SPECIFICATION TO ESTABLISH A PANEL OF QUALIFIED SUPPLIERS, FOR THE PROVISION OF CLOSED CIRCUIT TELEVISION (CCTV) AND ACCESS CONTROL SYSTEMS FOR THE SOUTH AFRICAN POLICE SERVICE (SAPS) NATIONALLY FOR A PERIOD OF FIVE (5) YEARS

DESCRIPTION		COMPLY/ DO NOT COMPLY
10	**OPTIONAL MAINTENANCE CONTRACT**	
10.1	All installations shall be accompanied by a 3-year maintenance contract at least at the level of **Platinum**, please take note that it is the intention that the maintenance contract will kick-off after the warrantee period of the system is reached.	
10.2	Bidders must provide an example of a detailed maintenance contract offered including pricing models for the different type of systems.	

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SPECIFICATION APPROVAL PAGE:

End User Approval

BRIGADIER
Division Technology Management Services: Converged Communication Services

Date: 2023-11-03

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SAPS Access Layer Site
Cabling Infrastructure Standard

Version	:	**5.0**
Revision date	:	**2022-11-11**

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Notice

Amendment history

Revision	Date	CCR number	RFS number	Change comment
1.a	2006-12-20	N/A	N/A	New Release
1.b	2007-03-14	N/A	N/A	3.1.3.3; 3.1.1
1.c	2008-02-20	N/A	N/A	6.3; 6.1.5; entire document
1.d	2009-07-29	N/A	N/A	Update technology and services
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5.0	2022-11-11	N/A	N/A	Updates on various aspects of the document

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Approval page

The signatories hereof, being duly authorised thereto, by their signatures, hereto authorise the execution of the work detailed herein, or confirm their acceptance of the contents hereof and authorise the implementation/adoption thereof, as the case may be, for and on behalf of the parties represented by them.

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Conventions

Type	Application
Text	Microsoft Word
Figures	Visio

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Abbreviations and acronyms

Abbreviation/Acronym	Definition
AC	Alternating Current
ACCU	Air-conditioner Controller Unit
AMP	Ampere
ANSI	American National Standards Institute
DCab	Distribution Cabinet
BoM	Bill of Material
BUS	Bidirectional Universal Switch
CCA	Copper, Chrome and Arsenic
CD	Campus Distributor
dB	Decibel
DB	Distribution Board
DHCP	Dynamic Host Configuration Protocol
EIA	Electronic Industries Alliance
EMI	Electro-Magnetic Interference
ETC	Electro Technical Commission
EUE	End User Equipment
FD	Floor Distributor
FIN	Financial
HR	Human Resources
ICT	Information Communication Technology
ICTU	Information Communication Technology Unit
ID	Identity
IEC	International Electro-technical Commission
IETC	International Electro Technical Commission
IMS	Information Management Systems
IO	Input / Output
IP	Internet Protocol
IRB	Institutional Review Board
ISO	International Organisation for Standardisation
IT	Information Technology
J-STD	Joint Standard
KVA	Kilo Volt Amperes
LAN	Local Area Network
LED	Light Emitting Diode

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Abbreviation/Acronym	Definition
NM	Nanometre
NTU	Network Termination Unit
OEM	Original Equipment Manufacturer
ohms	Measuring unit of electrical resistance
OSP	Outside Plant
OTDR	Optical Time Domain Reflector Meter
PBX	Private Branch Exchange
PDU	Power Distribution Unit
PE	Protective Conductor
POE	Power Over Ethernet
PVC	Polyvinyl Chloride
RFID	Radio Frequency Identification
RFS	Request for Service
SABS	South African Bureau of Standards
SANS	South African National Standards
SAPS	South African Police Service
SCM	Supply Chain Management
SITA	State Information Technology Agency
SNMP	Simple Network Management Protocol
SQL	Structured Query Language
STP	Shielded Twisted-Pair
TCP	Transmission Control Protocol
TIA	Telecommunications Industry Association
TMS	Technology Management Services
UPS	Uninterruptible Power Supply
UTP	Unshielded Twisted Pair
UV	Ultra Violet
V	Volt
VAC	The same as Alternating Current (Voltage)
WAN	Wide Area Network

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Terms and definitions

Term	Definition
Campus Distributor	Core Cabinet housing the Data carrier, Router and Server equipment.
Building Distributor	Where a Site consist of a Campus network and the building not housing the Core cabinet require an additional Distribution Cabinets because of the size and the Equipment requirement.
Floor Distributor	Standard Distribution Cabinet
KWh	If energy is transmitted or used at a constant rate (power) over a period of time, the total energy in kilowatt hours is equal to the power in kilowatts multiplied by the time in hours
(ISM band) communications.	(ISM band) refers to a group of radio bands or parts of the radio spectrum that are internationally reserved for the use of radio frequency (RF) energy intended for scientific, medical and industrial requirements rather than for communications.

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1 Introduction

1.1 Purpose

1.1.1 The purpose of this document is to outline the SAPS cabling standard that shall be used for the implementation of the structural cabling at SAPS sites.

1.2 Scope

1.2.1 This standard document addresses the following key areas:

1.2.1.1 Electrical and data reticulation for Network and EUE architecture;

1.2.1.2 Wi-Fi, cabling infrastructure and architecture;

1.2.1.3 Backup power, cooling and surge protection;

1.2.1.4 Roles and Responsibilities;

1.2.1.5 Documentation; and

1.2.1.6 Cabinets layout.

1.3 Regulations

1.3.1 The following international, national, industry and government regulations shall be applicable:

1.3.1.1 ISO/IEC 11801 Edition 2: 2017: Cabling UTP and STP Category 6a and 7, Transmission performance and Fibre cable and connectors.

1.3.1.2 SABS 0142 and SANS 10142-2-2018: Electrical reticulation.

1.3.1.3 SANS 1200 and Telkom Specification 325R: Civil Works. Standards for civil works in Dolomite areas.

1.3.1.4 ANSI/TIA/EIA-569-B: Commercial building standards for telecommunication pathways and spaces.

1.3.1.5 ANSI J-STD-607-B: Commercial building grounding (earthling) and bonding requirements for telecommunications, 2002.

1.3.1.6 ANSI/TIA/EIA-758: Customer-owned outside plant telecommunications cabling standard, 2015.

1.4 Confidentiality statement

1.4.1 The information data and drawing embodied in this document are strictly confidential and are supplied on the understanding that they will be held confidentially and not disclosed to third parties without the prior written consent of SAPS TMS.

2 Roles and responsibilities

2.1 User requirement

2.1.1 Site visits will be requested by SAPS and arranged by SITA.

2.1.2 These site visits will be conducted by the cabling vendor or representative who must be accompanied by the SITA and SAPS TMS representatives. These representatives must indicate to the cabling vendor the requirements for each site.

2.1.3 The requirement baseline and design must be accepted and signed-off by the SITA, SAPS TMS representatives, and the applicable Vendor. Station commanders or duly authorized SAPS delegated member from the station to sign as well.

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2.1.4 SAPS TMS need to be involved in all the scoping meetings with Facility Management during the development of new police stations/repairs and renovations.

2.2 Storage facilities

2.2.1 Storage facilities shall be negotiated with the SAPS TMS by the SITA project managers, on a case by case basis, if required. If there is no storage facility available the vendors need to supply their own storage at the vendors cost.

2.2.2 Storage can be negotiated based on the following terms:

2.2.2.1 Storage required for equipment used during an installation.

2.2.2.2 Storage requirements for SAPS assets that have been removed from SAPS premises during installation of new infrastructure.

2.2.2.3 Storage requirement as stipulated in the cabling Vendor contracts.

2.2.3 The safeguarding of the vendors equipment stays the responsibility of the vendor, and not the responsibility of SITA or SAPS.

2.3 End of life infrastructure

2.3.1 The Cabinets and its contents will be removed by the cabling Vendor. All redundant cable connections and pathways that are no longer in use must be identified by SITA and removed by the vendor. All equipment must be accompanied by a delivery note. SITA and SAPS TMS to ensure these assets to be removed from ARS and PAS where applicable.

2.3.2 Old cabinets (prior 1999) and the contents thereof must be delivered to the nearest SITA office as stipulated in the cabling vendor contracts. All old cabinets after 1999 must be delivered to Provincial TMS or SCM as determined by the Provincial Head, TMS.

2.3.3 All surfaces where such redundant infrastructure has been removed shall be reinstated to its original condition, or as close as possible, by the vendor.

2.3.4 Block paint shall be done. Where block painting is not viable, the full wall must be painted. The paint colour shall match the existing colour of the wall, or be as close as possible. The vendor is responsible for painting the wall.

2.3.5 Disposal process and the board of survey must be instituted without delay in accordance with directives issued by SAPS SCM.

2.4 Project management

2.4.1 SAPS TMS Infrastructure Manager and SITA must oversee and manage all cabling related projects and ensure that ARS is updated after the project (Refer to paragraph 3.4.1.4).

2.4.2 Vendor project managers are required to attend progress and steering committee meetings as and when required on a National and/or Provincial level.

2.5 Quality assurance

2.5.1 The cabling vendor will be held responsible for the quality of the installation. SITA and SAPS TMS shall be responsible for assurance of the final quality of the installation.

2.6 Site visits

2.6.1 During all site visits all the following parties must be present:

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2.6.1.1 The SAPS TMS representative;

2.6.1.2 The SAPS station/unit commander (or Delegated SAPS member);

2.6.1.3 SITA representative; and

2.6.1.4 The cabling Vendor.

2.6.2 It is recommended that SAPS SCM Facility Management forms part of site visits to get permission from the site owners.

3 Project documentation required

3.1 User requirements

3.1.1 The requirement originates from SAPS. The scope of work provided to the vendor will be derived from the site visit.

3.2 Quotation documentation

3.2.1 The Initial Site Visit Baseline Bill of Materials (BoM) must be completed and signed by all relevant Vendors, TMS Representative, and SITA Representative during the Site Visit. The attendance must be supported with a signed Attendance register and a copy of both documents must be supplied to all role-players. The relevant SITA Representative must then ensure that the signed BoM and Attendance Register are uploaded on the SITA Planning Database.

3.2.2 All quotations must be uploaded on the online SITA Planning Database per site. The quotation must include the bill of materials including pricing.

3.2.3 The preliminary floor plan notes must be provided in MS Visio format to SITA and must be uploaded on SITA Planning Database.

3.2.4 Building Floor plans will be provided to vendor where available. Vendor must render the floor plans in Visio format of the current and proposed situation.

3.3 Pre installation site visit documentation

3.3.1 The preliminary floor plan must be signed by the Unit / Station commander or SAPS member duly authorised thereto, TMS and SITA representative on Site. Any changes to the layout of the floor plan shall only be done if there are nil (zero) cost implication to SAPS and/or SITA and must be approved by TMS.

3.3.2 During installation all work scope documentation must be available on site for inspection / quality control.

3.4 Post installation documentation

3.4.1 Site Sign off documentation required on-site in a file and on a memory stick consisting of the following:

3.4.1.1 Installed material versus the original requirement;

3.4.1.2 Final Site and floor plans;

3.4.1.3 Summary of the copper cabling test results;

3.4.1.4 Audit documentation (the audit should be done electronically where possible and the results printed for record keeping purposes);

3.4.1.5 OTDR Fibre optic test results; and

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3.4.1.6 The COC must be included.

3.4.2 The layout related to the cabling infrastructure and environmental equipment of each cabinet must be provided in Microsoft Visio by the cabling vendor. The Vendor responsible for the installation of the network equipment will update the cabinet layout with the placement of the network equipment.

3.4.2.1 All Post installation documentation which include certificate by asset manager to be included and must be uploaded on the planning database.

3.5 Site and floor plans

3.5.1 On a new Site, Site and floor plans must be provided by the Vendor in Microsoft Visio except where floor plans are already available the Vendor may make use of them if suitable.

3.5.2 In the case of expansions amendments on the existing plan it must be indicated in red on the updated Microsoft Visio Site and or Floor plan by the Vendor. These plans will be supplied to the vendor if available by the relevant SITA representative.

3.5.3 Site plans

3.5.3.1 These plans are applicable on a Site with more than one Distribution Cabinet to indicate the different buildings and cabling infrastructure and Fibre backbone layout linking these Cabinets.

3.5.3.2 Buildings must be numbered Alpha numerically starting with the building housing the Core cabinet as "A"

3.5.4 Floor plans

3.5.4.1 Floor plans must indicate the complete indoor cabling infrastructure and room number where available. Where room numbers is not available, the PAS room description should be used.

3.5.4.2 The floor plan must use the following legend as stipulated in the figure below.

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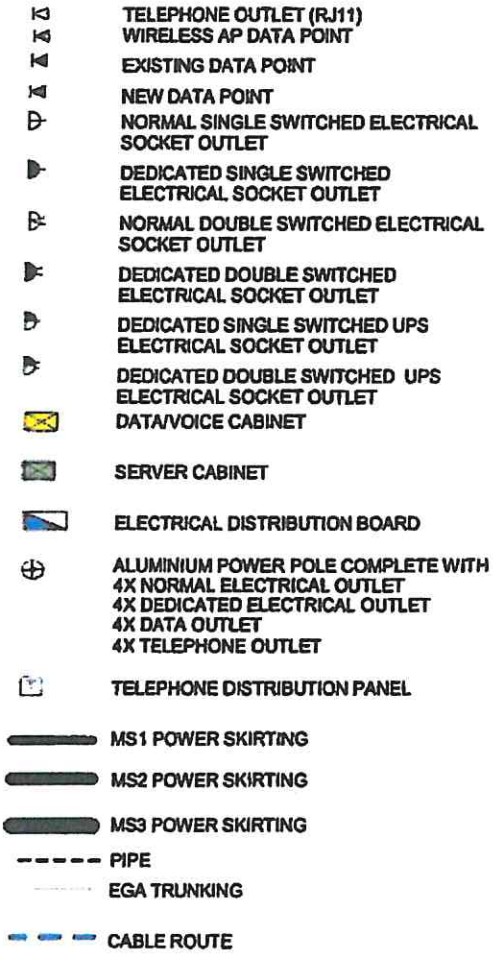

4 Cabling infrastructure architecture

4.1 Cabling infrastructure building blocks

4.1.1 The Cabling Infrastructure Architecture consists of the following building blocks and varies depending on the services required at each site:

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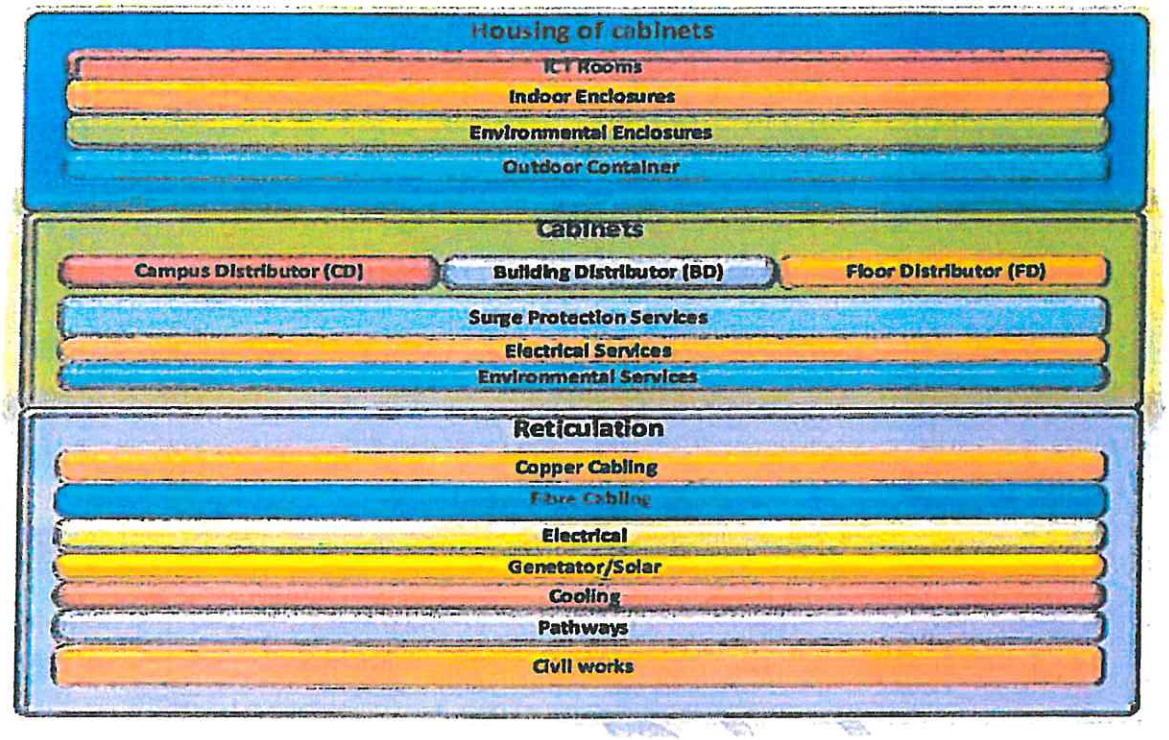

Figure 1: Building Blocks

4.1.2 Cabinets

4.1.3 Cabinets placement

4.1.3.1 The vendor or service provider shall where possible, place cabinets in an enclosure close to an outside wall for easy access to the nearest relevant building entry and near the centre of a building to minimize cable lengths and optimize performance. The location of the cabinets shall be decided and based on the recommendation from the vendor or service provider and SITA, and approved by SAPS.

4.1.3.2 The cabinet shall be located in a position where at least the front, back and one of the side doors must be able to be opened entirely. The cabinet shall stand securely and must be level.

4.1.3.3 A distribution cabinet can cover more than one floor/building, but cabling must comply with UTP standard. More than one floor distributor may be planned per floor. Where buildings / temporary buildings (including park homes) are close to each other, Underground sleeves/ariel can be used instead of a cabinet in each building. UTP Cable not to exceed 99 meter including patch and fly-leads. The building must be properly earthed according to electrical standards / specifications. When this situation arises STP Cable must be utilised and not UTP.

4.1.3.4 All floor standing network Cabinets must provide a secure enclosure with an uninterrupted power supply and dedicated environmental services.

4.1.3.5 The options for placement of such Cabinets are listed below:

4.1.3.5.1 Indoor ICT rooms

4.1.3.5.1.1 A dedicated room with the size of at least 3 m x 3 m shall ideally be identified as the ICT room for a 43U/47U Cabinet and 4 m x 5 m for 2 x 43U cabinets by the station/unit commander in consultation with Provincial TMS and SITA.

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4.1.3.5.1.2 The ICT room shall house a Core or distribution Enviro-Cabinets/Standard Cabinets, as per par. 4.3.3. A notice board supplied by vendor, must be installed in an ICT room stipulating that no hazardous material should be stored in this environment.

4.1.3.5.1.3 Where standard Cabinets as per paragraph 4.3.4 are installed a normal split unit air conditioner must be installed.

4.2.1 Indoor enclosure

4.1.3.5.1.4 If a dedicated room is not available, the Station/Unit commander must identify an area with sufficient space where an indoor enclosure can be constructed with the same specifications as the ICT rooms. This enclosure must preferably be built on an outside wall. The enclosure needs to be made dust proof and must have a suitable light source and a lockable door.

4.1.3.5.1.5 This enclosure shall house a core or distribution cabinet.

4.1.3.5.1.6 Where standard Cabinets as per paragraph 4.3.4 are installed a normal split unit air conditioner must be installed.

4.2 Cabinets types and sizes

4.2.2 Cabinets types

4.2.2.1 Floor standing and wall-mounted cabinets may be used. This will be determined by the site-specific conditions.

4.2.2.2 The rules are:

4.2.2.2.1 Floor standing Cabinets for the campus distributor (CD / Core) and distribution Cabinet (DCab);

4.2.2.2.2 Either a floor standing standard Cabinets or Enviro-Cabinets or a wall mounted Cabinets / Enviro-Cabinets for the floor distributor (FD) cabinet; and

4.2.2.2.3 Only Enviro-Cabinets cabinets should allow for fitting of Fire Suppression Canisters as and when required.

4.2.3 Cabinets sizes

4.2.3.1 Core cabinets (Campus): Selection to be managed as per the requirement by SITA and TMS - 43U/47U (H) x 600 mm (W) x 1000 mm (D).

4.2.3.2 Distribution cabinets: Selection to be managed as per the requirement by SITA and TMS - 43U/47U/25U/ (H) x 600 mm (W) x 1000 mm (D).

4.2.3.3 Distribution cabinets: Selection to be managed as per the requirement by SITA and TMS - 9U/10U/ 12U/15U (H) x 600 mm (W) x 800 mm (D).

4.2.4 Floor standing Enviro-Cabinets Specifications (Core 43U/47U and distribution 25U/43U Cabinets)

4.2.4.1 The cabinet must be IP54 rated and constructed of welded steel and/or aluminium

4.2.4.2 Constructions shall comply to:

4.2.4.2.1 Material.

4.2.4.2.1.1 1.6mm Mild Steel/ aluminium CRCQ

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4.2.4.2.2 **Finish**

Powder Coated – Matt Black Texture

4.2.4.2.3 **Design to include the following:**

4.2.4.2.3.1 Welded Frame with Open front, rear and both sides, optional knock-down format

4.2.4.2.3.2 Front, Rear and Both Sides fitted with Clip-on Gasket (rubber seal) for IP54 rating

4.2.4.2.3.3 Glazed Front door, with provision for Keypad

4.2.4.2.3.4 Front and Rear doors to be fitted with e-locking system for Locking

4.2.4.2.3.5 Doors must be fitted with a mechanical over-riding mechanism is case of a power failure for emergency access

4.2.4.2.3.6 All doors and side panels to be fitted with Door Contacts for monitoring purposes

4.2.4.2.3.7 Side Panels - Saloon Split one side, Solid type (non-perforated) on the other with a cut out to fit a self-contained air conditioner with concealed hinges and wing knobs, top and bottom. The wing knobs must be only capable of being opened form the inside of the Cabinets.

4.2.4.2.3.8 The cabinet must include a back upright Cabinets mountable PDU which consist of 4 x SANS 164-2, 2 point plugs, and 6 normal -3 point plugs.(Power Strip)

4.2.4.3 The side where the air conditioner must be fitted (left or right from the front of the cabinet) will be specified as per the requirement.

4.2.4.4 The handless front door of the Cabinets will be fitted with an E-locking mechanism (Key Pad), all cabinet doors will simultaneously unlock on entry of active key-code or remote door open command.

4.2.4.5 The e-locking system, locking into the doorframe to lock, will only consume power during the locking and unlocking cycles of the door. The front door will only initiate a locking process once the side, rear doors are closed, and a closed condition detected through the activation of a door-monitoring switch mounted on each individual door.

4.2.4.6 The front and back doors of the Cabinet must open 270 degrees.

4.2.4.7 Cabinets shall be fitted with four punched profiles and six depth reducers. The punched profiles shall be 19" from the front and back. The position of the punched profiles shall be as close as possible to the front of the cabinet but shall be deep enough to ensure that there is no strain on any cables against the front door of the cabinet.

4.2.4.8 The air-conditioner must be fitted central to the relevant side of the cabinet.

4.2.4.9 The cabinet must be fitted with two separate 200 mm light-duty cable trays on the same side of the cabinet where the air-conditioner is installed.

4.2.4.10 The cabinet must be fitted with one floor panel and with two glands to ensure enough cable entry space related to the size of the cabinet.

4.2.4.11 The Cabinets and the air-conditioner must be powder-coated black with the appropriate coating to prevent corrosion even when installed in coastal conditions.

4.2.4.12 The 43U Cabinets must be fitted with a 450 mm front-mount tray on U10 and also with one blank panel on U43.

4.2.4.13 The 25U and 43U Cabinets must be fitted with at least one perforated blank panel on the top and bottom U.

4.2.4.14 The cabinet shall be fitted with a six-way earth bar at the bottom on the side of the Cabinets where the saloon door is fitted. The earth bar must be easily accessible without opening any side panel.

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4.2.4.15 Where more than one cabinet is installed next to each other a 300mm Slack-Cabinets shall be installed in between the cabinets. The slack Cabinets must have doors at the front and rear for ease of cable access.

4.2.4.16 When any of the Cabinets doors are opened the air-conditioner must switch off and switch on again only once all doors are closed.

4.2.4.17 The E-locking mechanism on the Cabinets doors must be able to be opened remotely via the environmental management system (EMS). All locks must open simultaneously.

4.2.4.18 Any of the doors on the Cabinets must be able to send an alarm when opened. This alarm must be active as long as the doors are open through the environmental control unit.

4.2.4.19 Plinths (Floor Standing Cabinets ONLY) - 150mm High, with cable entries on three sides, for cable trunking access

4.2.4.20 The air-conditioner must send all possible alarms through the environmental management system.

4.2.4.21 The U's on the Cabinets must be numbered from the bottom to the top.

4.2.4.22 The standard size of the air-conditioner for the 43U/47U Cabinets must be 4000W.

4.2.4.23 The standard size of the air-conditioner for 25U Cabinets must be 2500W.

4.2.4.24 Enviro-Cabinets cabinets must be fitted with either a Main (32Amp) environmental management unit for Core cabinet and a Lite (16Amp) environmental management unit for distribution cabinets.

4.2.5 **Floor standing standard Cabinets specifications (Core 43U/47U and Distribution 25U/43U Cabinets)**

4.2.5.1 The Cabinets must be constructed of welded steel

4.2.5.2 Construction shall comply to :

4.2.5.2.1 **Material.**

4.2.5.2.1.1 1.6mm Mild Steel CRCQ

4.2.5.2.2 **Finish**

4.2.5.2.2.1 Powder Coated – Matt Black Texture

4.2.5.2.3 **Design to include :**

4.2.5.2.3.1 Fully Welded Frame with Open front, rear and both sides

4.2.5.2.3.2 Front and Rear Door "Perforated Saloon" with Leaf hinges.

4.2.5.2.3.3 All doors to be fitted with 3-Point locking (swing Handle, Cam and rods) for Door Locking

4.2.5.2.3.4 All doors and side panels to be fitted with Door Contacts for monitoring purposes

4.2.5.2.3.5 Any of the doors on the Cabinets must send an alarm when opened. This alarm must be active as long as the doors are open through the environmental control unit.

4.2.5.2.3.6 Side Panels - Saloon Split both sides, not perforated, with concealed hinges and wing knobs, top and bottom. The wing knobs must be only capable of being opened form the inside of the Cabinets.

4.2.5.2.3.7 The cabinet must include a back upright Cabinets mountable PDU which consist of 4 x SANS 164-2, 2 point plugs, and 6 normal -3 point plugs.(Power Strip)

4.2.5.3 Plinths (Floor Standing Cabinets ONLY) - 150mm High, with cable entries on three sides, for cable trunking access

4.2.5.4 The plinth must be constructed in such a way that the metal trunking can easily be fitted to the plinth and cabinets shall be fitted with four punched profiles and four depth reducers.

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4.2.5.5 The punched profiles shall be 19" from the front and back. The position of the punched profiles shall be as close as possible to the front of the cabinet but shall be deep enough to ensure that there is no strain on any cables against the front door of the cabinet.

4.2.5.6 The cabinet must be fitted with two separate 200 mm light-duty cable trays on the same side of the cabinet where solid side panels are installed. The cable trays must be fitted on the opposite sides of the relevant side.

4.2.5.7 Fitted with two blank floor plates and two base side brush panel entries.

4.2.5.8 The 43U Cabinets must be fitted with a 450 mm front-mount tray and also with two perforated blank panel on U43 and the 25U and 43U Cabinets must be fitted with two blank panel on the top and bottom U.

4.2.5.9 The cabinet shall be fitted with a six-way earth bar at the bottom on the side of the Cabinets where the saloon door is fitted. The earth bar must be easily accessible without opening any side panel where more than one cabinet is installed next to each other a 300mm Slack-Cabinets shall be installed in between the cabinets.

4.2.5.10 The slack Cabinets must have doors on the front and rear for ease of cable access.

4.2.5.11 The U's on the Cabinets must be numbered from the bottom to the top.

4.2.5.12 Fans must be installed, but the temperature regulation must be supplied by the external air conditioning unit.

4.2.5.13 Standard Cabinets must be fitted with either a Main (32Amp) environmental management unit for Core cabinet and a Lite (16Amp) environmental management unit for distribution cabinets.

4.2.6 Wall mounted Cabinets

4.2.5.1 The Cabinets must be a 9U, 10U, 12U and 15U, constructed of a mild steel frame. This type of Cabinets shall only be used as a distribution cabinet.

4.2.5.2 Wall mount Cabinets construction shall comply to

4.2.5.2.1 **Material.**

4.2.5.2.1.1 1.6mm Mild Steel CRCQ

4.2.5.2.2 **Finish**

4.2.5.2.2.1 Powder Coated – Matt Black Texture

4.2.5.2.3 **Design to include**

4.2.5.2.3.1 Fully Welded Frame with Open front, rear and both sides

4.2.5.2.3.2 Front and Rear Door "Perforated Saloon" with Leaf hinges.

4.2.5.2.3.3 All doors to be fitted with 3-Point locking (swing Handle, Cam and rods) for Door Locking

4.2.5.2.3.4 All doors and side panels to be fitted with Door Contacts for monitoring purposes

4.2.5.2.3.5 Side Panels - Saloon Split one side, not perforated, with concealed hinges and wing knobs, top and bottom. The wing knobs must be only capable of being opened form the inside of the Cabinets. The other side shall be Solid type (non-perforated) and shall be fixed.

4.2.5.2.3.6 The cabinet must include a back upright Cabinets mountable PDU which consist of 3 x SANS 164-2, 2 point plugs, and 3 normal -3 point plugs.(Power Strip)

4.2.5.3 The Cabinets must be wall mounted on one of the side panels, which shall be fixed. The Cabinets must only be mounted against solid walls and must not be fitted to temporary structures such as dry walls. (In the event where a Park Home has to be fitted with a 9U Cabinet, due to the fact that a 25U floor

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standing cabinet cannot be used, a backing plate(secured to the structure) should be included to secure the cabinet)

4.2.5.4 Side panel with fittings for mounting against the wall. The side where this will be needed (left or Right) will be specified as per the requirement.

4.2.5.5 Cabinets shall be fitted with four punched profiles and four depth reducers. The punched profiles shall be 19" from the front and back. The position of the punched profiles shall be as close as possible to the front of the cabinet but shall be deep enough to ensure that there is no strain on any cables against the front door of the cabinet.

4.2.5.6 The Cabinets must be fitted with 1 x 100 mm light-duty cable tray on the wall mounted side of the Cabinets.

4.2.5.7 The Cabinets must have a sufficient number of entry glands to ensure enough cable entry space into the cabinet at the top and the bottom.

4.2.5.8 The Cabinets must be fitted with one blank panel. The U's on the Cabinets must be numbered from the bottom to the top.

4.2.5.9 The cabinet shall be fitted with a six-way earth bar at the bottom on the side of the Cabinets where the saloon door is fitted. The earth bar must be easily accessible without opening any side panel.

4.2.5.10 Wall mounted cabinets must be mounted as high above the floor and close to the ceiling as possible and the wall mounted cabinet shall have the enhanced fittings to support the weight requirement and fitted level on solid walls with at least four M8 rawl bolts.

4.2.5.11 The wall-mounted cabinet shall not have an air-conditioner fitted to it.

4.2.5.12 Wall mounted Cabinets must be fitted with a distribution environmental management unit.

4.3 Outdoor containers

4.3.5 General specifications

4.3.5.1 The outdoor containers will be implemented in areas where:

4.3.5.1.1 Indoor space is not suitable; or

4.3.5.1.2 Insufficient available space for the self-contained cabinets.

4.3.5.2 The containers will be shipped as a complete unit. When necessary, a knock-down kit, might be use for assembly on site.

4.3.5.3 The container must be installed level and on a pre-manufactured container plinth, the plinth must be elevated to 10cm above the 100-year flood-line.

4.3.5.4 The container side walls will be manufactured from 75mm 16DV fire retardant expanded polystyrene core with bonded 0.5mm Aluzinc metal sheeting on either side.

4.3.5.5 The container door must be manufactured from 75mm 16DV fire retardant expanded polystyrene core with bonded 0.5mm Aluzinc metal sheeting on either side:

4.3.5.5.1 Framed with 2mm powder-coated aluminium extruded framing and fitted with an internal remote/local monitored three-point T-locking system with optional Biometric/Keypad/RFID access system; and

4.3.5.5.2 A tamper proof enclosure must be fitted over the locking mechanism.

4.3.5.6 The roofing will be manufactured from 75mm 16DV fire retardant expanded polystyrene core with bonded 0.5mm Aluzinc metal sheeting with an IRB top finish and with an overhang of 30cm on all sides of the container.

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4.3.5.7 Adjacent wall panels must be joined with 2mm waterproof powder-coated aluminium extruded H-joint and with a 2mm waterproof powder-coated V-joint.

4.3.5.8 The top of the wall panels must be fitted with 2mm waterproof powder-coated aluminium extruded double T-joint for the direct mounting of the roof.

4.3.5.9 The roof must be fitted at a 7-degree slanting angle, slanting from the door-side wall and must have and 30cm overhang (Optional) over the wall on all sides.

4.3.5.10 The galvanized mild-steel container base must be painted with rust resistant paint prior to fitting the carbolinium treated plywood flooring.

4.3.5.11 The inside floor must be covered with an antistatic PVC-type self-adhesive floor sheet.

4.3.5.12 A protective cage, manufactured from galvanized mild-steel and powder-coated, with through mount flange plate for securing from the inside of the container.

4.3.5.13 All containers should be fitted with a 4 kg Co2 Fire Extinguisher.

4.3.5.14 All containers must be fitted with the air-conditioning unit

4.3.5.15 All outdoor containers must be equipped with perforated cabinets.

4.3.5.16 The inside walls and door of the container must be fitted with extreme strength wire mesh:

4.3.5.16.1 2.4-meter height;

4.3.5.16.2 hot-dip galvanized PVC-coated protective layer;

4.3.5.16.3 12.7x12.7mm mesh with 4mm wire;

4.3.5.16.4 10-year anti-corrosion guarantee; and

4.3.5.16.5 Each panel fitted with a seismic sensor.

4.3.5.17 Cables must enter through a stainless-steel gland plate and sealed with the appropriate stainless-steel glands.

4.3.5.18 A cable tray system must be mounted in-between the rails to cater for the slack on the UTP, electrical cable and fibre when required to extract the cabinet.

4.3.5.19 The appropriate electrical DB must be fitted according to site requirements.

4.3.5.20 The container shall be equipped with a 9-way distribution board mounted on the inside of the container fed from the main building distribution board with 10mm armoured cable:

4.3.5.20.1 Each air conditioner must be fed from the 9-way distribution board, from a 20Amp circuit breaker with 2.5mm surfex cable and a dedicated dual pole 30A isolator switch; and

4.3.5.20.2 Each SAPS standard cabinet should be fed from the 9-way distribution board, from a 32Amp circuit breaker with 4mm surfex cable, which connects to the female 32Amp blue minor keyway industrial socket-outlet.

4.3.5.21 Two (2) T8 LED tube lights must be installed in the container:

4.3.5.21.1 The first on the front wall up against the roof below the feeding ducting;

4.3.5.21.2 The second on the rear wall panel up against the roof below the feeding ducting, fed from a 10 Amp circuit breaker in the distribution board with 1.5mm surfex cable and override switch; and

4.3.5.21.3 Must be controlled from the environmental controller and triggered by a door switch.

4.3.5.21.4 A 10 Watt LED protected Floodlight to be mounted above the door on the outside, connected to a daylight switch.

4.3.6 Medium container

4.3.6.1 The medium container size 2.4m (w) x 2.4m (l) x 2.7m <->'2.4m(h).

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4.3.6.2 The rear wall must house a cut-out to fit a Mid-wall air-conditioner; the cut-out must be lined with a 2mm U-joint waterproof powder-coated extruded aluminium covering.

4.3.6.3 The medium size container must be fitted 30cm below the top of the rear wall, 1 x Mid-wall Air-conditioner monitored by an Air-Conditioner monitoring unit connected to the environmental management unit, with management contacts (industry standard based normally open/closed contacts) that is used to monitor the air conditioner.

4.3.7 Large container

4.3.7.1 The large container size 3m (w) x 3m (l) x 2.8m <-> '2.4m (h).

4.3.7.2 The rear wall must house two cut-outs to fit dual Mid-wall air-conditioners; the cut-outs must be lined with a 2mm U-joint waterproof powder-coated extruded aluminium covering.

4.3.7.3 The Large size container must be fitted 30cm below the top of the rear wall, 2 x Mid-wall Air-conditioners monitored by an Air-Conditioner monitoring unit connected to the environmental management unit:

4.3.7.3.1 Duty cycle the air-conditioner to load-share the cooling and switch both on at extremely hot conditions, with management contacts (industry standard based normally open/closed contacts) that is used to monitor the air conditioner.

4.3.8 Positioning and areas

4.3.8.1 The container must be placed as close as possible to the building and linked with 2 x 110mm earthed steel sleeves enclosed in a building entry.

4.3.8.2 The cement plinth need to extend 1M around the outside of the container.

4.3.9 Add air-conditioner controller unit (ACCU) specification

4.3.9.1 The ACCU must connect to the environmental units and form part of the control and monitoring of this unit and be managed from the same IP network address as the environmental unit and include:

4.3.9.1.1 Dual class 1 energy meters with measurements of voltage, current, instantaneous KWh, accumulative KWh and Power Factor;

4.3.9.1.2 Have a user definable duty cycle, upper and lower temperature limits where both AC's are switched ON and OFF or when in limits equally share the workload duty cycle;

4.3.9.1.3 Include 2 temperature sensors, one humidity sensor and two rope flooding detectors through feed the power to each individual air-conditioner.

4.4 Environmental Unit & Surge Protection Elements

4.4.5.1 Electrical Distribution board mounted monitored Lightning and Surge Arrestor Type 1+2 / Class I+II protection.

4.4.5.2 The main feeding electrical building and/or each floor distribution board shall be fitted with a monitor able type 1+2 / Class I+II primary pluggable lightning and surge protection arrestor combination module.

4.4.5.3 In accordance with IEC 61643-11 2011 & EN 61643-11-2012 and the fixed base shall be connected to low-voltage grid systems in accordance to IEC 60364-1.

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4.4.5.4 It shall specifically be in the TN-S grid system configuration. The neutral conductor (N) and protective conductor (PE) are routed to the consumer system in separate conductors. (L1, N and PE).

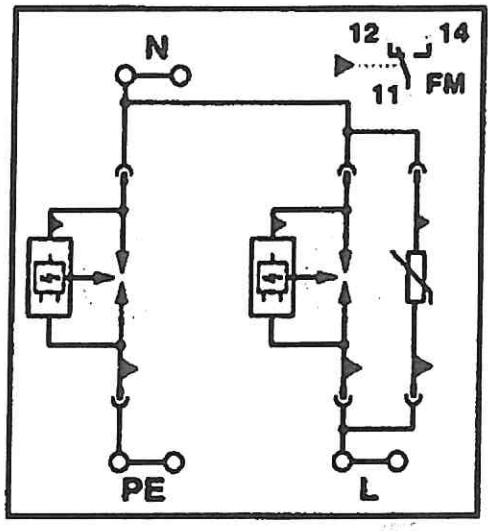

Figure 2: Electrical distribution

4.4.5.5 The earthling shall be compliant to 11.3, the "Electrical Endpoint Services" of this document.

4.4.5.6 The Type 1 / Class I with discharge current of at least 100KA at the rate of 10/350µs (L - N) and with a reaction time better than 100ns.

4.4.5.7 The Type 2 / Class II with discharge current of at least 40KA at the rate of 8/20 µs (L - N) and with a reaction time better than 25ns and shall include mode protections for (L-N), (L-PE), (N-PE) configurations.

4.4.5.8 It shall have a high continuous maximum voltage of 350 V AC for 230/400 V AC networks with high voltage fluctuations.

4.4.5.9 It shall be able to withstand multiple lightning strikes as defined in Type 1+2 / Class I+II surge protection.

4.4.5.10 The pluggable modules shall have a standard five-year warranty.

4.4.5.11 It shall have a red/green optical, thermo-mechanical status indicator with floating remote management indication contact:

4.4.5.11.1 The contacts shall be wired to an Environmental Unit for monitoring through either an UTP point, of the designated colour, installed next to the electrical distribution board; or

4.4.5.11.2 Through an ISM-band radio transceiver pair with the receiver located at the Environmental Unit.

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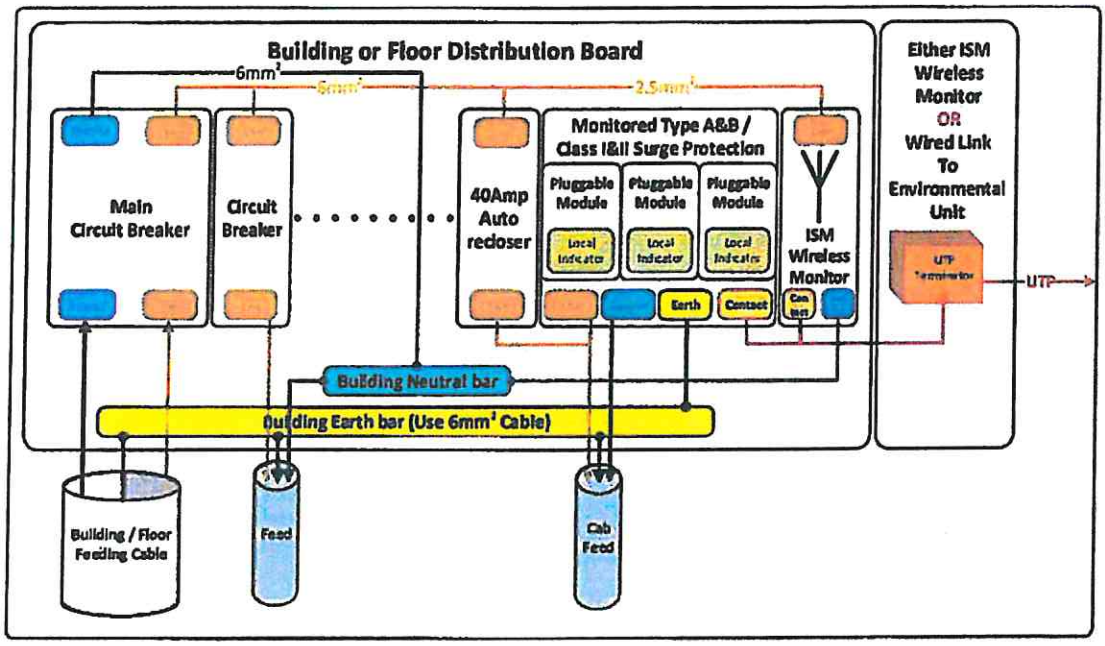

Figure 3: Building or floor distribution board

4.5 General specifications

4.5.1 The core cabinet: Power distribution Unit (PDU)

4.5.1.1 The Core cabinet shall have the following features additional to the general functioning and houses the transmission equipment.

4.5.1.2 The Core cabinet must be supplied with a 3 meter 4.5mm Cabtyre power lead (SANS 1411) terminated on a 40Amp blue IEC 60309, Hubble, type plug to connect to the power feeding wall mount power socket of the same grade.

4.5.1.3 The Core cabinet must be fitted with dual 40Amp distribution termination connectors to terminate the 4mm2 1.5-meter Cabtyre power leads, ferruled and supplied with the unit, feeding the UPS/Inverter and returning feed from the UPS/Inverter or 4mm2 1.5-meter Cabtyre power leads terminated on a 40Amp blue IEC 60309, Hubble, type cable mount socket to feed power into the unit to feed power to the UPS/Inverter a the 4mm2 1.5-meter Cabtyre power leads Cabtyre power lead terminated on a 40Amp blue IEC 60309, Hubble, type cable mount plug to feed power from the UPS/Inverter back to the EV unit for pre-wiring to PDU's and other power sockets.

4.5.1.4 The Power Distribution Unit must be fitted with the following electrical sockets:

4.5.1.4.1 The PDU must include at least five (5) C13 10Amp and

4.5.1.4.2 Four (4) C19 15Amp electrical feeding sockets.

4.5.1.4.3 At least two (2) three point electrical socket (SANS164-1).

4.5.1.4.4 At least three (3) three point electrical socket (SANS164-2).

4.5.1.5 The Core cabinet must include the following cables:

4.5.1.5.1 Two (2) 1,5-Meter C14 to C15, IEC-60320 plug/sockets cables;

4.5.1.5.2 Two (2) 1,8-Meter C14 to C15 IEC-60320 plug/sockets cables;

4.5.1.5.3 Two (2) 3,0-Meter C14 to C15 IEC-60320 plug/sockets cables;

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4.5.2 The Distribution cabinet: Power distribution Unit (PDU)

4.5.2.1 The Distribution cabinet must have the following features additional to the general functioning and houses the transmission equipment.

4.5.2.2 The Distribution cabinet must be supplied with a 3 meter 4.5mm Cabtyre power lead (SANS 1411) terminated on a 25Amp blue IEC 60309, Hubble, type plug to connect to the power feeding wall mount power socket of the same grade.

4.5.2.3 The Distribution cabinet must be fitted with dual 25Amp distribution termination connector to terminate the 2.5mm 2 1.5-meter Cabtyre power leads, ferruled and supplied with the unit, feeding the UPS/Inverter and returning feed from the UPS/Inverter an C20 terminated 2.5mm2 1.5-meter Cabtyre power lead ferruled at the other end or two x C19 to C20 1.5-meter leads to connect the UPS/Inverter.

4.5.2.4 The Power Distribution Unit must be fitted with the following electrical sockets.

4.5.2.4.1 At least two (2) C13 10Amp and (referring to one switch in cabinet).

4.5.2.4.2 One (1) C19 15Amp electrical feeding sockets (referring to one switch in cabinet).

4.5.2.4.3 At least two (2) three point electrical socket (SANS164-2) (referring to one switch in cabinet).

4.5.2.5 The Distribution cabinet must include the following cables:

4.5.2.5.1 Two (2) 1,5-Meter C14 to C15, IEC-60320 plug/sockets cables;

4.6 Cabinets types and sizes for use in outdoor Containers

4.6.1 Cabinets types

4.6.1.1 Floor standing types of Cabinets will be used in an outdoor container. In cases where the Core will housed, 43/47U Cabinets will be utilised. Where a Distribution Cabinets will be housed, 25U Cabinets will be used.

4.6.1.2 The Cabinets must be constructed of welded steel

4.6.1.3 Construction shall comply to

4.6.1.3.1 **Material.**

4.6.1.3.1.1 1.6mm Mild Steel CRCQ

4.6.1.3.2 **Finish**

4.6.1.3.2.1 Powder Coated – Matt Black Texture

4.6.1.3.3 Fully Welded Frame with Open front, rear and both sides

4.6.1.3.4 Plinth - 150mm High, with cable entries on three sides, for cable trunking access

4.6.1.4 The plinth must be constructed in such a way that the metal trunking can easily be fitted to the plinth and cabinets shall be fitted with four punched profiles and four depth reducers.

4.6.1.5 The punched profiles shall be 19" from the front and back. The position of the punched profiles shall be as close as possible to the front of the cabinet but shall be deep enough to ensure that there is no strain on any cables against the front door of the cabinet.

4.6.1.6 The cabinet must be fitted with two separate 200 mm light-duty cable trays on the same side of the cabinet where slack Cabinets are installed. The cable trays must be fitted on the opposite sides of the relevant side.

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4.6.1.7 Fitted with two blank floor plates and two base side brush panel entries.

4.6.1.8 The 43U Cabinets must be fitted with a 450 mm front-mount tray and also with one blank panel on U43 and the 25U and 43U Cabinets must be fitted with one blank panel on the top U.

4.6.1.9 The Cabinets shall be fitted with a six-way earth bar at the bottom. The earth bar must be easily accessible. Where more than one Cabinets is installed next to each other a 300mm Slack-Cabinets shall be installed in between the Cabinets.

4.6.1.10 The slack Cabinets must have doors on the front and rear for ease of cable access.

4.6.1.11 The U's on the Cabinets must be numbered from the bottom to the top.

4.6.1.12 The temperature must be controlled by the external air conditioning unit.

Figure 4: Cabinets and services

4.7 Cabinets management

4.7.1 Labelling

4.7.1.1 All cabinets must be marked with a label, with a number for that cabinet, in the building it is situated in, according to specification below.

4.7.1.2 All labels shall be permanent and printed black on white with a font size of at least 12 mm.

4.7.1.3 The label shall be fitted from the front on the right side of the Cabinets on the top left corner of the frame. (Closest to front door)

4.7.1.4 On wall mounted Cabinets the label shall be fitted on the visible side of the Cabinets on the top corner of the frame (Closest to front door).

4.7.1.5 The label on cabinets shall be: "Cabinet X/Y/Z" where:

4.7.1.5.1 X - Indicates the Building where the cabinet is housed with an A or where more than one building B, C etc.;

4.7.1.5.2 Y - Indicates the floor on which the cabinet is situated as designated by the building owner (e.g.: -2, -1, G, 1, 2); and

4.7.1.5.3 Z - Indicates the cabinet number that shall be numbered A, B, C etc. for more than one cabinet per floor.

4.7.1.5.4 A distribution floor plan of that cabinet must be printed in A4 plastic filing sleeve, and must be attached on the front of the cabinet.

4.7.2 Asset tagging

4.7.2.1 The vendor or service providers are responsible for the asset tagging (WEB number) of all the cabinets. SITA will still be responsible for asset tagging delegated to the vendor and the control of WEB labels. On floor standing Cabinets the WEB label shall be fitted "On the side of the frame of the Cabinets in the top corner on the side that is visible from the entrance to the facility/room."(Closest to front door).

4.7.2.2 On wall mounted Cabinets the WEB label shall be fitted on the visible side of the Cabinets on the top corner of the frame (Closest to front door).

4.7.2.3 The web sticker must be visible from either the front door or the back door.

4.7.2.4 The webbing of the containers must be on the inside of the door.

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4.7.3 Cabinets access security

4.7.3.1 Enviro Cabinets must have 3 Default Keypad codes configured per keypad. These must be the same codes per Provinces for all sites. The doors of the Cabinets must be able to be opened remotely.

4.7.3.2 Standard Cabinets must be supplied with locks making use of keys. One set of keys to be handed to the relevant Station/Unit Commander.

4.7.4 Fittings

4.7.4.1 The cabinet must be populated with cage nuts for all standard fittings and devices as per the standard cabinet layout. On all open spaces cage nuts must be placed 1u's apart for any future expansions. The back of the cabinet will only be populated with cage nuts as per the equipment requirement.

4.8 Uninterrupted power supply (UPS) where a Generators is on site

4.8.1 The UPS shall be Cabinets-mounted with Cabinets-mounting of the UPS commencing 1U from the bottom of the cabinet.

4.8.2 Proper Cabinets mount kits must be included with all units.

4.8.3 The UPS must be an online double conversion unit with a pure sinewave output and a no-break electronic automatic bypass.

4.8.4 The unit must have a minimum throughput of 10KVA with a 0.9 output power factor for the Core Cabinet (CD), (i.e. 4500 watts on output... at full load). The battery run time of 6 -15 minutes will be determined by the total electrical load (in watts) within the cabinet. The UPS should be able to accommodate an extra battery module in instances where longer run-time is required and the UPS charger must be rated to handle the re-charge of that extra battery module. Battery failure excludes replacement of batteries that have exceeded their maximum number of discharges.

4.8.5 The unit must have a minimum throughput of 5KVA with a 0.9 output power factor for the Core Cabinet (CD), (i.e. 4500 watts on output... at full load). The battery run time of 6 -15 minutes will be determined by the total electrical load (in watts) within the cabinet. The UPS should be able to accommodate an extra battery module in instances where longer run-time is required and the UPS charger must be rated to handle the re-charge of that extra battery module. Battery failure excludes replacement of batteries that have exceeded their maximum number of discharges.

4.8.6 The unit must be a minimum throughput 2KVA with a 0.9 output power factor for the Building (BD) - and Floor Distributor (FD) Cabinets. The battery run time of 6 -15 minutes will be determined by the total electrical load (in watts) within the cabinet. The UPS should be able to accommodate an extra battery module in instances where longer run-time is required and the UPS charger must be rated to handle the re-charge of that extra battery module. Battery failure excludes replacement of batteries that have exceeded their maximum number of discharges.

4.8.7 The unit must at least be a minimum throughput of 1 KVA with a 0.9 output power factor for the wall mount cabinet. The battery run time of 6 -15 minutes will be determined by the total electrical load (in watts) within the cabinet. The UPS should be able to accommodate an extra battery module in instances

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where longer run-time is required and the UPS charger must be rated to handle the re-charge of that extra battery module. Battery failure excludes replacement of batteries that have exceeded their maximum number of discharges.

4.8.8 The 5KVA UPS shall be wired as follows: both the input and output of the UPS shall be "hard-wired" on the UPS side unto two 4mm flexible cables of 300mm each. The other end of the INPUT cable shall be fitted with a 40 amp male Hubble connector and the other end of the OUTPUT cable shall be fitted with a 40 amp female connector.

4.8.9 The UPS must have a standard 3 year onsite warranty and preventative maintenance should be conducted under a maintenance contract to secure warranty conditions without any additional costs to SAPS or SITA.

4.8.10 The batteries must have a related 3 year warranty (must have a lifespan of at least 5 years).

4.8.11 An Official signed OEM certificate, stating the warranty information itself and based on what product qualities such warranty is possible must be presented. Because of the quality and unique attributes of the device it must be manufactured to operate flawlessly in the suitable environment for at least 3 years without any maintenance other than the standard preventative maintenance. This feature must also be confirmed by and on the OEM certificate.

4.8.12 The certificate must also be used for capturing the product and installation details to serve as a warranty card to be returned to the company responsible for the warranty and copies must accompany the environmental installation sign off documentation for each unit.

4.8.13 The preventative service intervals must be according to manufacturer specification.

4.8.14 Reference made to batteries is referred to lithium ion must have the 8000 cycles.

4.9 Hybrid Inverter (Dual purpose Inverter)

4.9.1 The Hybrid Inverter system must be fully scalable to accommodate site requirements. In addition to parallel connections, three units of the same model can be configured for 3phase output.

4.9.2 The Hybrid Inverter solar system must consist of the following equipment:

4.9.2.1 UPS/Inverter:

4.9.2.1.1 The UPS/Inverter must be a multifunctional inverter/charger with all features of the plus and external current sensor option which extends to Power Control and Power Assist function to 50A resp. 100A.

4.9.2.1.2 It must also have built-in anti-islanding functionality and an increasingly long list of country approvals for ESS application. Several system configurations should be possible. A maximum grid or generator current can be set.

4.9.2.1.3 It must take account of other AC loads and use what is extra for battery charging to prevent the generator or grid from being over loaded. It must be compatible with both solar charger controllers and grid-tie inverters.

4.9.2.1.4 The main output must have no break functionality. The second output must only be live when AC is available on the input.

4.9.2.1.5 Up to 6 can operate in parallel to achieve higher power output. Six 48/5000/70 units, for example, will provide 25 kW / 30 kVA output power with 420 Amps charging capacity.

4.9.2.1.6 In addition to parallel connection, three units of the same model can be configured for three phase output. But that's not all: up to 6 sets of three units can be parallel connected for a 75 kW / 90 kVA inverter and more than 1200 Amps charging capacity.

4.9.2.2 A controller product to connect to the SAPS local LAN, to store operational data and must be remotely accessible. The Controller ensures that the UPS/Inverter and Smart solar charger and lithium ion all work in harmony.

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