
3.1.5	Backfill Trenches / Compaction	m	0		
3.1.6	Concrete cable markers	ea	20		
3.2	**Sleeves**				
	Unplasticised polyvinyl chloride (UPVC) sleeve piping including short lengths and joining, laid in trench (trench and backfilling measured elsewhere).				
3.2.1	160mm Diameter Sleeve with draw wire.	m	0		
3.2.2	110mm Diameter Sleeve with draw wire.	m	0		
3.3.3	75mm Diameter Sleeve with draw wire.	m	0		
3.3.4	160mm Bends	ea	0		
3.3.5	110mm Bends	ea	0		
3.3.6	75mm Bends	ea	0		
3.3	**Warning Tape**				
3.3.1	Cable warning tape placed 150mm above cable in excavations.	m	500		
3.4	**Manhole**				
3.4.1	Case iron covers for Telkom manhole 600mm x 600mm x 500mm	ea	14		
3.4.2	Case iron covers for Building of Main Supply manholes 800mm x 800mm x 600mm	ea	22		
3.4.3	Supply and install 300mm cable tray including the necessary supports, clamps, hangers, fixing material, bends, angles, junction, reducers, etc.	ea	65		
	TOTAL CARRIED FORWARD				

Item	Description	Unit	Quantity	Unit Price	Total Price (R)
	Carried Forward				
3.5	**Site Low Voltage Cabling**				
	Supply and install PVC/ SWA/ PVC copper laid in trenches (trenching and backfilling measured elsewhere), draw into risers and sleeves and terminals.				
3.5.1	185mm² x 4C PVC SWA ECC	m	0		
3.5.2	150mm² x 4C PVC SWA ECC	m	240		
3.5.3	25mm² x 4C PVC SWA ECC	m	90		
3.5.4	16mm² x 4C PVC SWA ECC	m	300		
3.5.5	10mm² x 4C PVC SWA ECC	m	75		
3.5.6	16mm² x 2C PVC SWA ECC	m	80		
3.5.7	10mm² x 2C PVC SWA ECC	m	12.5		
3.5.8	6mm² x 2C PVC SWA ECC	m	250		
3.5.9	4mm² x 4C PVC SWA ECC	m	40		
3.5.10	4mm² x 2C PVC SWA ECC	m	150		
3.5.11	150mm² x Insulated Earth Wire ECC	m	0		
3.5.12	120mm² x Insulated Earth Wire ECC	m	0		
3.6	**Termination of PVC/ SWA/ PVC Copper Cables**				
3.6.1	185mm² x 4C PVC SWA ECC	ea	0		
3.6.2	150mm² x 4C PVC SWA ECC	ea	24		
3.6.3	25mm² x 4C PVC SWA ECC	ea	16		
3.6.4	16mm² x 4C PVC SWA ECC	ea	24		
3.6.5	10mm² x 4C PVC SWA ECC	ea	16		
3.6.6	4mm² x 4C PVC SWA ECC	ea	8		
3.6.7	16mm² x 2C PVC SWA ECC	ea	12		
3.6.8	10mm² x 2C PVC SWA ECC	ea	6		
3.6.9	6mm² x 2C PVC SWA ECC	ea	12		
3.6.10	4mm² x 2C PVC SWA ECC	ea	12		
3.6.11	150mm² x Insulated Earth Wire ECC	ea	2		
3.6.12	185mm² x Insulated Earth Wire ECC	ea	0		
	TOTAL CARRIED FORWARD TO SUMMARY				

SECTION 5 - ELECTRICAL INSTALLATION

BILL NO 4 - LUMINAIRES

NTUZUMA CCTV ROOM		ESTIMATE			
Item	Description	UNIT	QTY	UNIT PRICE	TOTAL PRICE
4.	**Luminaires** **Luminaires complete as specified and indicated in schedule of luminaires supplied and fitted as described to structure or ceilings, including lamps, tubes, connections, brackets & plug tops.**				
4.1	LIGHT FITTING TYPE AD: 600 X 600 RECESSED L E D PANEL 6500K DIMMABLE	ea	28		
4.2	LIGHT FITTING TYPE A 600 X 600 RECESSED L E D PANEL 6500K STANDARD	ea	48		
4.3	LIGHT FITTING TYPE C 9W 6500K LED DOWN LIGHT	ea	18		
4.4	LIGHT FITTING TYPE D 30 W 6500K DOWNLIGHT	ea	11		
4.5	LIGHT FITTING TYPE E 16W 6500K ROUND PVC BULKHEAD BLACK TRIM	ea	32		
4.6	LIGHT FITTING TYPE F & H 1,3 M BLACK LED BOLLARD NO PLINTH	ea	16		
4.7	LIGHT FITTING TYPE G 3 M BLACK POLE NO TRAP DOOR ES BLACK POST TOP WITH ENERGYSAVING LAMP	ea	20		
4.8	LIGHT FITTING TYPE I 2 X 36 W CORROSSION PROOF	ea	6		
4.9	STRONGROOM WARNING LIGHT	ea	1		
	TOTAL CARRIED FORWARD TO SUMMARY				

SECTION 5 - ELECTRICAL INSTALLATION

BILL NO 5 - POWER AND LIGHTING INSTALLATION

NTUZUMA CCTV ROOM		ESTIMATE			
Item	Description	UNIT	QTY	UNIT PRICE	TOTAL PRICE
5	**Power & Lighting**				
	Conduits (Power)				
	Rigid PVC conduit including bends, draw boxes with covers, etc. fixed.				
5.1	20mm Diameter conduit	m	200		
5.2	25mm Diameter conduit	m	200		
	Galvanised steel flexible conduit with PVC sheath				
5.3	20mm Diameter 1000mm long complete with connectors at both ends	ea	20		
	Socket Outlets Boxes				
	Galvanised outlet box and cover plate to suit any number, size or type of entries, fixed onto conduit.				
5.4	100 x 100 x 50mm Deep Box.	ea	310		
	Conductors				
	PVC insulated stranded copper conductor drawn into conduit including terminations and connections.				
5.5	2,5mm² Conductor	m	12000		
5.6	4,0mm² Conductor	m	8000		
5.7	6,0mm² Conductor	m	4000		
5.8	10,0mm² Conductor	m	1000		
	Switched socket outlets, etc., complete with cover plate fixed in flush box type.				
5.9.	16A Three-pin single switched socket outlet wall mounted.	ea	44		
5.10	Data Point	ea	15		
5.11	16A Three-pin double switched socket outlet wall mounted.	ea	21		
5.12	Telkom Point	ea	17		
5.13	16A dedicated three-pin single switched socket outlet wall mounted.	ea	34		
5.14	16A Three-pin single UPS switched socket outlet wall mounted.	ea	12		
5.15	Powercomm Floor Cluster units complete with 1 x Dedicated socket outlet, 1 x ups outlet, 1 x RJ11 Telkom Point and 1 x Data Point	ea	0		
5.16	30 TP isolator in weather proof enclosure	ea	3		
5.17	20 DP isolator in weather prrof enclosure	ea	2		
5.18	5A Single Socket outlet for aircons	ea	8		
	TOTAL CARRIED FORWARD TO NEXT PAGE				

Item	Description	Unit	Quantity	Unit Price	Total Price (R)
	Amount Brought Forward				
	Conduits Lighting				
	Rigid PVC conduit including bends, draw boxes with covers, etc. fixed.				
5.19	20mm Diameter Conduit	m	200		
	Light Switch Outlet Boxes				
	Galvanised outlet box and cover plate, to suit any number, size or type or entries, fixed onto conduit.				
5.20	50 x 100 x 50mm deep box	ea	240		
5.21	60mm Diameter shallow type box PVC	ea	30		
5.22	60mm Diameter deep type box PVC	ea	30		
	Conductors				
	PVC insulated stranded copper conductor drawn into conduit including terminations and connections.				
5.23	2.5mm² conductor	m	600		
5.24	4.0mm² conductor	m	400		
	P8000 trunking with accessories	3m	116		
	P8000 Covers	ea	116		
	P8000 Splices	ea	19		
	P8000 T Joints	ea	4		
	P8000 4 way cross over	ea	4		
	P8000 End Caps	ea	3		
	Light switches complete with cover plate fixed in flush box type.				
5.25	16A Single lever one-way switch	ea	32		
5.26	16A Two-lever Two-way switch	ea	4		
5.27	Two lever one-way switch	ea	2		
5.28	20A Photo-electric daylight-sensative switch complete as specified with contactor and overide switch	ea	6		
5.29	Timer for lighting circuit	ea	4		
5.30	16A Surface Mounted Weather proof light switch	ea	2		
5.31	Power Trunking under CCTV floor two channel for PowerComm Cluster Units	m	0		
	TOTAL CARRIED FORWARD TO NEXT PAGE				

Item	Description	Unit	Quantity	Unit Price	Total Price (R)
	Amount Brought Forward				
	KITCHEN EQUIPMENT				
5.32	4 Plate Stove Type Defy or Kelvinator	ea	1		
5.33	120Lt. Fridge	ea	1		
5.34	Microwave 17 Lt.	ea	1		
5.35	Installation of hydro boilers type kwikhot 10lt. 2kW including plumbing	ea	1		
	3 compartment, 2 cover PVC power skirting system complete with all splices, dividers, fixings, end caps,				
5.37	**covers etc.**	m	120.00		
5.38	16A Switched socket outlet in power skirting	ea	18.00		
5.39	16A Dedicated switched socket outlet in power skirting	ea	10.00		
5.40	16A UPS switched socket outlet in power skirting	ea	1.00		
5.41	Data point outlet in power skirting	ea	9.00		
5.42	Telkom point outlet in power skirting	ea	9.00		
5.43	PVC rectangular trunking: 16mmx16mm	m	20.00		
5.44	TP 30A Breaker	ea	1.00		
5.46	3phase 32A 5pin s/o	ea	4.00		
	TOTAL CARRIED FORWARD TO SUMMARY				

SECTION 5 - ELECTRICAL INSTALLATION

BILL NO 6 - UPS AND GENERATOR

NTUZUMA CCTV ROOM		ESTIMATE			
Item	Description	UNIT	QTY	UNIT PRICE	TOTAL PRICE
6.1	**UPS 50 KVA**				
6.1.1	Supply, installation, testing and commissioning of a double conversion 50 Kva UPS. The UPS must include all the necessary equipment.	ea	1		
6.1.2	Testing & Commissioning	sum	1		
6.1.3	Issue Maintenance Manuals (4 Copies)	sum	1		
6.1.4	Maintenance & Service Period of 1 Year	sum	1		
6.2	**200kVA Generator**				
	Supply, installation, testing and commissioning of a 200kVA generator as per the specifications by specialised supplier.				
6.2.1	200kVA Generator Indoor unit complete with AMF control panel	ea	1		
6.2.2	Installation of 1000litre day tank with a circulation pump, fuel gauge and fuel pump	ea	1		
6.2.3	Supply 1000 Litres Diesal for testing & commissioning.	Lts	2000		
6.2.4	Testing & Commissioning	sum	1		
6.2.5	Issue Maintenance Manuals (4 Copies)	sum	1		
6.2.6	Maintenance & Service Period of 1 Year	sum	1		
	TOTAL CARRIED FORWARD TO SUMMARY				

SECTION 5 - ELECTRICAL INSTALLATION

BILL NO 7 - LIGHTNING PROTECTION

NTUZUMA CCTV ROOM		ESTIMATE			
Item	Description	UNIT	QTY	UNIT PRICE	TOTAL PRICE
7	**Lightning Protection & Earthing**				
	Supply Installation of the Lightning Protection and Earthing by a Specillist Contractor				
7.1	**Main Earthing** Supply and Install main earth bar on back wall of Main Tranformer Bay and L.V. Switch Boards and alos Earth Mat in the vicinity of the L.V. switchboard to provide an earthing system less than 1.0 Ohm				
7.1.1	500mm x 50mm x 6mm thick copper earth bar mounted on suitable insulators	ea	4		
7.1.2	Main Earth mat in vicinity of LV switchboard cupboard	ea	4		
7.1.3	7.5m copper coated earth electrodes driven into ground complete with brass coupling between rods.	ea	8		
8	**Lightning Protection as per SABS**				
8.1	Lightning Protection on Main Building Guard House Generator Room Main Substation	Sum Sum Sum Sum	1 1 1 1		
8.2	**Connect Lightning Protection to the Main Earth** Connect lightning protection in the following buildings back to the main earth bar behind the L.V. Switchboard				
8.2.1	Main Building	Sum	1		
8.2.2	Guard House	Sum	1		
8.2.3	Generator Room	Sum	1		
8.2.4	Main Substation	Sum	1		
8.3	Allow for resistivity tests, reports and certificates for the total installation	sum	1		
8.4	Allow for testing and commissioning of the complete lightining protection installation.	sum	1		
8.5	Earthing / Bonding of water pipes DBs and Kiosks.	ea	20		
	TOTAL CARRIED FORWARD TO SUMMARY				

SECTION 5 - ELECTRICAL INSTALLATION

BILL NO 8 - FIRE DETECTION

NTUZUMA CCTV ROOM		ESTIMATE			
Item	Description	UNIT	QTY	UNIT PRICE	TOTAL PRICE
8	**Fire Detection System Installed by Specialist Contractor as per the Specifications.**				
8.1	Fire control panel 10 Zone unit complete with battery backup power, charging unit & printer (Addressable)	ea	1		
8.2	Manual Break Glass Emergence Unit	ea	2		
8.3	Ironization Smoke Detectors Ceiling Mounted	ea	22		
8.4	Alarm type strob light siren combination	ea	2		
8.5	Heat Detectors 60 Ceiling Mounted i	ea	2		
8.6	20mm PVC Conduit	m	200		
8.7	PVC Round Boxes	ea	30		
8.8	20mm Galvanised Conduit	m	100		
8.9	Galvanised Round Boxes	ea	20		
8.10	20amp Surface Mounted Isolator	ea	1		
8.11	2.5mm PVC Covered Wire	m	300		
8.12	1mm Twisted two pair fire retardant cable	m	190		
8.13	1mm Twisted six pair fire retardant cable	m	250		
8.14	Server Room - Complete inert gas fire extinguished installation including two zone fire panel and detection system, gas fill, fire and gas alarm sirens all cabling, piping, controlselectrics, and interface with main fire detection	ea	1.00		
8.15	Allow for testing, commissioning and issuing of certificates for the entire system	Sum	1.00		
8.16	Allow for the guarantee and maintenance periods.	Sum	1.00		
8.17	Allow for re-testing of the entire system prior to first	Sum	1.00		
8.18	Allow for the training of the maintenance staff.	Sum	1.00		
8.19	Allow for the issue of maintenance manuals.	Sum	1.00		
8.20	Supply GMS fire brigade signalling system, set up an licence for 12 momths	Sum	1.00		
8.21	Install Fire Bridigade Signalling System	ea	1.00		
	TOTAL CARRIED FORWARD TO SUMMARY				

FINAL SUMMARY

NTUZUMA CCTV ROOM			ESTIMATE
Item	Description		TOTAL PRICE
1	PRELIMINARY AND GENERAL	Page 115	
2	LV EQUIPMENT	Page 116	
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4	LUMINAIRES	Page 119	
5	POWER AND ACCESSORIES AND EQUIPMENT	Page 122	
6	UPS AND GENERATOR	Page 123	
7	LIGHTNING PROTECTION	Page 124	
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	TOTAL CARRIED FORWARD TO FINAL SUMMARY PAGE		

SECTION 6 - MECHANICAL INSTALLATION
NATIONAL DEPARTMENT OF PUBLIC WORKS
NTUZUMA POLICE STATION : NEW CCTV BUILDING
PROJECT CODE WCS 046725
AIR CONDITIONING & VENTILATION INSTALLATION

Item No.		Unit	Qty	Rate	Total
	WORKS TO COMPLETION				
1	CCTV Rm 17.2 KwR 'in ceiling ducted' split	No.	3		
2	IT Core Rm 5.3 KwR 'mid wall' split	No.	2		
3	Electronic Equip Rm 5.3 KwR 'mid wall' split	No.	1		
4	UPS Rm 2.6 KwR 'mid wall' split	No.	2		
5	Radio Tech W/Shop 3.6 KwR 'cassette' split	No.	2		
6	Records Rm 3.6 KwR 'cassette' split	No.	1		
7	Commander Office 3.6 KwR 'cassette' split	No.	1		
8	Rest Rm Kitchen 7.1 KwR 'cassette' split	No.	1		
9	Office 3.6 KwR 'cassette' split	No.	1		
10	Reception 5.3 KwR 'cassette' split	No.	2		
11	Evidence Rm 7.1 KwR 'cassette'	No.	1		
12	Parade Rm 5.3 KwR 'cassette' split	No.	1		
	REFRIGERANT PIPING SYSTEMS				
13	A/C System 1	m	20		
14	A/C System 2	m	20		
15	A/C System 3	m	20		
16	A/C System 4	m	20		
17	A/C System 5	m	20		
18	A/C System 6	m	15		
19	A/C System 7	m	25		
20	A/C System 8	m	25		
21	A/C System 9	m	25		
22	A/C System 10	m	25		
23	A/C System 11	m	20		
24	A/C System 12	m	15		
	Carried Forward to Summary Page				**R**

Item No.		Unit	Qty	Rate	Total
25	A/C System 13	m	15		
26	A/C System 14	m	25		
27	A/C System 15	m	25		
28	A/C System 16	m	25		
29	A/C System 17	m	25		
30	A/C System 18	m	30		
31	A/C System 19	m	35		
	Fresh Air Ductwork				
32	560 dia uninsulated	m^2	1		
33	150 dia uninsulated	m^2	7		
34	100 dia Uninsulated	m^2	1		
35	300 dia Uninsulated	m^2	4		
36	200 dia uninsulated	m^2	1		
	Fittings				
37	560 dia 90 deg bend	No.	2		
38	560/920x600 sq/round	No.	2		
39	300 dia 90 deg bend	No.	7		
	Supply Air Ducting				
40	450 dia externally insulated	m^2	5		
41	300 dia externally insulated	m^2	2		
42	350 dia externally insulated	m^2	4		
	Flexible Ducting				
43	200 dia uninsulated	m	2		
44	150 dia uninsulated	m	10		
45	100 dia uninsulated	m	4		
46	450 dia externally insulated	m	6		
47	350 dia externally insulated	m	14		
	Carried Forward to Summary Page				**R**

Item No.		Unit	Qty	Rate	Total
48	300 dia externally insulated	m	2		
	Fittings				
49	350 dia spigot	No.	9		
50	300 dia spigot	No.	3		
51	200 dia spigot	No.	2		
52	150 dia spigot	No.	5		
53	100 dia spigot	No.	3		
	FANS				
54	Electronic Equip Rm (EAF 1) vitro6/150 AL	No.	1		
55	IT Core Rm (EAF 2) vitro6/150 AL	No.	1		
56	UPS Rm (EAF 3) vitro6/150 AL	No.	1		
57	Rest Area & Kitchen (EAF 4) vitro6/150 AH	No.	1		
58	Store Rm (EAF 5) vitro9/230 A	No.	1		
59	Fresh Air Input LUFT LCA560/10/1440 RPM plus 2 x cylindrical sound attenuators	No.	1		
	Grilles, Diffusers/Louvres				
60	Under Floor Exhaust Louvre (W/L 1) 400X400	No.	2		
61	Diffusers (SAD 1) 350 dia	No.	3		
62	Return Air Grilles (RAG 1) RAFF 600X600	No.	3		
63	Floor Grilles (FLG 1) 600X300	No.	3		
64	Fresh Air Disc Valves (DV 1) 150 dia	No.	5		
65	Fresh Air Disc Valves (DV 2) 200 dia	No.	3		
66	Fresh Air Disc Valves (DV 3) 100 dia	No.	3		
	Fresh Air Intake Filter				
67	50mm wash pleat 900x600 + Frames	No.	1		
	Electrical Power Cabling connections				
68	Cabling and connection to Indoor Evap Units	No.	19		
69	Cabling and connection to Out door Cond Units	No.	19		
	Carried Forward to Summary Page				**R**

Item No.		Unit	Qty	Rate	Total
70	Cabling and connection to ext/supply air fans	No.	9		
71	Removal of existing vandalised split A/C units	Sum	1		
	GENERAL				
72	Ref Gas 410 a charge & Split unit Comm	Sum	1		
74	Testing Commissioning O&M Manuals	Sum	1		
75	12 Month Maintenance and Guarantee	Sum	1		
	SUNDRIES				
76	Labour Cost Estimate	Sum	1		
	Carried Forward to Summary Page				R

		Total
	SUMMARY PAGE	
	Page No. 1	R
	Page No. 2	R
	Page No. 3	R
	Page No. 4	R
	Carried Forward to Collection Sheet	**R**

	PRICED SCHEDULE	AMOUNT
1.	**General Items**	
1.1	Working drawings	R
1.2	Operating and Maintenance Manuals with As-Built Drawings	R
1.3	The twelve month maintenance period as Specified	R
1.4	Testing and demonstrating the function of the system to the Building Manager	R
2.	**Gas Suppression Installation**	
2.1	Supply and installation of the compete 60 Kg FM200 Gas Suppression system as specified	R

CARRIED FORWARD TO FINAL SUMMARY PAGE	**R -**

Item No		Quantity	Rate	Amount R
	SECTION 8			
	BILL NO 1			
	PROVISIONAL SUMS, ETC			
	SUPPLEMENTARY PREAMBLES			
	General			
	Work for which budgetary allowances are provided will be measured and valued in accordance with the relevant building agreement and deducted in whole or in part if not required without any compensation for loss of profit on the said allowances			
	All prime cost amount and provisional sum allowances are net and will be adjusted in accordance with the relevant building agreement and deducted in whole or in part if not required without any compensation for loss of profit on the said allowances. Prime cost amounts shall include for delivery to site of all articles concerned			
	Overheads and profit			
	The contractor may allow for overheads and profit if required in the item "Allow for overheads and profit" wherever indicated			
	Profit and general attendance upon selected subcontract works			
	The item "Allow for profit and general attendance" which follows each selected subcontract works, shall be deemed to allow for the contractor's profit if required and to cover all the contractor's costs incurred in providing free of charge to the selected subcontract works the duties of the contractor as described in clause 12.2 of the JBCC N/S Subcontract Agreement inclusive of the amendments thereto contained in the "Preliminaries"			
	PROVISIONAL SUMS FOR SELECTED SUBCONTRACT WORKS			
	Carried to Collection		R	

Bill No. 1
Provisional Sums, Etc

	Landscaping to maintain plants in planter boxes			
1	Provide an amount of R50 000.00 (Fifty Thousand Rand) for landscaping to maintain plants in planter boxes	Item		50 000.00
2	Allow for profit and general attendance	Item		
	Specialist sign-off of elevated water tanks			
3	Provide an amount of R25 000.00 (Twenty Five Thousand Rand) for specialist sign-off of elevated water tanks	Item		25 000.00
4	Allow for profit and general attendance	Item		
	NET SUMS			
5	Allow an amount of R50 000.00 (Fifty Thousand Rand) for builder's work associated with crack repairs to be measured and priced at billed rates, or rates to be agreed and to be deducted in whole or in part if not used	Item		50 000.00
6	Allow an amount of R50 000.00 (Fifty Thousand Rand) for builder's work associated with plumbing repairs to be measured and priced at billed rates, or rates to be agreed and to be deducted in whole or in part if not used	Item		50 000.00
7	Allow an amount of R72 000.00 (Seventy Two Thousand Rand) as allowance for the community liaison officer as instructed by the Department of Public Works	Item		72 000.00
8	Allow an amount of R250 000.00 (Two Hundred and Fifty Thousand Rand) for non-scheduled builder's work to be measured and priced at billed rates, or rates to be agreed and to be deducted in whole or in part if not used	Item		250 000.00
	Carried to Collection		R	

Bill No. 1
Provisional Sums, Etc

Section No. 8

Bill No. 1

Provisional Sums, Etc

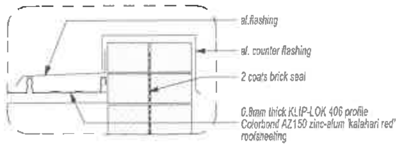
COLLECTION PAGE

	Page No	Amount R
Total Brought Forward from Page No.	133	
Total Brought Forward from Page No.	134	
Carried to Final Summary		R

Bill No. 1
Provisional Sums, Etc

FINAL SUMMARY

Section No		Page No		Amount R
1	Preliminaries	20		
2	CCTV Building	71		
3	Guard House/Generator Room	97		
4	External works	114		
5	Electrical Installation	126		
6	Mechanical Installation	131		
7	Gas Suppression	132		
8	Provisional Sums	135		
	Subtotal		R	
	Add: Value Added Tax at 15%		R	
	TOTAL CARRIED TO FORM OF TENDER		R	



1.2 GABLE-ROOF JUNCTION DETAIL
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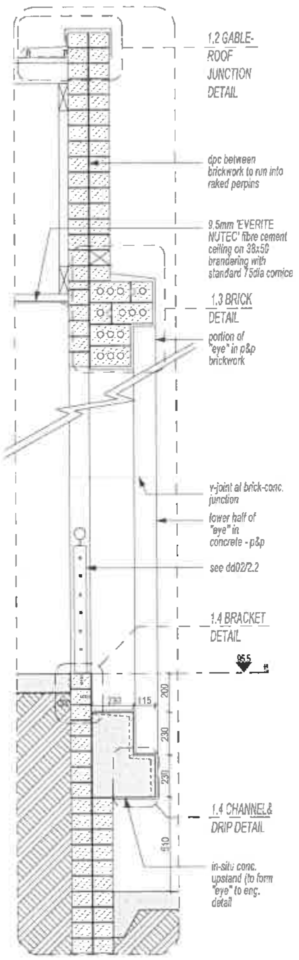
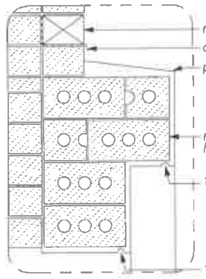
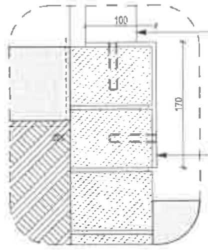


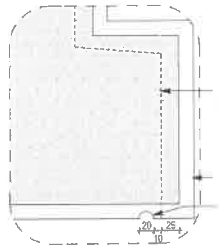
1.1 GABLE DETAIL
SCALE 1:20



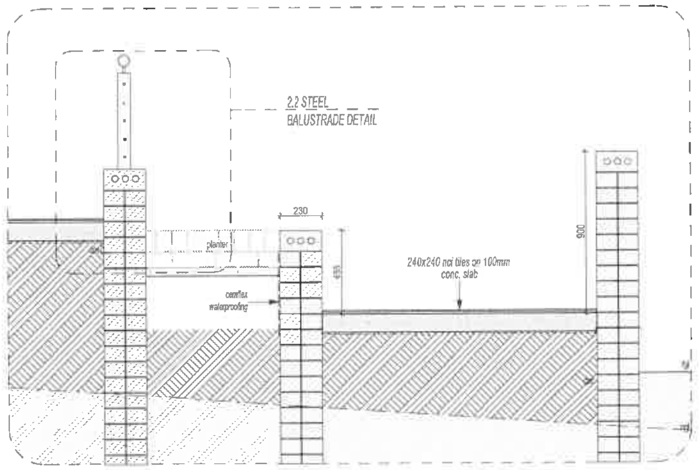
1.3 BRICK DETAIL
SCALE 1:10



1.4 BRACKET DETAIL
SCALE 1:5



1.5 CHANNEL&DRIP DETAIL
SCALE 1:5



2.1 PLANTER BOX DETAIL
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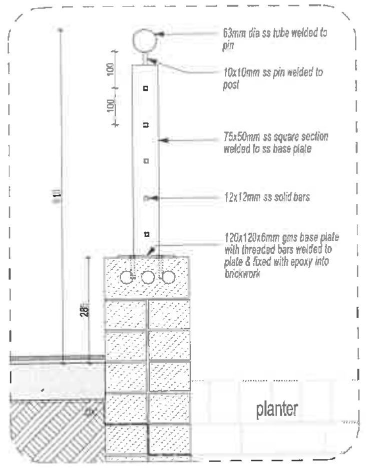
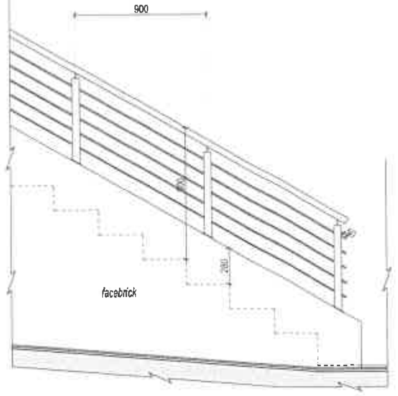
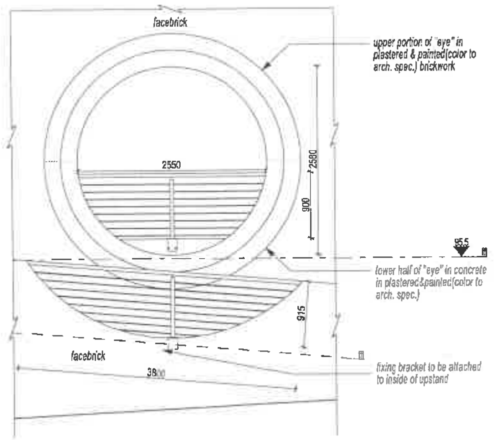


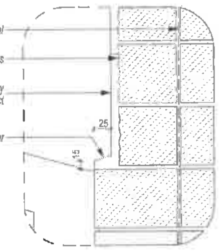
2.2 STEEL BALUSTRADE DETAIL
SCALE 1:10



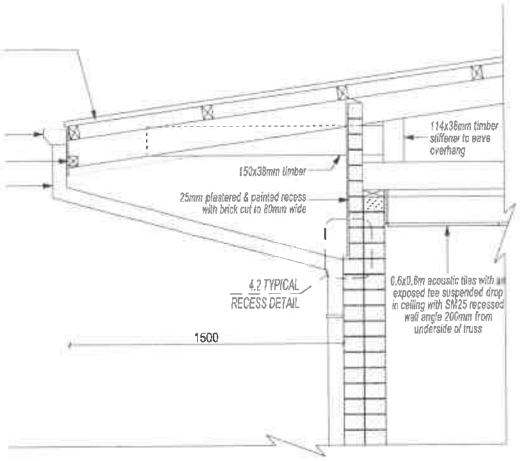
2.3 STEEL BALUSTRADE DETAIL ELEVATION
SCALE 1:25



2.4 STEEL BALUSTRADE DETAIL ELEVATION
SCALE 1:25



3.2 TYPICAL RECESS DETAIL UNDER EAVES
SCALE 1:5



3.1 TYPICAL EAVE DETAIL
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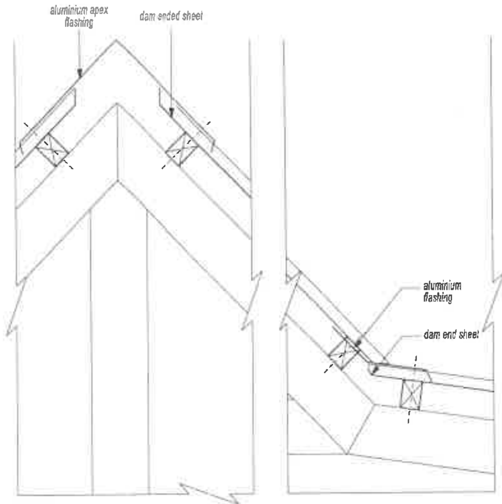
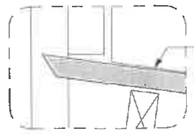
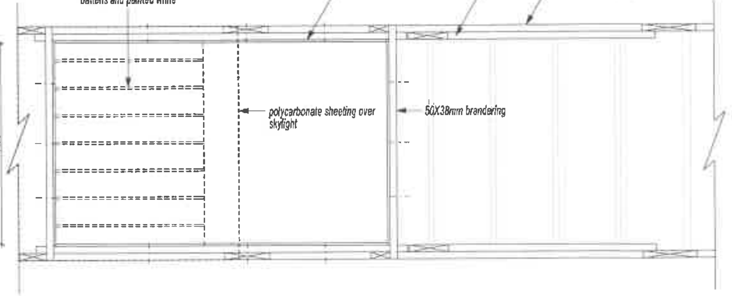


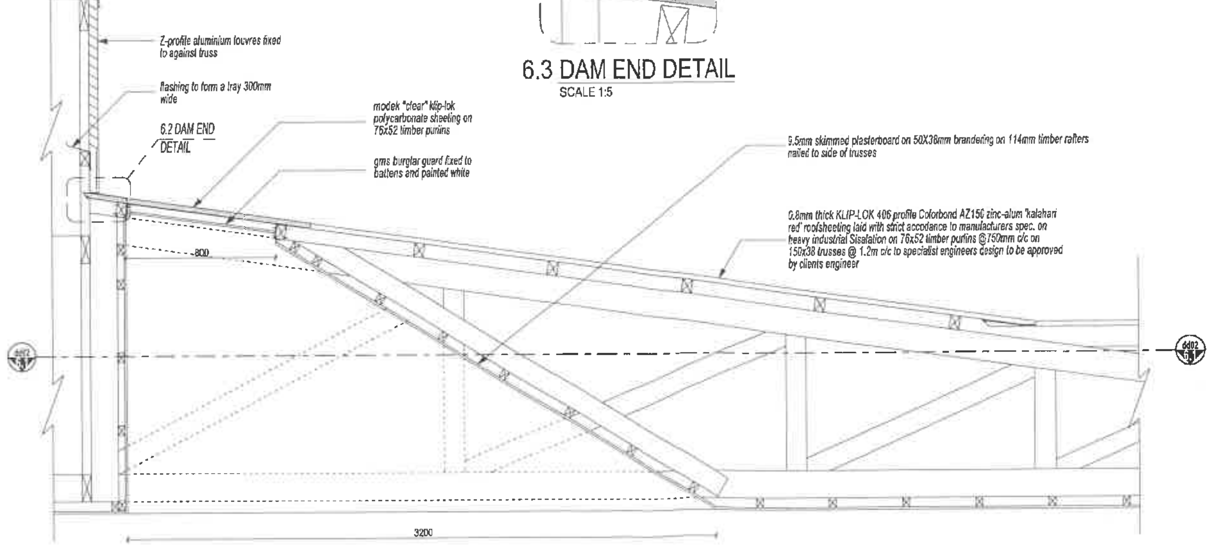
4. ROOF APEX & JUNCTION DETAIL
SCALE 1:10



6.3 DAM END DETAIL
SCALE 1:5



6.1 DETAIL PLAN OF SKYLIGHT
SCALE 1:20



6.2 ROOF JUNCTION &SKYLIGHT DETAIL
SCALE 1:20

NO.	DATE	AMENDMENT	D.P.W.

cad file name

public works
Department: Public Works
REPUBLIC OF SOUTH AFRICA
DIRECTOR-GENERAL
MR. M. MOROKA

consultant
G M KHAN ARCHITECT

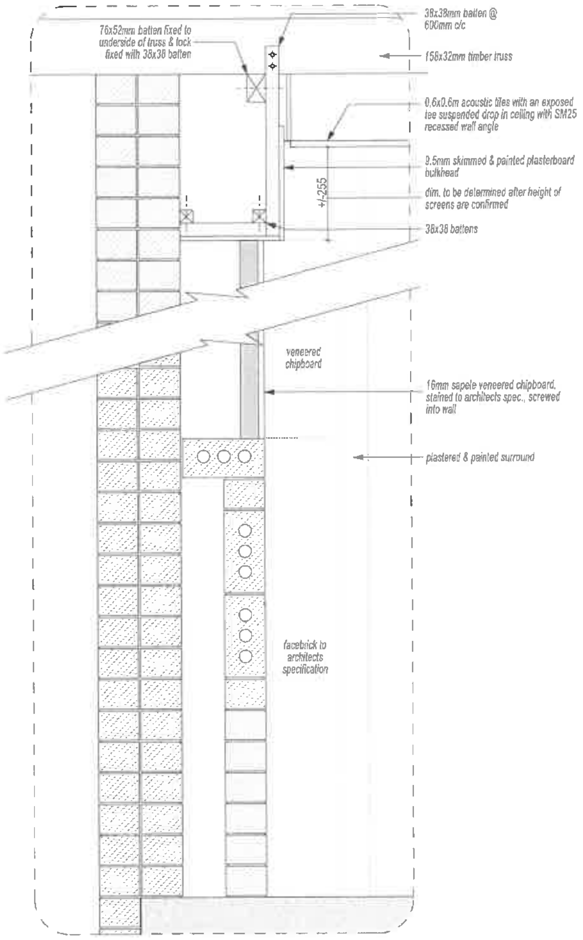
discipline: ARCHITECTURAL

service: NTUZUMA SAPS: NEW CCTV BUILDING on PORTION 1 of ERF 2132 NTUZUMA C

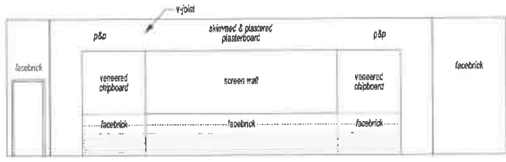
WCS number: 046 725

drawing title:
DETAIL DRAWING
CONSTRUCTION DETAILS

ref.no: 6313/0078/26/5
scale: as shown
drawn: TS
date: 16-09-2011
checked: G.M.K
type number
drawing number: nss/dd/02
rev



1.1 CCTV ROOM WALL DETAIL
SCALE 1:10



1.2 ELEVATION
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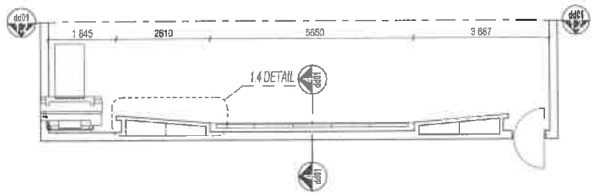
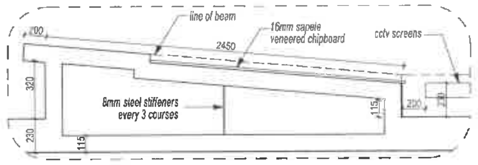
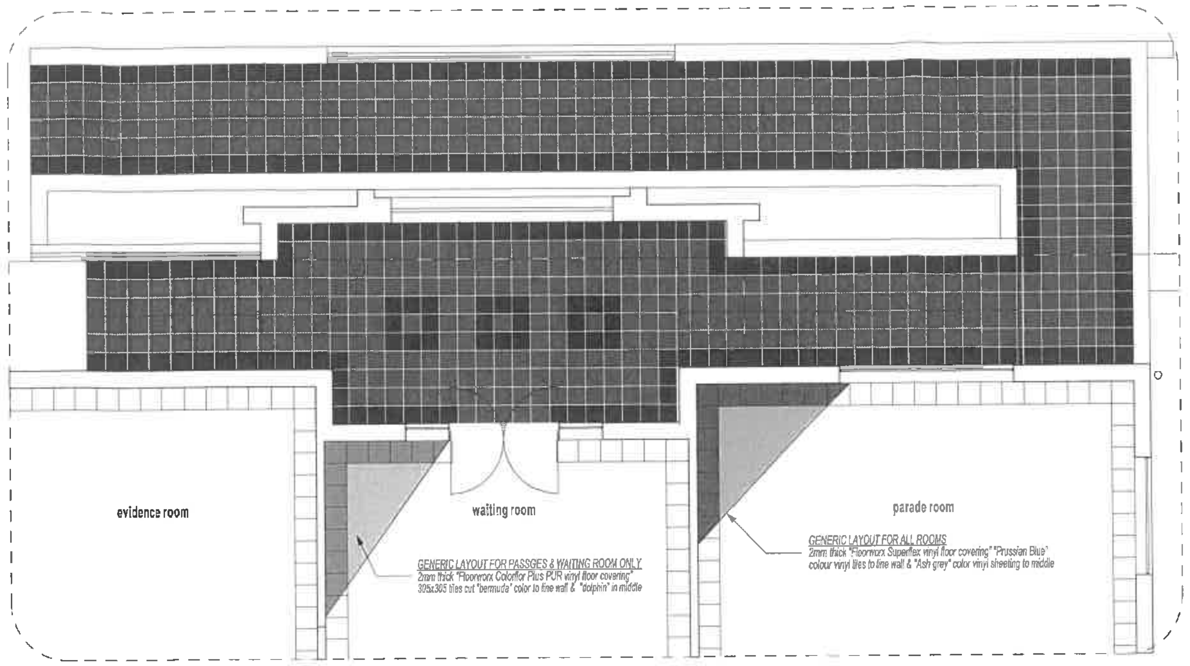


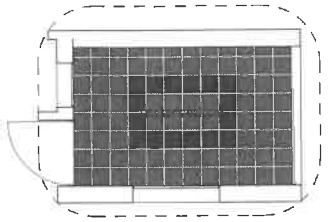
1.3 PLAN OF CCTV ROOM
SCALE 1:100



1.4 DETAIL OF WALL
SCALE 1:25



3.1 GENERAL TILING & VINYL LAYOUT
SCALE 1:50



3.2 TILING & VINYL LAYOUT OF BALCONY
SCALE 1:50

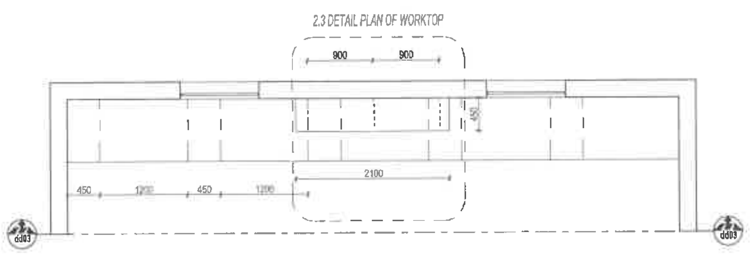
NOTES

All wooden surfaces are to be finished as follows:
-2 coats polyurethane sealer
-1 coat "Plascon Interior Ultra Varnish"
-surface to be sanded between each coat

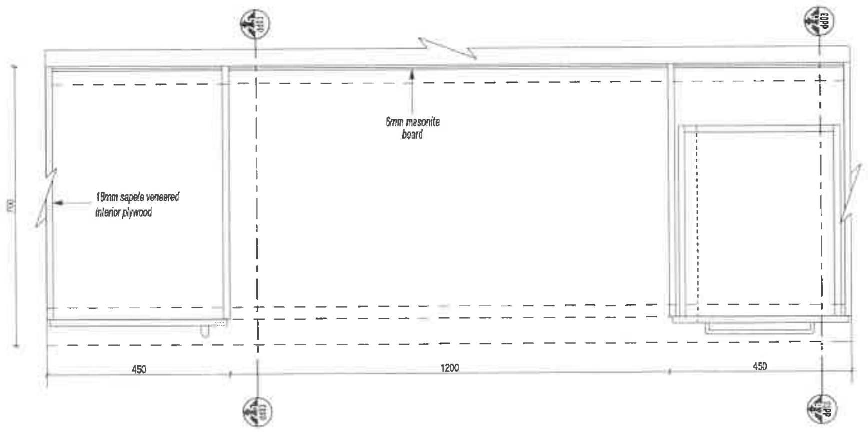
ONLY PLASCON OR DULUX EQUIVALENT PRODUCTS ARE TO BE USED

NO.	DATE	AMENDMENT	D.P.W.

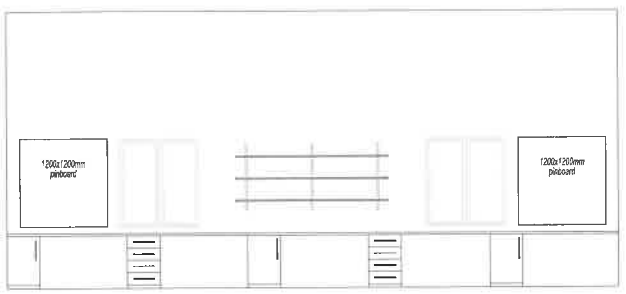
cad file name



2.1 DETAIL PLAN OF RADIO-TECH WORKSHOP
SCALE 1:50



2.3 DETAIL PLAN OF WORKTOP
SCALE 1:10



2.2 ELEVATION
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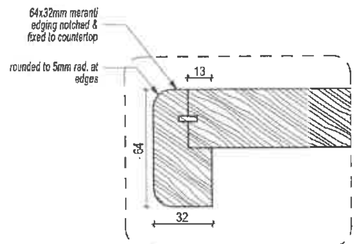
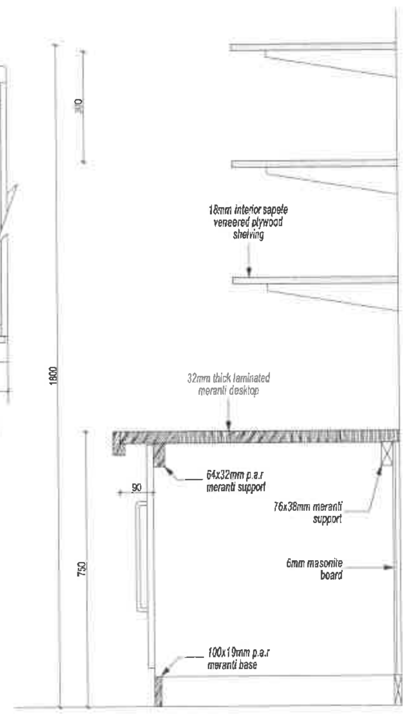


2.4 DETAIL A
SCALE 1:5



2.5 SECTION
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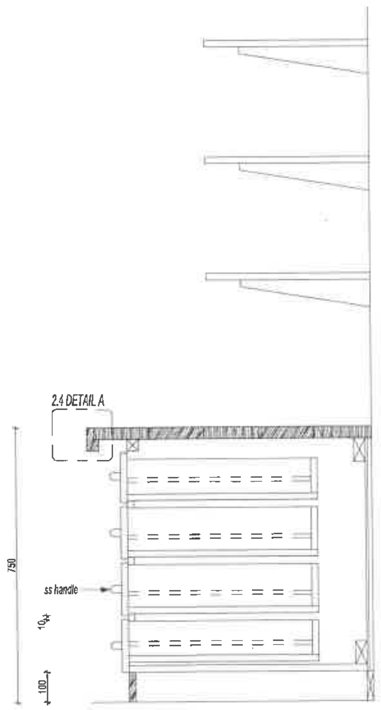


2.5 SECTION
SCALE 1:10

public works
Department: Public Works
REPUBLIC OF SOUTH AFRICA

DIRECTOR-GENERAL
MR. M. MOROKA

consultant

G M KHAN ARCHITECT

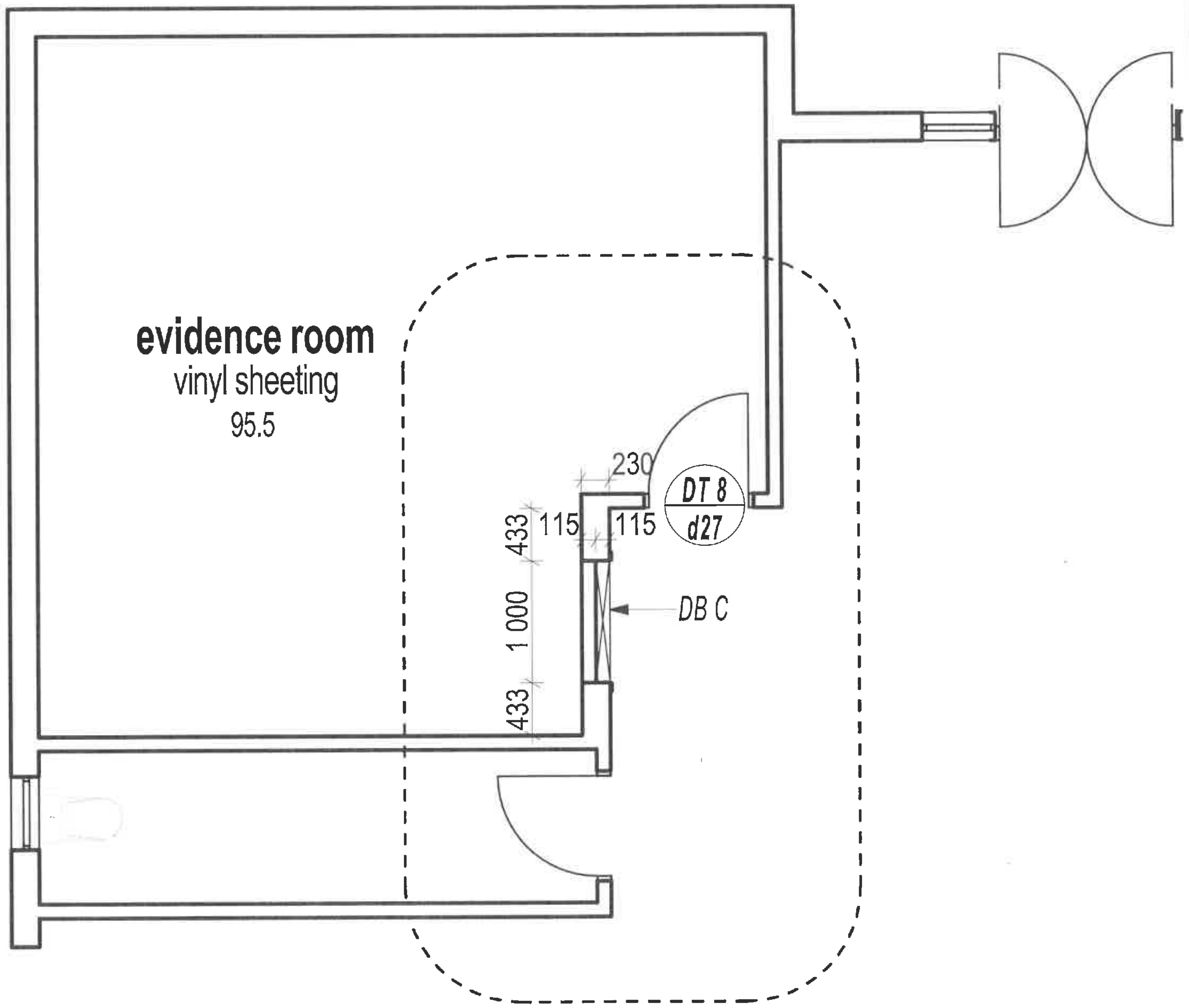
discipline ARCHITECTURAL

service
NTUZUMA SAPS: NEW CCTV BUILDING
on PORTION 1 of ERF 2132 NTUZUMA C

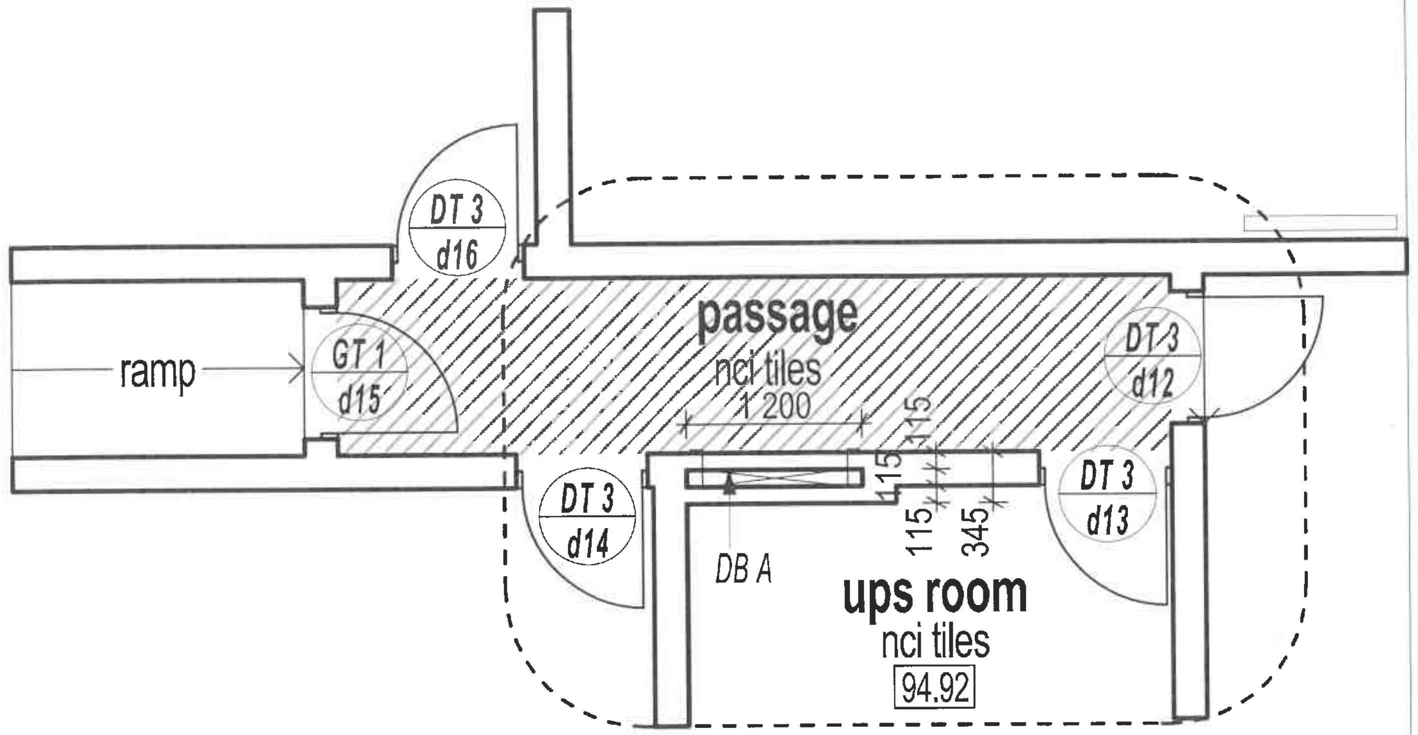
WCS number 046 725

drawing title
DETAIL DRAWING
DETAILS

ref.no	6313/0078/26/5		
scale	as shown	drawn	TS
date	16-09-2011	checked	G.M.K
type number			
drawing number	nsd/dd/03	rev	



1. DETAIL
SCALE 1:50



2. DETAIL
SCALE 1:50

cad file name

public works
Department:
Public Works
REPUBLIC OF SOUTH AFRICA
DIRECTOR-GENERAL
MR. M. MOROKA

consultant
G M KHAN ARCHITECT
P.O. BOX 19128 DORMERTON 4015 REG. NO.:
TELEPHONE: 2073131 FAX: 2073132 S.A.C.A.P: 5212

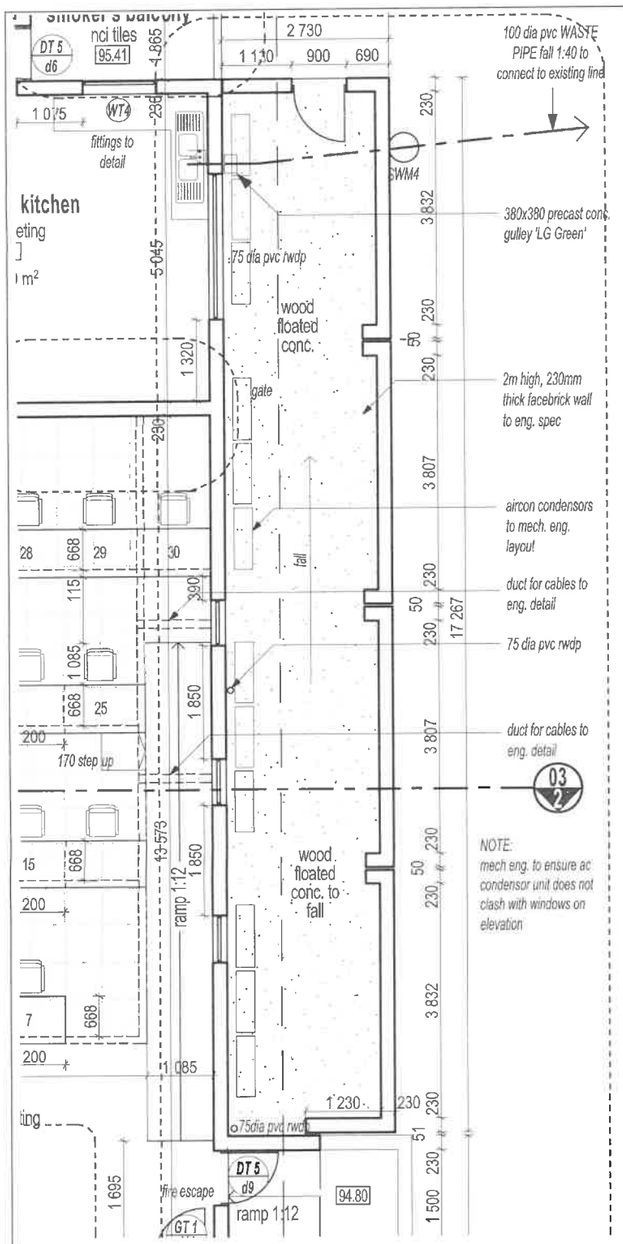
discipline: ARCHITECTURAL

service:
NTUZUMA SAPS: NEW CCTV BUILDING
on PORTION 1 of ERF 2132 NTUZUMA C

WCS number: 046 725

drawing title:
DETAIL DRAWING
DB BOX THRESHHOLD
NEW CCTV BUILDING

ref.no	6313/0078/26/5		
scale	1:50	drawn	A.H.O
date	04-03-2013	checked	G.M.K
type number			
drawing number	nsd/dd/04	rev	

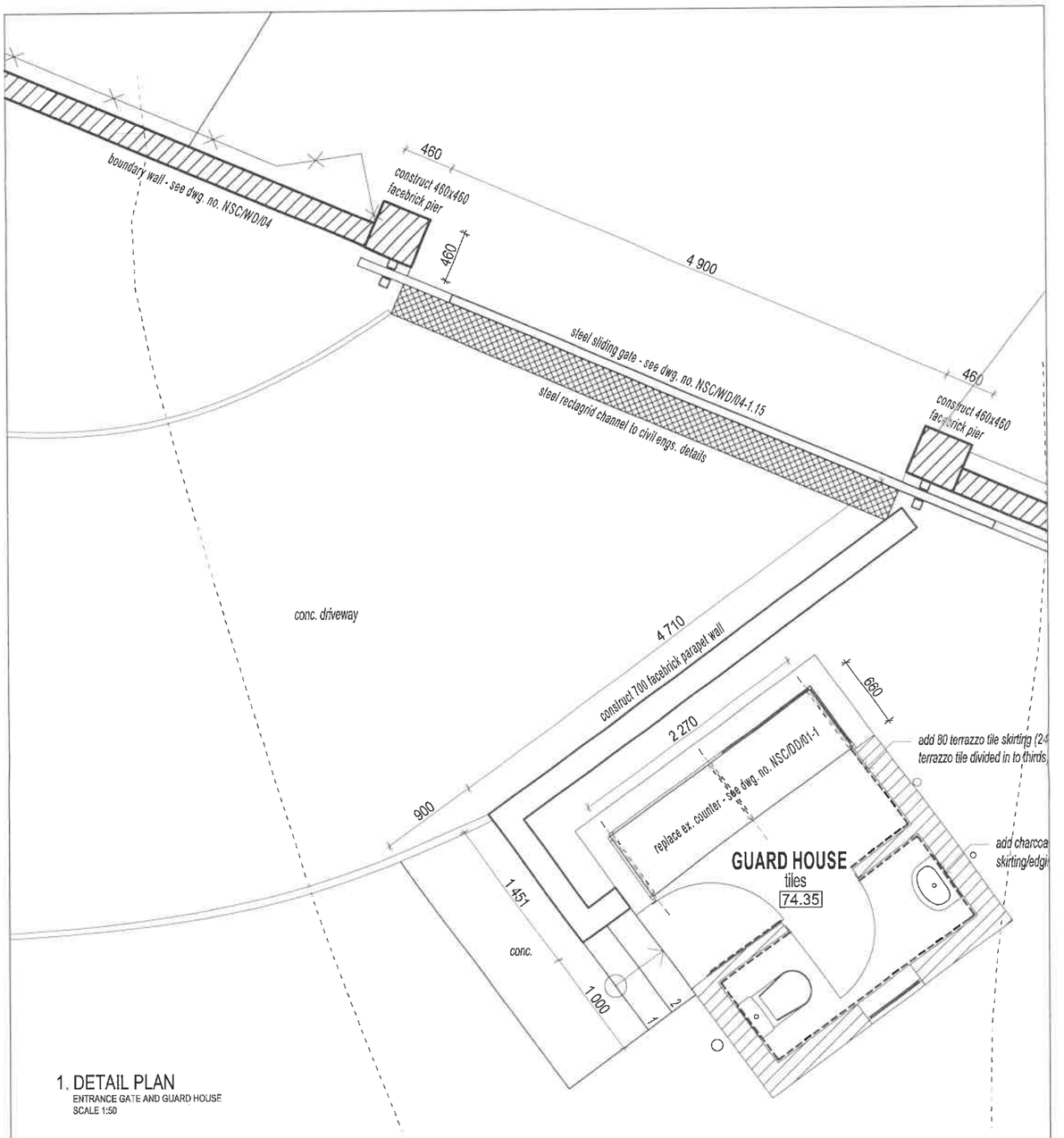


1. PLAN
SERVICE YARD (AIRCONS)
SCALE 1:100

2. SECTION
SECTION THROUGH SERVICE YARD (AIRCONS)
SCALE 1:50

G M KHAN ARCHITECT

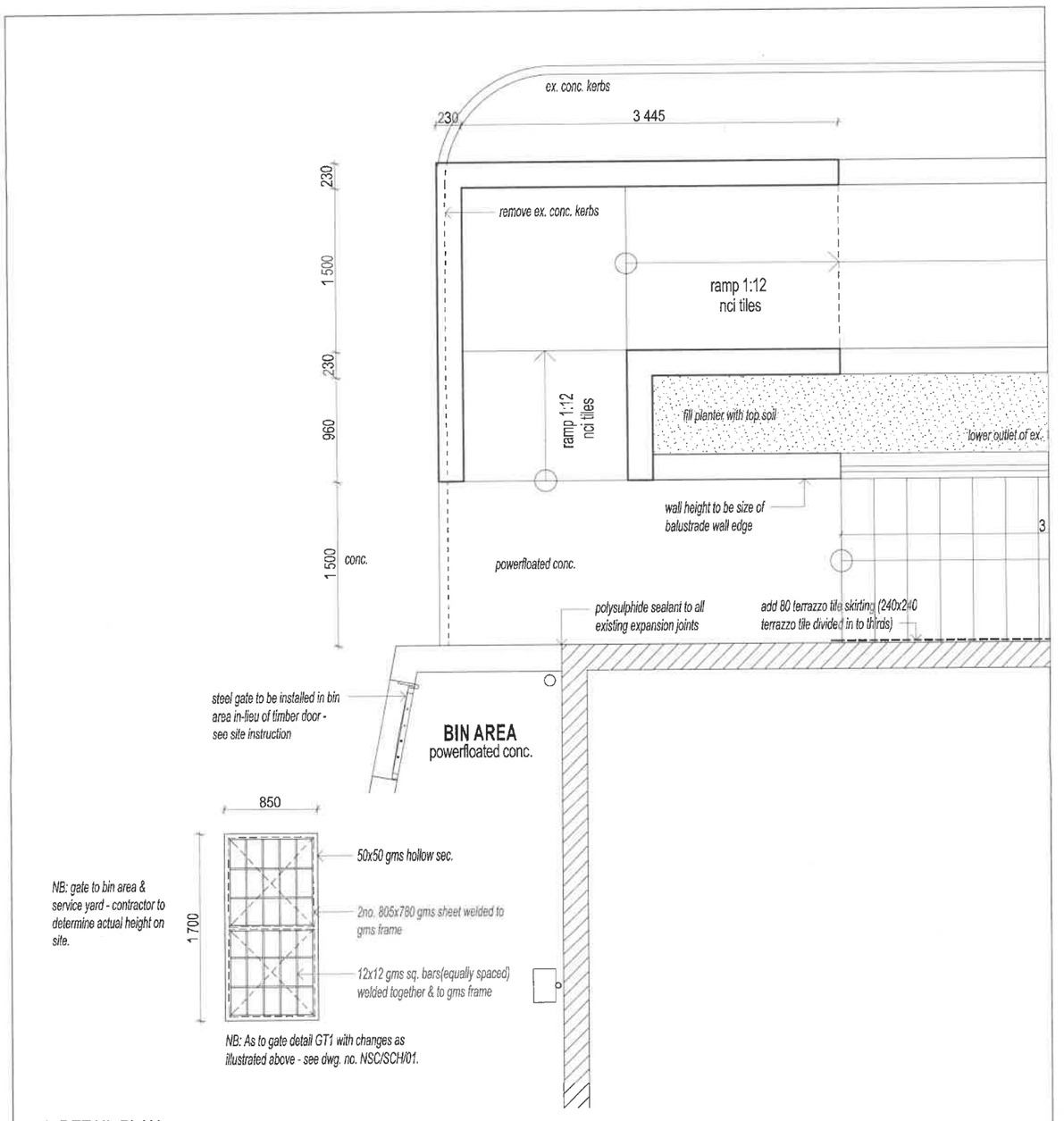
project: NEW CCTV BUILDING					no.	revision	by	date
for: **NTUZUMA SAPS: NEW CCTV BUILDING**								
on: on PORTION 1 of ERF 2132 NTUZUMA C								
project no.	NSC	scale	1:50; 1:100	drawing no.	rev	P.O.BOX 19128 DORMERTON 4015 TELEPHONE : 2073131 FAX : 2073132		REG. NO.: S.A.C.A.P : 5242
designed	G.M.K	date	22-05-2017	nsc/dd/05				
drawn	T.K.M	checked	G.M.K					



1. DETAIL PLAN
ENTRANCE GATE AND GUARD HOUSE
SCALE 1:50

G M KHAN ARCHITECT

project: NEW CCTV BUILDING						no.	revision	by / date
for: NTUZUMA SAPS: NEW CCTV BUILDING								
on: on PORTION 1 of ERF 2132 NTUZUMA C								
project no.	NSC	scale	1:50	drawing no.	rev	P.O.BOX 19128 DORMERTON 4015 TELEPHONE : 2073131 FAX : 2073132		REG. NO.: S.A.C.A.P : 5242
designed	G.M.K	date	22-05-2017	nsc/dd/06				
drawn	T.K.M	checked	G.M.K					

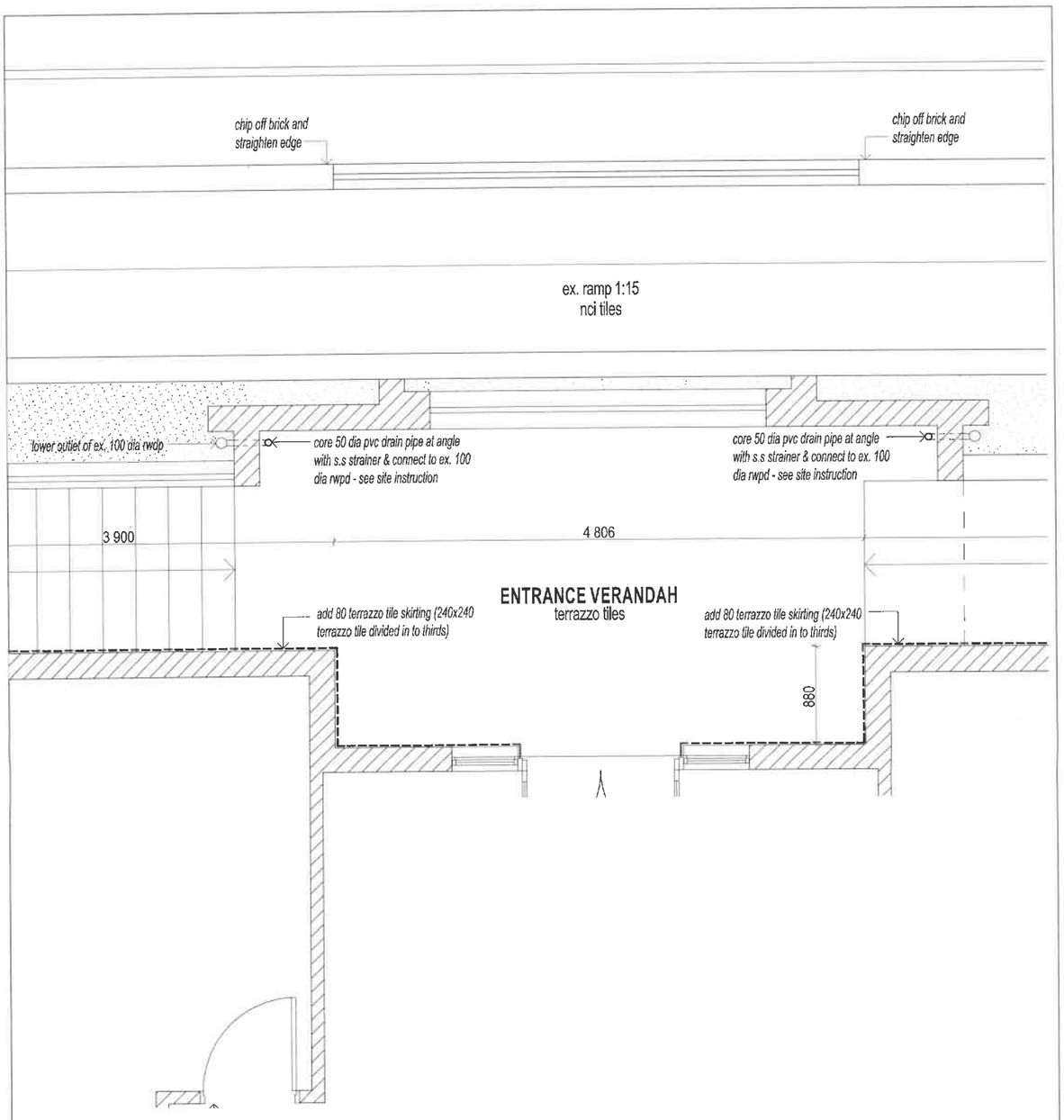


1. DETAIL PLAN

BIN AREA & ENTRANCE RAMP
SCALE 1:50

G M KHAN ARCHITECT

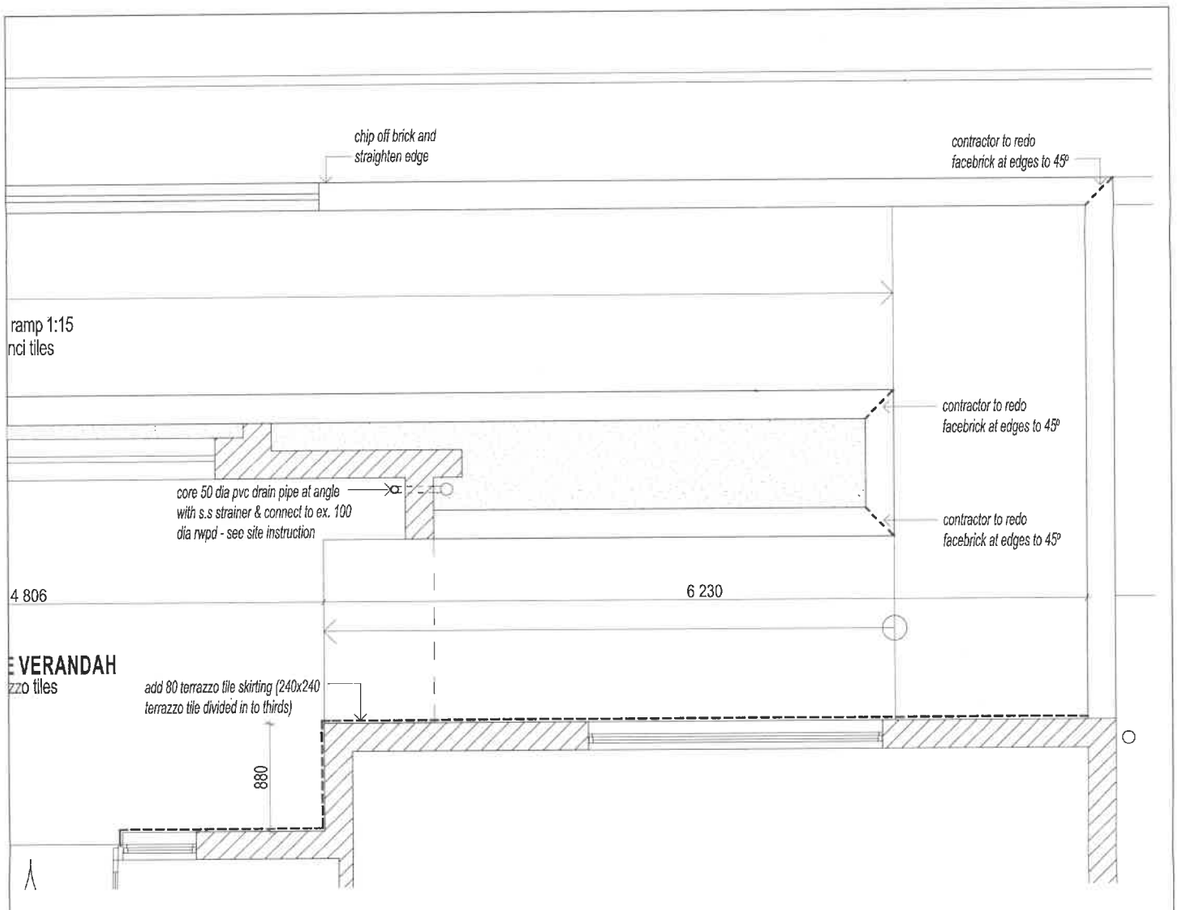
project: NEW CCTV BUILDING						no.	revision	by / date
for: NTUZUMA SAPS: NEW CCTV BUILDING								
on: on PORTION 1 of ERF 2132 NTUZUMA C								
project no.	NSC	scale	1:50	drawing no.	rev	P.O.BOX 19128 DORMERTON 4015 TELEPHONE : 2073131 FAX : 2073132		REG. NO.: S.A.C.A.P : 5242
designed	G.M.K	date	22-05-2017	nsc/dd/07				
drawn	T.K.M	checked	G.M.K					



1. DETAIL PLAN
ENTRANCE VERANDAH
SCALE 1:50

G M KHAN ARCHITECT

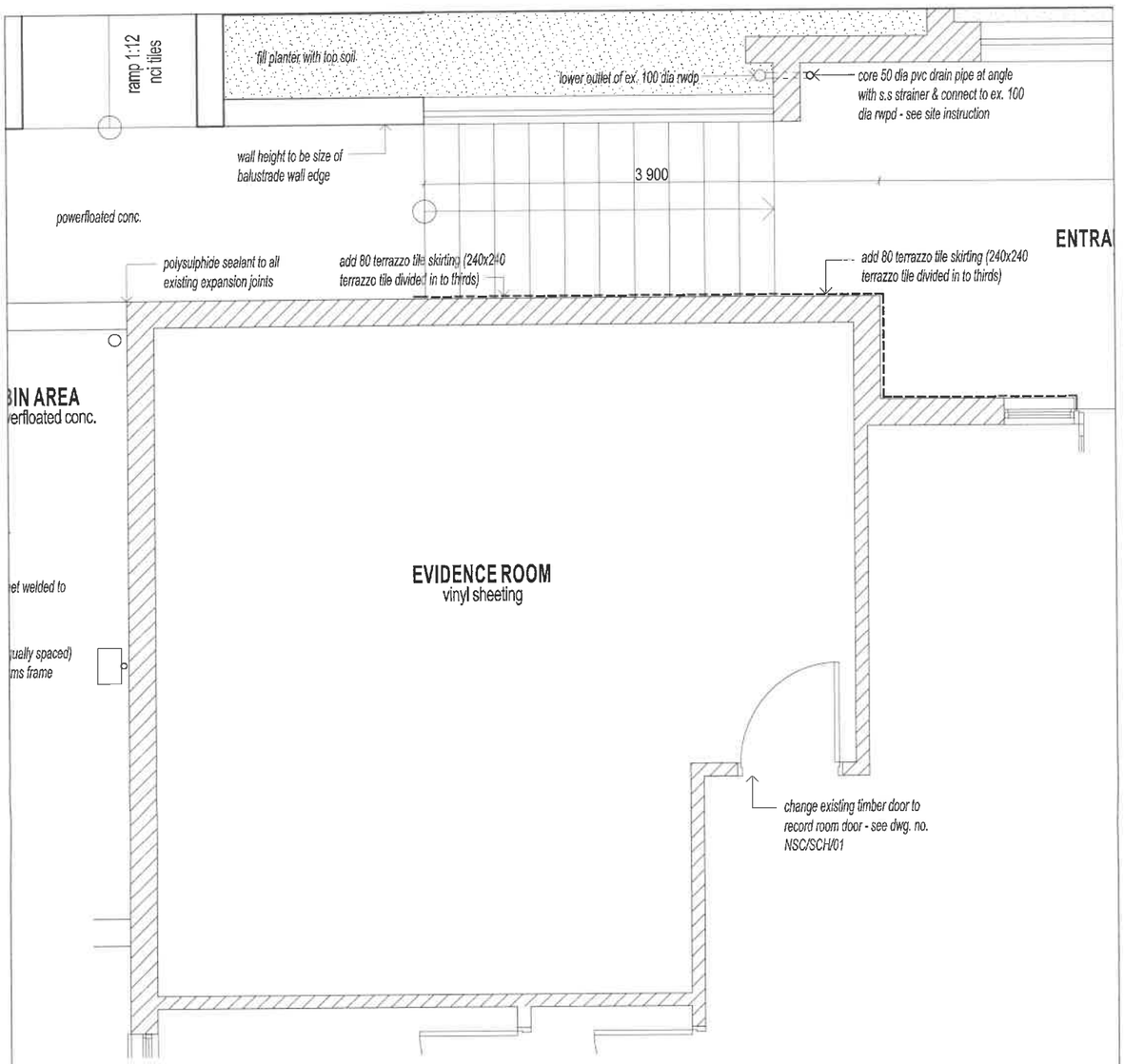
project: NEW CCTV BUILDING						no.	revision	by	date
for: NTUZUMA SAPS: NEW CCTV BUILDING									
on: on PORTION 1 of ERF 2132 NTUZUMA C									
project no.	NSC	scale	1:50	drawing no.	rev	P.O.BOX 19128 DORMERTON 4015 TELEPHONE : 2073131 FAX : 2073132		REG. NO.: S.A.C.A.P : 5242	
designed	G.M.K	date	22-05-2017	nsc/dd/08					
drawn	T.K.M	checked	G.M.K						



1. DETAIL PLAN
ENTRANCE RAMP
SCALE 1:50

G M KHAN ARCHITECT

project: NEW CCTV BUILDING						no.	revision	by / date
for: NTUZUMA SAPS: NEW CCTV BUILDING								
on: on PORTION 1 of ERF 2132 NTUZUMA C								
project no.	NSC	scale	1:50	drawing no.	rev	P.O.BOX 19128 DORMERTON 4015 TELEPHONE : 2073131 FAX : 2073132		REG. NO.: S.A.C.A.P : 5242
designed	G.M.K	date	22-05-2017	nsc/dd/09				
drawn	T.K.M	checked	G.M.K					

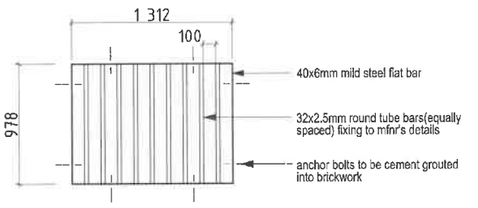


1. DETAIL PLAN
EVIDENCE ROOM
SCALE 1:50

G M KHAN ARCHITECT

project:	NEW CCTV BUILDING					no.	revision	by	date
for:	NTUZUMA SAPS: NEW CCTV BUILDING								
on:	on PORTION 1 of ERF 2132 NTUZUMA C								
project no.	NSC	scale	1:50	drawing no.	rev	P.O.BOX 19128 DORMERTON 4015 TELEPHONE : 2073131 FAX : 2073132			REG. NO.: S.A.C.A.P : 5242
designed	G.M.K	date	22-05-2017	nsc/dd/10					
drawn	T.K.M	checked	G.M.K						

TYPICAL DETAIL



ffl

quantity	
location	All exterior windows as per window schedule
description	Internal gms burglar guard fixed onto wall window openings. Sizes vary
finish	hot dip galvanised

DETAIL No.	SCALE	DETAIL DESCRIPTION	SEE DWG No.
DTL	**1:50**	**BURGLAR GUARD**	

G M KHAN ARCHITECT

project: **NEW CCTV BUILDING**

for: **NTUZUMA SAPS: NEW CCTV BUILDING**

on: on PORTION 1 of ERF 2132 NTUZUMA C

no.	revision	by	date

project no.	NSC	scale	1:50	drawing no.	rev
designed	G.M.K	date	22-05-2017	nsc/dd/11	
drawn	T.K.M	checked	G.M.K		

P.O.BOX 19128 DORMERTON 4015
TELEPHONE : 2073131 FAX : 2073132

REG. NO.:
S.A.C.A.P : 5242

Sanitaryware Fitting

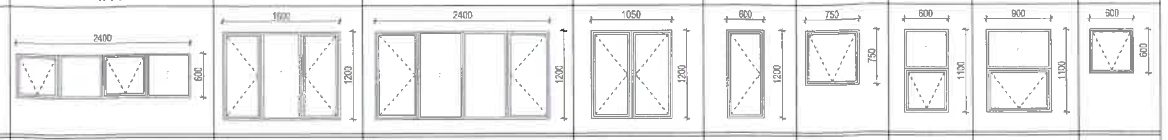
		MALE TOILET	FEMALE TOILET	PARAPLEGIC TOILET	RECEPTION TOILET	KITCHEN & REST AREA
WC	Vaal "Hibiscus" close coupled 90 deg. outlet open rim front single flush suite complete with lid and fitments (code772654)	1	2	-	1	-
URINAL	Vaal wall hung "Lavatera" urinal with top inlet (Code 705426). supplied with 38mm C.P. domical grating , C.P top inlet spreader & two hanger brackets	2	-	-	-	-
PARA. WC	Vaal "Pearl Paraplegic" semi close couple pan & matching 9 litre cistern complete with lid, fitments & purpose made C.P side flush lever (right or left) . Supplied with purpose made urea seat & cover plate.32mm stainless steel side grab rail(codeDL2) & 32mm stainless steel rear grab rail around cistern(code SR2A)	-	-	1	-	-
WHB	Vaal sanware vitreous china 580x410mm "President" oval underslung vanity basin with . with intergrated overflow. with Cobra Star 111-15. heavy pattened pillar tap.1/2"BSP male inlet. Cold & hot indices included.	5	2	-	-	-
WHB	Vaal Vitreous China 510x405mm rounded 'Hibiscus' basin (code 7023) with three semi punched tapholes, bolted to the wall using two 10mm bolts (code 8448Z0). with Cobra Star 111-15. heavy pattened pillar tap.1/2"BSP male inlet. Cold & hot indices included.	-	-	-	1	-
PARA. WHB	Vaal Potteries Vitreous China 510x405mm rounded 'Hibiscus' basin (code 7023) with one taphole, bolted to the wall using two 10mm bolts (code 8448Z0). configuration with Cobra watertech chrome plated " elbow action pillar tap (code 505-21) or equal approved- cold water only	-	-	1	-	-
SINKS	" FRANKE TRENDLINE" Model Double End Bowl DEB 1200x 535mm (code 312081) with Cobra STAR Sink Mixer. pillar type with aerated swivel outlet. 1/2"BSP male inlet. SANS 226 type 1	-	-	-	-	1
TLT ROLL HLDR	Double Toilet Roll Holder STRX672	1	2	1	1	-
SOAP DISH & DISPENSER	"Franke" BS 618 soap dispenser (200 x 130 x 85)	1	1	1	1	-
PAPER TOWEL DISPENSER	"Franke" Paper Towel Dispemser STRX 600	1	1	1	1	-
WASTE BIN	"Franke" Waste Bin STRX 605	1	1	1	1	-
MIRRORS	300x400 mirror	2	2	-	1	-
MIRRORS	900x350 mirror	-	-	1	-	-

Finishing Schedule

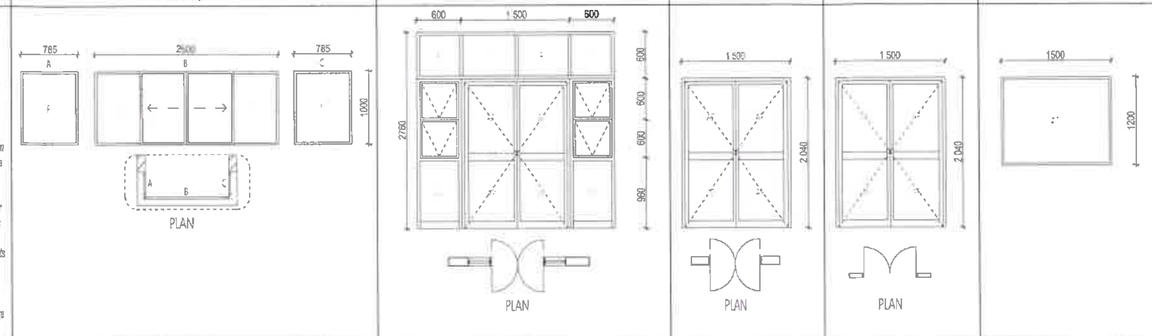
VERANDAH, RAMP & SMOKERS BALCONY	floors	240 x 240 x 12.5mm NCI tiles with 75mm NCI tile skirting
	walls	COROBRIK 'firelight satin' FBX to match ex. station
	ceilings	9.5mm 'EVERITE NUTEC' fibre cement painted with 'PLASCON PVA'
WAITING RM & RECEPTION	floors	2mm thick "Floorworx Colorflor Plus PUR vinyl floor covering" vinyl sheeting & painted meranti skirting
	walls	COROBRIK 'firelight satin' FBX to match ex. station
	ceilings	9.5mm skimmed plaster board ceiling
EVIDENCE ROOM PARADE ROOM OFFICE COMMANDER REST AREA RECORD ROOM RADIO TECH	floors	2mm thick "Floorworx Superflex vinyl floor covering" vinyl sheeting & painted meranti skirting
	walls	plaster & paint with 'PLASCON PVA'
	ceilings	0.6x0.6m acoustic tiles with an exposed tee suspended drop in ceiling with SM25 recessed wall angle
ALL TOILETS	floors	240 x 240 x 12.5mm glazed NCI tiles
	walls	240 x 115 white std. glazed NCI wall tiles to 2.4m high remainder to be plaster & paint with 'PLASCON PVA'
	ceilings	0.6x0.6m acoustic tiles with an exposed tee suspended drop in ceiling with SM25 recessed wall angle
PASSAGE 1&2	floors	2mm thick "Floorworx Colorflor Plus PUR vinyl floor covering" vinyl sheeting & painted meranti skirting
	walls	COROBRIK 'firelight satin' FBX to match ex. station
	ceilings	0.6x0.6m acoustic tiles with an exposed tee suspended drop in ceiling with SM25 recessed wall angle
CCTV ROOM IT CORE ROOM	floors	-NON-SUSPENDED FLOOR 2mm thick "Floorworx Colorflor Plus PUR vinyl floor covering" vinyl sheeting & painted meranti skirting -SUSPENDED FLOOR 'Nexus Zig Zag nexbac tiles. 50x50cm, manuf. from 100% stainproof miracle fibre' carpet on suspended floor system ('solidfeel 25')
	walls	COROBRIK 'firelight satin' FBX to match ex. station
	ceilings	0.6x0.6m acoustic tiles with an exposed tee suspended drop in ceiling with SM25 recessed wall angle
UPS ROOM ELEC.EQUIP. RM LT ROOM	floors	240 x 240 x 12.5mm NCI tiles with 75mm NCI tile skirting
	walls	COROBRIK 'firelight satin' FBX to match ex. station
	ceilings	0.6x0.6m acoustic tiles with an exposed tee suspended drop in ceiling with SM25 recessed wall angle
STORE ROOM	floors	grano
	walls	COROBRIK 'firelight satin' FBX to match ex. station
	ceilings	0.6x0.6m acoustic tiles with an exposed tee suspended drop in ceiling with SM25 recessed wall angle
GENERATOR RM	floors	grano
	walls	COROBRIK 'firelight satin' FBX to match ex. station
	ceilings	9.5mm skimmed plaster board ceiling
GUARD RM	floors	240 x 240 x 12.5mm NCI tiles with 75mm NCI tile skirting
	walls	plaster & paint with 'PLASCON PVA'
	ceilings	9.5mm skimmed plaster board ceiling
DOORS		All doors to be painted with "Plascon VELVAGLO"

NOTES
-ALL BRANDED PRODUCTS TO BE READ AS "OR ALTERNATIVE APPROVED IN WRITING BY ARCHITECT"
-ALL PAINTS TO BE PLASCON OR DULUX

Aluminium windows and doors



ref	WT1	WT2	WT3	WT4	WT5	WT6	WT7	WT8	WT9
quantity	1 of	3 of	1 of	5 of	5 of	3 of	6 of	1 of	1 of
location	parade room	parade room(2no) & office (1no)	rest area & kitchen	LT rm(1no). elec. equip. rm(1no). radio tech(2no), rest area & kitchen	elec. equip. rm(1no). ups rm(1no). IT core rm (1no.), records rm(2no)	cctv room	recep. tl(1no.), male tl (2no), parap. tl(1no). female tl(1no)	store	broom cupboard (1no). guardhouse toilet(1no)
glass	4mm clear glass								
frame finish	powder coated charcoal grey aluminium								
sill	175x15mm painted fibre cement sill (color to be charcoal grey)								

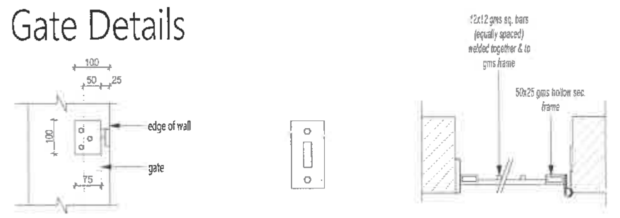


ref	WT10	WT11	WT12	WT13	WT14
quantity	1 of	1 of	1 of	1 of	1 of
location	guard house	entrance door	entrance to cctv room	entrance to passage f	commanders office
glass	4mm clear glass & armour plate where shown				
frame finish	powder coated charcoal grey aluminium				

NOTES
-All glazing to comply with sabs regulations
-All openings to be measured on site prior to manufacture
-Colour sample to be approved by architect
-All windows are shown as viewed from outside
-Sizes shown are to brickwork opening
-Window manufacturer to work on dimensions less 10mm
-All glazing to architects approval

F- fixed glass pane
AP-4mm armour plate glass

Gate Details



Typical hinge detail
scale 1:10

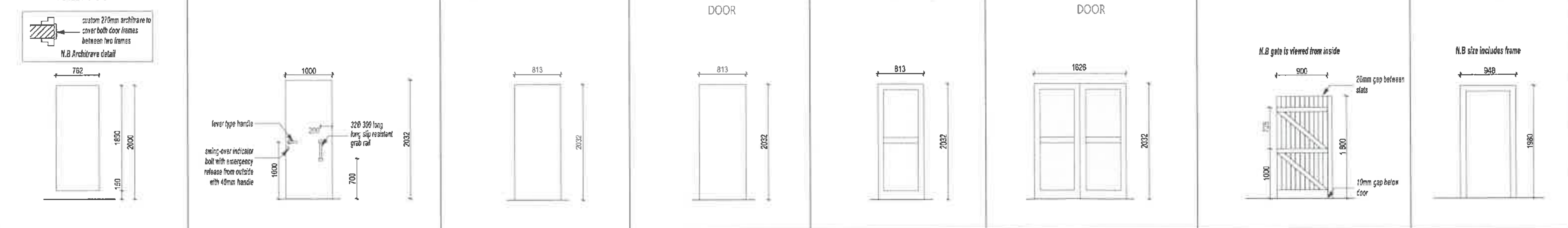
Typical striker plate
scale 1:10

Typical hinge detail
scale 1:10

Door Schedule

scale: 1:50

	DT 1	DT 2	DT 3	DT 4	DT 5	DT 6	DT 7	DT 8
	TOILET DOOR	PARAPLEGIC TOILET DOOR	INTERNAL SOLID CORE DOOR	INTERNAL SEMI-SOLID CORE DOOR	EXT. FRAMED & LEDGED DOOR	EXT. DOUBLE FRAMED & LOUVERED DOOR	EXT. RODENT PROOF GATE	RECORD ROOM DOOR

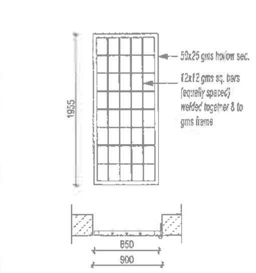


	DT 1	DT 2	DT 3	DT 4	DT 5	DT 6	DT 7	DT 8
door	1850x762x44 flush panel semi-solid core door having 3 concealed edges with hardwood veneer suitable for painting on both faces	2032x1000x44 semi-solid core timber door having 2 concealed edges with hardwood veneer suitable for painting on both faces	2032x813x44 solid core timber door having 2 concealed edges hardwood veneer suitable for painting on both faces	2032x813x44 solid core timber door having 2 concealed edges hardwood veneer suitable for painting on both faces	2032x813x44 meranti framed & ledged door	2032x1626x44 meranti framed & louvered double leaf door	1800x900 meranti ledged gate with 68x19mm slats and braced & ledged with 142x19 & 217x19 meranti on a 108x68 style	1980x948 record room door with a 2 hour fire test rating (size includes frame)
door. finish	Sand, apply 2 coats "Plascon Velvaglo" to manufacturer instruction							
frame	meranti 108 x 68 frame with 40mm architrave(see detail for architrave between two frames)	meranti 108 x 68 frame with 40mm architrave			meranti 108 x 68 frame		n/a	supplied complete with door
fr. finish	Sand, apply 2 coats "Plascon Velvaglo" to manufacturer instruction							
quantity	3 of	1 of	7 of	10 of	3 of	1 of	1 of	1 of
ironmongery	see ironmongery schedule							
location	d20,d23,d24	d21	d10,d12,d13,d14,d16,d17,d18	d2,d3,d4,d5,d7,d19,d22,d25,d26,d31	d6,d9,d30	d29	d28	d27

Gate Schedule

scale: 1:50

	GT 1
	SINGLE GATE



	GT 1
description	single gate with hinges & security lock
finish	hot dip galvanised
lockset	see ironmongery shedule (marked as d11)
hinge	hot dip galvanised see dwg
quantity	2 of
location	d11, d15

NO.	DATE	AMENDMENT	D.P.W.

cad file name

public works
Department:
Public Works
REPUBLIC OF SOUTH AFRICA

DIRECTOR-GENERAL
MR. M. MOROKA

consultant
G M KHAN ARCHITECT
P. O. BOX 19128 DORMERTON 4015 REG. NO.: TELEPHONE : 2073131 FAX : 2073122 S.A.C.A.P : 5242

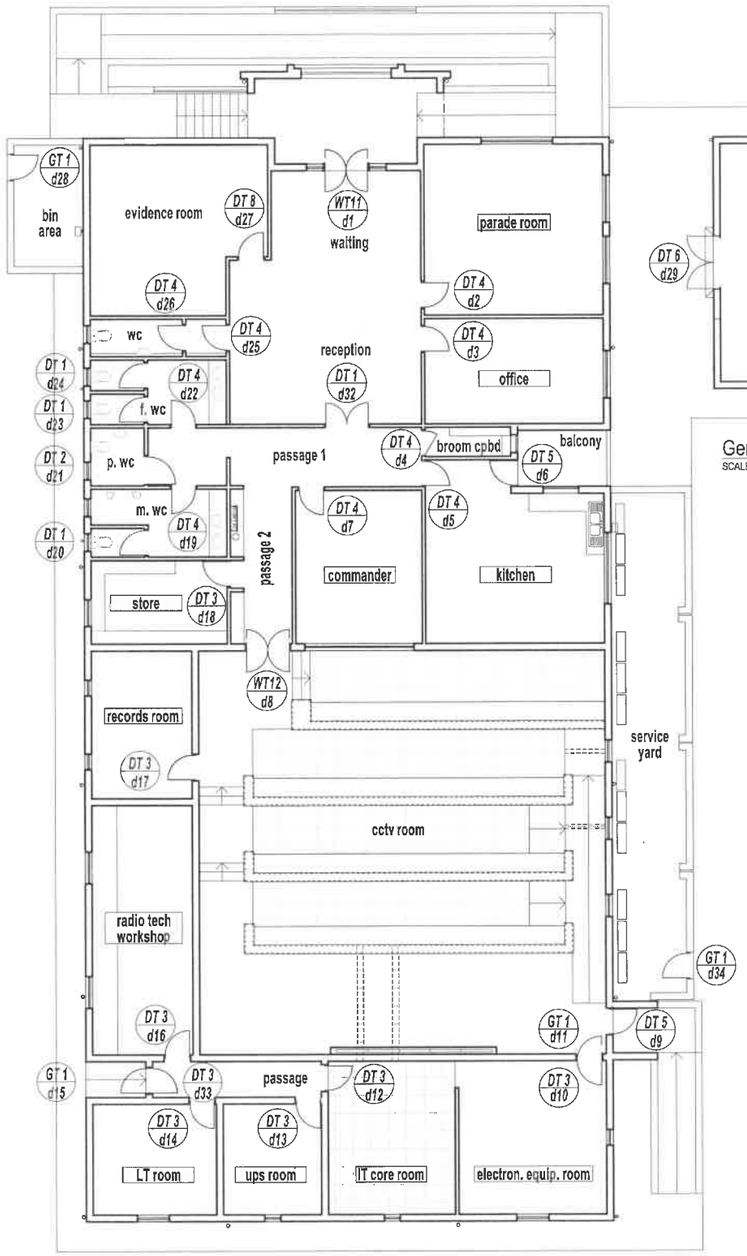
discipline: ARCHITECTURAL

service: **NTUZUMA SAPS: NEW CCTV BUILDING on PORTION 1 of ERF 2132 NTUZUMA C**

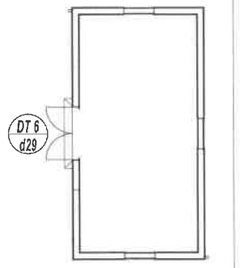
WCS number: 046 725

drawing title:
SHEDULES
DOOR, GATE, WINDOW, SANWARE & FINNISHING SCHEDULE

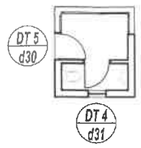
ref.no	6313/0078/26/5		
scale	as shown	drawn	TS
date	01-09-2011	checked	G.M.K
type number			
drawing number	nsd/sch/01	rev	



CCTV Room Plan
SCALE 1:200



Generator Room Plan
SCALE 1:200



Guard House Plan
SCALE 1:200

10

15mm font 'Arial' centered - colour 'black'

30 x 30 x 2mm thick plastic door tag - colour 'light grey'

Notes:
Door tag to be fixed to door by clear silicone adhesive at 1.7m high.
Door tag to be centralized and square to door x-y planes.
Door tags on gates and al. doors to be fixed to top of frame.

Door Tag Elevation
SCALE 1:10

Key Tag Specification

All sets of keys to be fitted with multicoloured MTS plastic key tags referenced by door tag no.

15mm font 'Arial' centered - colour 'black'

50 x 250 x 1.5mm thick interchangable al. wall holder - colour 'light grey'

Door Tag

ELECTRONICS EQUIPMENT ROOM

Wall Holder Elevation
SCALE 1:10

Note: Wall holder to be fixed to door by clear silicone adhesive below door tag. Door tag to be centralized and square to door x-y planes.

Ref	Door Tag	Wall Holder	Wall Holder Description
d1	●		
d2	●●	●	PARADE ROOM
d3	●	●	OFFICE
d4	●		
d5	●	●	OFFICE
d6	●		
d7	●	●	COMMANDER
d8	●●		
d9	●		
d10	●	●	ELECTRONICS EQUIPMENT ROOM
d11	●		
d12	●	●	IT CORE ROOM
d13	●	●	UPS ROOM
d14	●	●	LT ROOM
d15	●		
d16	●	●	RADIO TECH WORKSHOP
d17	●	●	RECORDS ROOM
d18	●	●	STORE ROOM
d19			
d20			
d21			
d22			
d23			
d24			
d25	●		
d26			
d27	●		
d28	●		
d29	●		
d30	●		
d31			
d32	●●		
d33	●		
	27	11	QTY

public works

Department:
Public Works
REPUBLIC OF SOUTH AFRICA

DIRECTOR-GENERAL
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discipline
ARCHITECTURAL

service

NTUZUMA SAPS: NEW CCTV BUILDING
on PORTION 1 of ERF 2132 NTUZUMA C

WCS number
046 725

drawing title

WORKING DRAWING
ELEMENT NUMBERING
NEW CCTV BUILDING

ref.no	6313/0078/26/5		
scale	1:200	drawn	KTM
date	29-07-2019	checked	KTM
type number			
drawing number	nsc/sch/03	rev	

NO.	DATE	AMENDMENT	D.P.W.

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Department:
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TELEPHONE : 2073131 FAX : 2073132 S.A.C.A.P : 5242

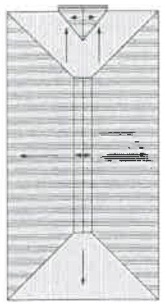
discipline ARCHITECTURAL

service
NTUZUMA SAPS: NEW CCTV BUILDING
on PORTION 1 of ERF 2132 NTUZUMA C

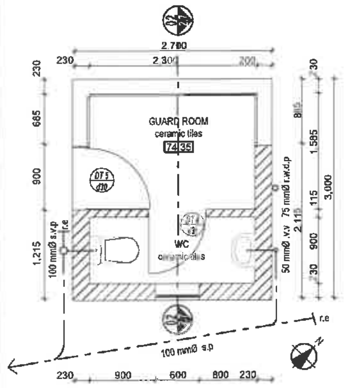
WCS number 046 725

drawing title
WORKING DRAWING
SITE PLAN
NEW CCTV BUILDING

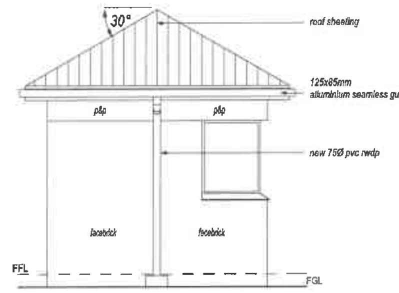
ref.no 6313/0078/26/5
scale 1:500
drawn TS
date 18-08-2011
checked G.M.K
type number
drawing number nsc/wd/01
rev



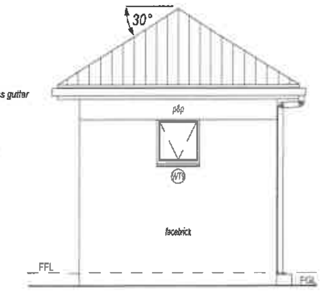
1. Roof Plan
SCALE 1:500



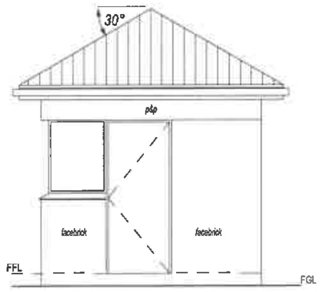
2.1 Guard House Plan
SCALE 1:50



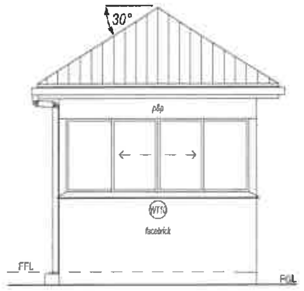
2.2. NORTH ELEVATION
SCALE 1:50



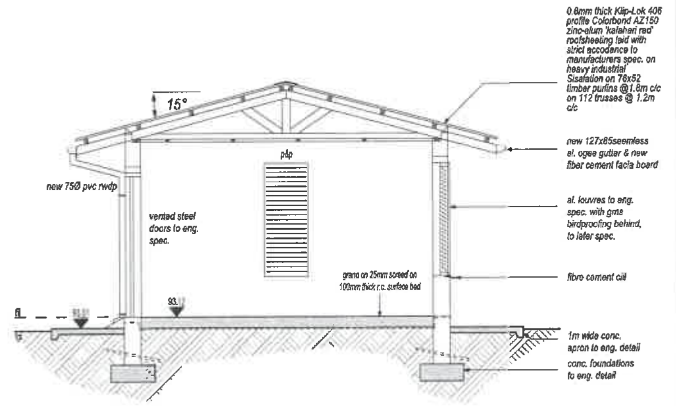
2.3 EAST ELEVATION
SCALE 1:50



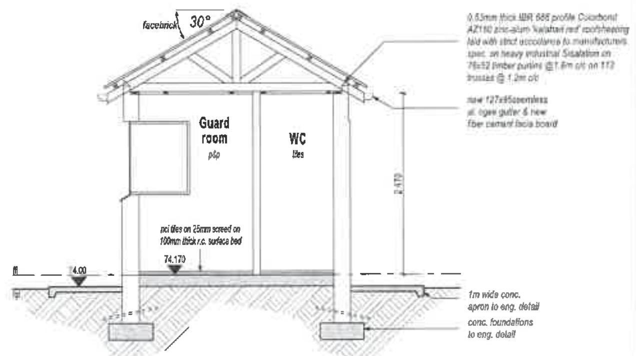
2.5 SOUTH ELEVATION
SCALE 1:50



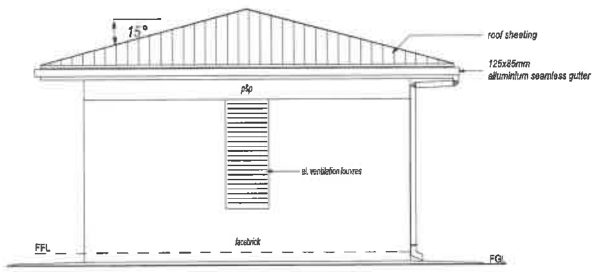
2.6 WEST ELEVATION
SCALE 1:50



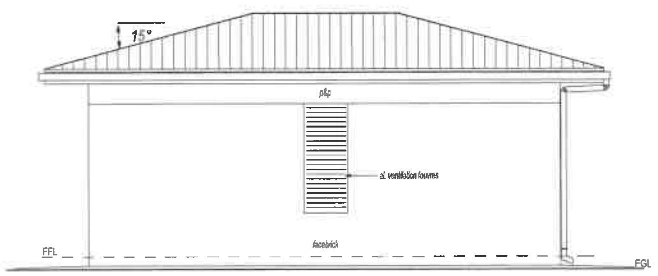
3.1 SECTION
SCALE 1:50



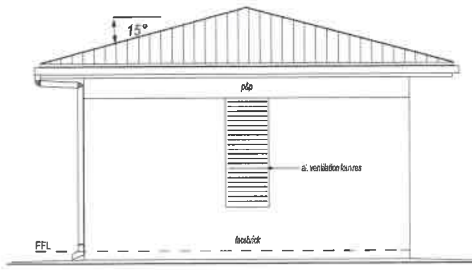
2.7 SECTION
SCALE 1:50



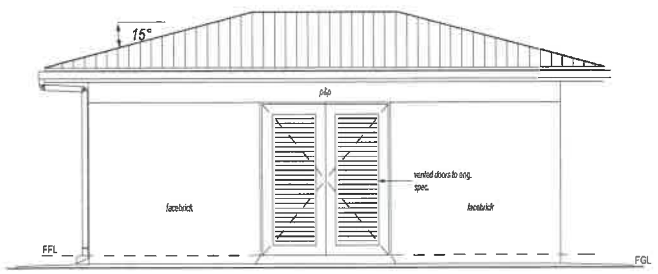
3.1 NORTH ELEVATION
SCALE 1:50



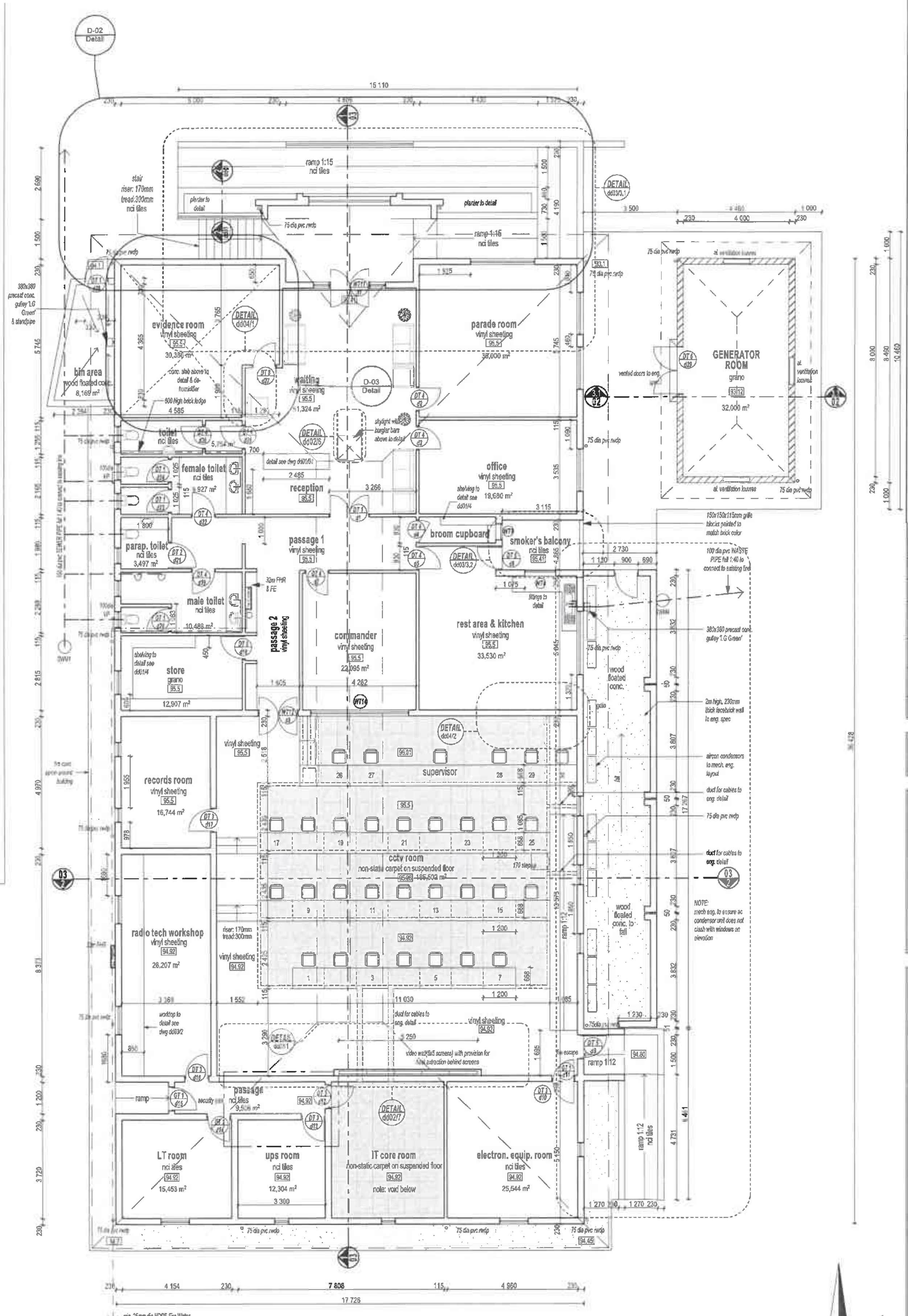
3.2 EASTELEVATION
SCALE 1:50



3.3 SOUTH ELEVATION
SCALE 1:50



3.4 WEST ELEVATION
SCALE 1:50



3. CCTV Room & Generator Room Floor Plan
SCALE 1:100

SHEDULE OF AREAS

waiting & reception	51.3 m²	
evidence room	30.3 m²	
office	20.1 m²	
parade room	35.3 m²	
toilets(all)	29.3 m²	
smoker balcony	6.5 m²	
rest area & kitchen	33.5 m²	
commander's office	22.9 m²	
store	12.9 m²	
cctv room & electron. equip. room	211.0 m²	
records room	16.7 m²	
IT core room	21.9 m²	
radio tech workshop	28.2 m²	
ups room	12.3 m²	
LT room	15.4 m²	539.0 m²
verandah & passages broom cupboard walls		157.8 m²
total area cctv bldg (incl. all spaces)	703.8 m2	
generator room	24 m2	
guard house	12.25 m2	
total developed area	740 m2	

NO.	DATE	AMENDMENT	D.P.W.

cad file name

public works
Department: Public Works
REPUBLIC OF SOUTH AFRICA

DIRECTOR-GENERAL
MR. M. MOROKA

consultant
G M KHAN ARCHITECT
P. O. BOX 19128 DORMERTON 4015 REG. NO.:
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discipline: ARCHITECTURAL

service: NTUZUMA SAPS: NEW CCTV BUILDING on PORTION 1 of ERF 2132 NTUZUMA C

WCS number: 046 725

drawing title:
WORKING DRAWING
CCTV ROOM FLOOR PLAN, PLANS, SECTIONS & ELEVATIONS OF GUARD HOUSE & GENERATOR ROOM
NEW CCTV BUILDING

ref.no 6313/0078/26/5
scale 1:100 drawn TS
date 02-08-2022 checked G.M.K
type number
drawing number nsc/wd/02 rev

CONSTRUCTION NOTES:

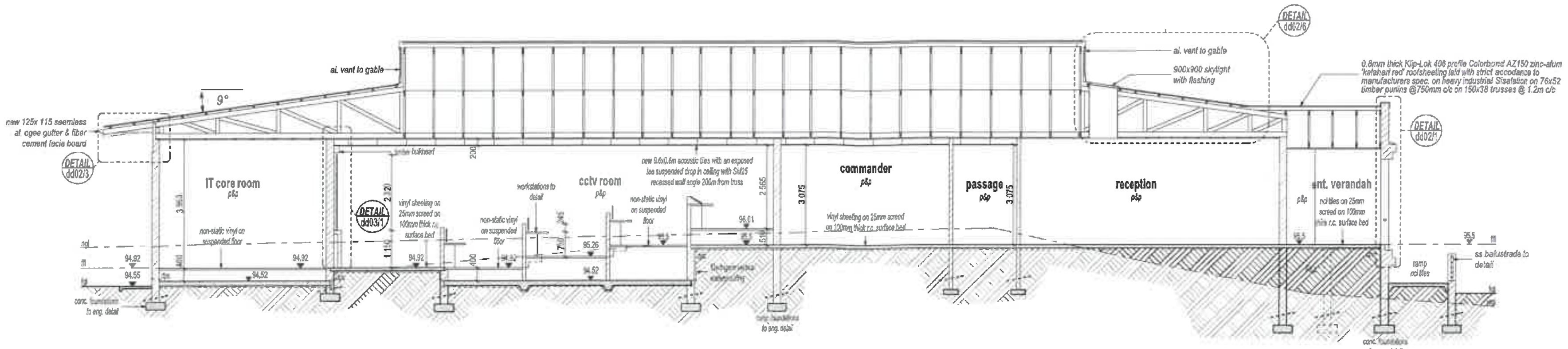
FLOOR CONSTRUCTION:
-100mm r.c slab on 250 micron b.r.c mesh on well compacted & poisoned earth
-slab to be 150mm thick where stated
-all to structural eng. spec.

ROOF CONSTRUCTION:
-roof @ 9° pitch(45° at ridge) with 0.8mm thick Klip-Lok 406 profile Colorbond AZ150 zinc-alum 'kalahari red' roofsheeting laid with strict accodance to manufacturers spec. on heavy industrial Sisalation on 76x52 timber purlins @750m c/c on 150x38 trusses @ 1.2m c/c .to specialist engineers design to be approved by clients engineer, on 114x 38 wall plate &
fixed down by gms hoop iron into 5 courses of brickwork

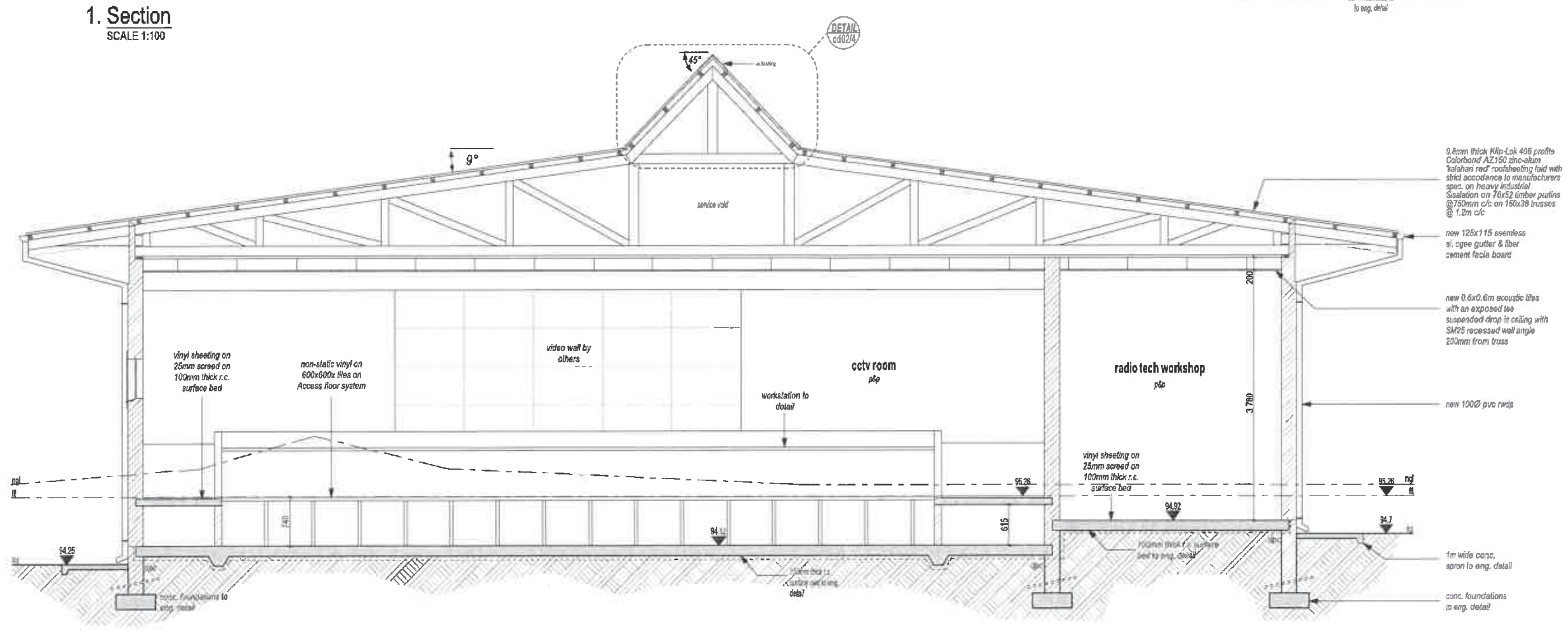
CEILING CONSTRUCTION:
-NON-SUSPENDED CEILING
9.5mm skimmed plaster board ceiling fixed to 38 x 50 brandering
at 400 centres
brandering to be lock fixed with 38 x 38 x 150 mm battens
-SUSPENDED CEILING
new 0.6x0.6m acoustic tiles with an exposed tee suspended drop in ceiling with SM25 recessed wall angle 200mm from truss
N.B ceiling tiles to be fibre cement in Smokers balcony & Entrance portico

WINDOWS:
-Powder coated charcoal grey alumunium windows with fiber cement sill & 115mm wide textured plasterband around, colour to be specified by architect later
-All windows are to have gms burglar bars to detail including rooflight and burglar gates to be shown on plan

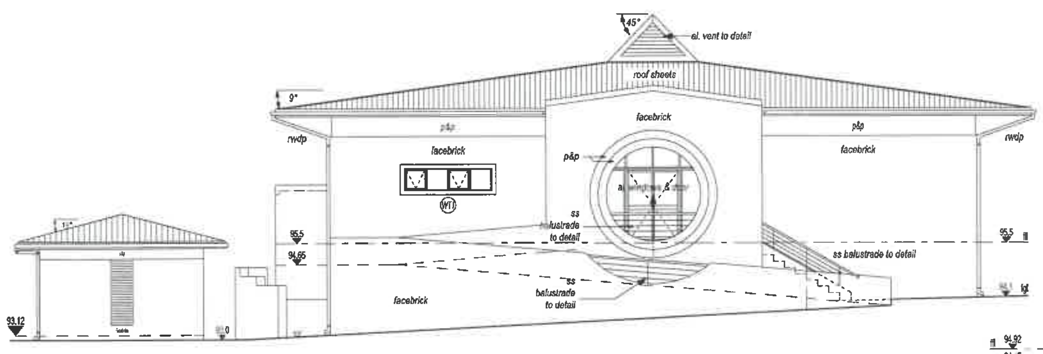
RAINWATER GOODS:
-125x115 seamless al. ogee gutter fixed to 10mm fc fascie board with 100mm pvc down pipe
-1m conc. apron around building



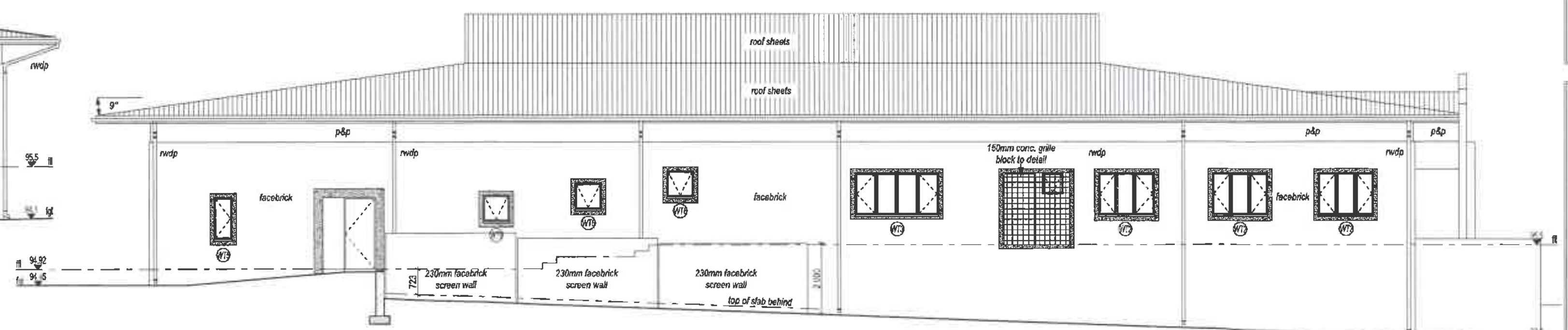
1. Section
SCALE 1:100



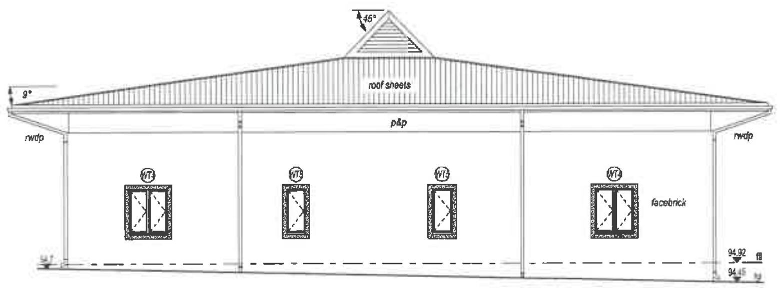
2. Section
SCALE 1:50



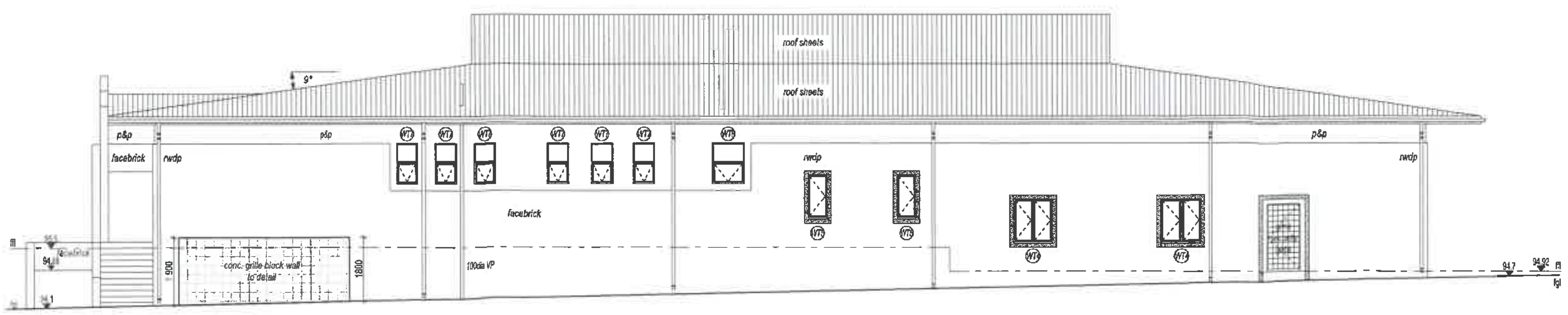
3. North Elevation
SCALE 1:100



4. East Elevation
SCALE 1:100



5. South Elevation
SCALE 1:100



6. West Elevation
SCALE 1:100

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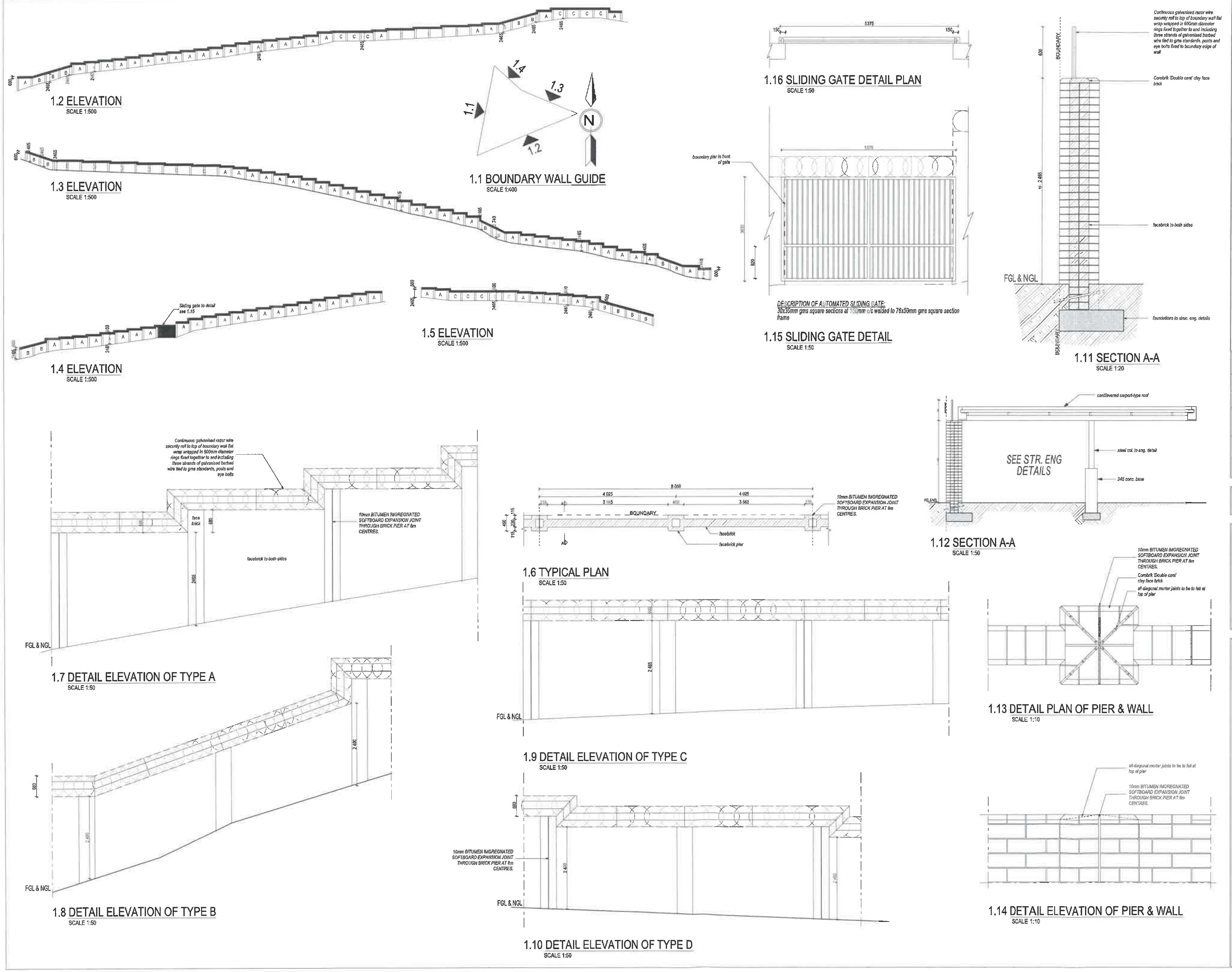
service: NTUZUMA SAPS: NEW CCTV BUILDING on PORTION 1 of ERF 2132 NTUZUMA C

WCS number: 046 725

drawing title:
WORKING DRAWING
SECTIONS & ELEVATIONS
NEW CCTV BUILDING

ref.no: 6313/0078/26/5
scale: 1:100 | drawn: TS
date: 01-09-2011 | checked: G.M.K
type number:
drawing number: nsc/wd/03 | rev:


1.1 BOUNDARY WALL GUIDE
SCALE 1:400
1.2 ELEVATION
SCALE 1:500
1.3 ELEVATION
SCALE 1:500
1.4 ELEVATION
SCALE 1:500
1.5 ELEVATION
SCALE 1:500
1.6 TYPICAL PLAN
SCALE 1:50
1.7 DETAIL ELEVATION OF TYPE A
SCALE 1:50
1.8 DETAIL ELEVATION OF TYPE B
SCALE 1:50
1.9 DETAIL ELEVATION OF TYPE C
SCALE 1:50
1.10 DETAIL ELEVATION OF TYPE D
SCALE 1:50
1.11 SECTION A-A
SCALE 1:20
1.12 SECTION A-A
SCALE 1:50
SEE STR. ENG DETAILS
1.13 DETAIL PLAN OF PIER & WALL
SCALE 1:10
1.14 DETAIL ELEVATION OF PIER & WALL
SCALE 1:10
1.15 SLIDING GATE DETAIL
SCALE 1:50
DESCRIPTION OF AUTOMATED SLIDING GATE:
1.16 SLIDING GATE DETAIL PLAN
SCALE 1:50
FGL & NGL

NO.	DATE	AMENDMENT	D.P.W.

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WCS number 046 725

drawing title
WORKING DRAWING
BOUNDARY WALL SECTIONS, ELEVATIONS & DETAILS

ref.no 6313/0078/26/5
scale as shown — drawn TS
date 18-08-2011 — checked G.M.K
type number
drawing number nsc/wd/04 — rev