Ministry of Defence

JSP 604 LEAFLET 4800

Regulations for the Installation of Information Communications Technology (Formerly JSP 480)

Part 2: Volume 2

Ministry of Defence

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Ministry of Defence

List of Contents

Ministry of Defence

List of Abbreviations

ACU	Air Conditioning Unit
AMSG	Allied Military Standards Group
AOR	Area Of Responsibility
BEF	Building Entry Facility
BD	Building Distribution
BS	British Standards
CAD	Computer Aided Design
CATV	Cable Access Television
CC	Configuration Control
CESG	Communications Electronic Security Group
CDIO	Chief Digital Information Officer
CM	Configuration Management
CIARFE	Confidentiality, Integrity, Availability, Resilience, Flexibility, Economy
CIDA	Co-ordinating Installation Design Authority
CPC	Circuit Protective Conductor
CPR	Construction Product Regulation
DAIS	Defence Assurance Information Security
DOP	Declaration of Performance
DSO	Departmental Security Officer
ECR	Engineering Change Request
EMC	Electro Magnetic Compatibility
EMI	Electro Magnetic Interference
EMR	Electromagnetic Radiation
EMSEC	Electromagnetic or Emissions Security
FD	Floor Distribution
GPG	Good Practice Guide
HMG	Her Majesty's Government
IDA	Installation Design Authority
IDS	Intruder Detection System
ISS	Information Systems Services
JSP	Joint Service Publication
LFH	Low Fire Hazard
LSF	Low Smoke Fume
LSHF	Low Smoke Halogen Free
LSZH	Low Smoke Zero Halogen
MET	Main Earthing Terminal
MOD	Ministry of Defence
MUTO	Multi User Telecommunication Outlet
NCSC	National Cyber Security Centre
OC	Office Commanding
OOA	Out Of Area
REPO	Remote Emergency Power Off
RFSEC	Radio Frequency Security
RSP	Radio Site Protection
SCIDA	Site Co-ordinating Installation Design Authority

SDA	System Design Authority
SDIPs	SECAN Doctrine and Information Publications
SLI	Service Level Inspection
SPF	Security Policy Framework
SSP	Stainless Steel Pipe
TCA	Tempest Countermeasures Assessment
TCO	Tempest Control Officer
TCP	Tempest Control Plan
TCR	TEMPEST Conformance Review
TSCIDA	Technical Supervisory Co-ordinating Installation Design Authority
TVI	Tempest Visual Inspection
UTP	Unshielded Twisted Pair

Guidance and Technical Controls

Rationale for this Leaflet

1. MOD Installation Standards Policy and Governance of the physical and environmental aspects of MOD ICT (as contained in this leaflet) ensure compliance with the Cabinet Office Information Assurance Governance Framework and HMG SPF.

Benefits and Risks of this Leaflet

2. Adherence to this directive ensures control over the installation design, site configuration and environment such that;

a. **Confidentiality.** By ensuring that where appropriate, installations meet the requirements for RADSEC and are maintained under configuration control.

b. **Integrity.** By ensuring that installations will not suffer from or be the cause of electrical interference to other co-located installations (EMC).

c. **Availability.** Optimising operational availability by ensuring that installations are implemented in accordance with relevant standards and good engineering practice, and maintained under effective CM. The aim is to reduce system failure due to poor installation standards and facilitate maintainability, fault rectification and future engineering change.

d. **Resilience.** By ensuring that where appropriate, installations are provided with diversity of location, power, connectivity and cooling to facilitate continuity of service during unforeseen disruptive malfunction.

e. **Flexibility.** By ensuring that correct installation documentation and standards are maintained, that installations and recoveries are conducted in a manner that facilitates future change and that a complete Facility Information set is available to future Change Designers.

f. **Economy.** By ensuring that spare capacity is correctly utilised, that additional systems are installed in a manner that makes best use of the site's infrastructure and available space and to co-ordinate change to avoid conflict or promote efficiency such as through combined cross-site duct projects or common works service provision.

Review Date

3. Annually from date of publication.

Technical Controls

CHAPTER 01 - Responsibilities and Definitions of CIDA and associated Roles

Introduction

0101. In compliance with legal requirements, the **HMG Security Policy Framework (SPF)** and the **Cabinet Office Information Assurance Governance Framework**, CIO, through D CBM J6 Executive Group, established the MOD CIS Resilience Policy and Recovery Strategy and the DSO publishes JSP 440, the Defence Manual of Security. These MOD policy documents mandate Information and Communications Technology (ICT) security, resilience, Configuration Management (CM), Change Control (CC), installation design control and accreditation processes, thus directly delivering the Cabinet Office governance requirement for compliance with ISO 17799 (BS ISO/IEC 27002), the provision of an Accreditation process and the use of ITIL best practice.

Co-ordinating Installation Design Authority

0102. The Defence Co-ordinating Installation Design Authority (CIDA) is a team within the Defence Assurance and Information Security (DAIS) branch of Information Systems and Services (ISS). Defence CIDA is responsible for the MOD Installation Standards Policy (as contained in this leaflet) and Governance of the physical and environmental aspects of MOD ICT ensuring compliance with the Cabinet Office Information Assurance Governance Framework and HMG SPF.

0103. MOD Installation Standards Policy ensures control over the installation design, site configuration and environment such that the following is ensured, whilst assuring that within a defined site, all security and safety requirements relating to each ICT installation are met and maintained;

a. **Confidentiality.** By ensuring that where appropriate, installations meet the requirements for RADSEC and are maintained under configuration control.

b. **Integrity.** By ensuring that installations will not suffer from or be the cause of electrical interference to other co-located installations (EMC).

c. **Availability.** Optimising operational availability by ensuring that installations are implemented in accordance with relevant standards and good engineering practice, and maintained under effective CM. The aim is to reduce system failure due to poor installation standards and facilitate maintainability, fault rectification and future engineering change.

d. **Resilience.** By ensuring that where appropriate, installations are provided with diversity of location, power, connectivity and cooling to facilitate continuity of service during unforeseen disruptive malfunction.

e. **Flexibility.** By ensuring that correct installation documentation and standards are maintained, that installations and recoveries are conducted in a manner that facilitates future change and that a complete Facility information set is available to future Change Designers.

f. **Economy.** By ensuring that spare capacity is correctly utilised, that additional systems are installed in a manner that makes best use of the site's infrastructure and available space and to co-ordinate change to avoid conflict or promote efficiency such as through combined cross-site duct projects or common works service provision.

0104. Defence CIDA policy ensures that the physical and environmental aspects of Defence ICT installations are compliant with the Cabinet Office Information Assurance Governance Framework and HMG SPF. To ensure compliance with these policies:

a. Certification of new and extant ICT installations is required before ICT systems can be accredited and re-accredited.

b. SCIDAs shall be established and maintained for all ICT facilities. Defence CIDA's SCIDA Framework Document establishes the delivery requirement for SCIDAs to provide the necessary CM of the physical and environmental aspects of Defence ICT Installations.

0105. In accordance with HMG SPF, CIDA uses a risk management approach. Risk is assessed to identify the potential impact to MOD business through the loss or reduction of Confidentiality, Integrity, Availability or Resilience from the viewpoint of the physical and environmental aspects of ICT installations.

0106. Identified risk is managed through normal CIDA process (see Chapter 04) or one of the following routes

a. The problem is rectified to remove the risk.

b. Risk to MOD data is directed to the appropriate system Accreditor for resolution or escalation, as appropriate; or for formal acceptance by the appropriate Information Risk Owner.

c. Risk to personnel or facilities are directed through the facility management to the Head of Establishment (HOE) for resolution or acceptance.

Site Co-ordinating Installation Design Authority

0107. To deliver MOD Installation Standards Policy, CIDA support the establishment of site based teams to deliver much of the day to day work. These teams are known as Site CIDA (SCIDA). All MOD facilities shall have a SCIDA, established in accordance with the Defence SCIDA Framework Document and recognised by Defence CIDA. All CIS change at site level must be in accordance with the requirements of JSP 604: Leaflet 4800 and agreed with the SCIDA. For Top Secret MOD ICT, SCIDA shall engage with Defence CIDA who have additional governance responsibilities of TS systems.

0108. The Site CIDA (SCIDA) function is to ensure that the full benefits of Physical and Environmental CM for MOD ICT are delivered across sites in accordance with the SCIDA Framework Document or Contract.

0109. TLBs are responsible for the provision of SCIDA at their sites with this responsibility normally delegated to the Head of Establishment or site owner. From the viewpoint of co-ordination of change and the regulation of installation standards, a SCIDA should preferably be independent from the organisations who deliver change.

0110. Where a site or facility owner provides a SCIDA to conduct SCIDA provision below that required by MOD and detailed in the SCIDA Framework Document then an assessment of the risk to the Confidentiality, Integrity and Availability of the ICT systems and data must be undertaken and formally recorded.

0111. The effectiveness of a SCIDA may be evaluated, by Defence CIDA personnel, through formal audit of both the SCIDA and the SCIDA process

Technical Supervisory Co-ordinating Installation Design Authority

0112. In certain circumstances, CIDA will authorise the appointment of a Technical Supervisory Co-ordinating Installation Design Authority (TSCIDA) to supervise the SCIDA(s) in the day to day running of the SCIDA role. The TSCIDA will always be an MOD employee with a technical communications background, and may be part of another, relevant, MOD organisation. The TSCIDA will always report to the CIDA on aspects relating to their TSCIDA role.

0113. To avoid lengthening chains of responsibility, the appointment of a TSCIDA should be limited to essential situations. A TSCIDA should not be appointed over a SCIDA where an individual is primarily filling the 'Contract Manager' as opposed to a supervisor role.

0114. A TSCIDA may be appointed under the following circumstances:

a. Where a non MOD SCIDA has been appointed or contracted and the Defence CIDA is unable to provide the technical support required at a specific location; or

b. To co-ordinate or provide a technical focal point for specialist areas, normally, across several sites.

CHAPTER 02 – Configuration Management and the CIDA Role

Introduction

0201. JSP945, Part 1, Para 1.2 "*MOD Policy for Configuration Management*" defines Configuration Management (CM) as the through life management of changes to the products as-designed, as-built and as-maintained standard. It enables changes and different build standards to be traced back to the system requirements. These changes may be introduced to mitigate or nullify the effects of product deterioration due to ageing, corrosion or repair on repair. The changes may also take the form of in-service modification to: improve safety, reduce risk, mitigate obsolescence, improve performance, improve supportability, comply with legislative changes, provide enhanced capability, allow for technology insertion or the correction of product defects and to the final disposal of products.

0202. The main objective of CM is to document and provide full visibility of the product's present configuration and on the status of achievement of its physical and functional requirements. A further objective is that everyone working on the project at any time in its life-cycle uses correct and accurate documentation.

0203. It is essential that the technical and organisational activities which are performed within the CM process are fully integrated for the process to be effective. These activities are listed below:

a. Configuration identification.

b. Change Control.

c. Configuration status accounting.

d. Configuration audit.

CIDA Application of Configuration Management

0204. Defence CIDA is mandated with the responsibility for optimising the maintenance of operational capability, flight safety and electrical security by co-ordinating changes into MOD ICT facilities and by regulating installation standards. CIDA authority applies to all sites, buildings, rooms and mobile/transportable equipment facilities but not to aircraft, ships or submarines.

0205. Day to day activities on a site is normally delegated to the Site CIDA (SCIDA) except for deployed operations which are usually managed centrally. The application of CM to an MOD ICT system is dependent upon the CIDA Service Level assigned to that system (see guidelines at Annex A). In accordance with the mandates of **JSP 440**, the minimum requirement is the granting of Installation Approval by CIDA.

0206. CIDA has no remit to include system or application software in its CM activities. The CIDA CM 'product', therefore, is the physical, in terms of layout, and electrical, in terms of connectivity, facets of all MOD ICT facilities. CIDA discharges its CM responsibilities for MOD ICT facilities by ensuring that the following procedures are adhered to.

Configuration Identification

0207. A library of 'As Fitted' drawings, including Site Plans, Location Maps and system documentation is generated from site survey and/or assembled from extant information to form the CM baseline for all MOD ICT. Drawing content and standards are fully documented at Chapter 12.

Change Control

0208. All changes to a CIDA controlled facility must go through a Change Control (CC) procedure to obtain CIDA endorsement before the change is implemented. Full details are documented at Chapter 4.

Configuration Status Accounting

0209. To facilitate visibility, traceability and the efficient management of evolving configuration, SCIDA maintain records of pertinent data relative to all 'change' of MOD ICT systems that fall within their AOR, and may use a variety of resources, in either paper or digital format, dependent on the volume of data that is recorded.

Configuration Audit

0210. To ensure continuing conformance to CIDA requirements, sites must be regularly inspected by the SCIDA. This will be carried out to a 'SCIDA Inspection Plan', with associated Inspection Reports produced. Separately, Defence CIDA conducts an assurance regime for all SCIDA/sites, the timing of which being determined by the Defence CIDA in consultation with the SCIDA. In combination, the CIDA and SCIDA process constitutes the Configuration Audit.

0211. The frequency of Configuration Audits of MOD ICT systems depends on the 'CIDA Service Level' for the system (in accordance with at Annex A).

0212. The configuration audit examines the 'As Fitted' product to its configuration documentation to ensure compliance. The audit confirms that the product conforms to the physical and functional requirements through assessment of:

a. The comprehensiveness of the CIDA baseline package.

b. Installation standards and maintainability across the whole site meet CIDA requirements.

c. Common Equipment layout and engineering requirements are being maintained.

d. Information Security requirements of **JSP 440** continue to be maintained.

e. The progress of observations and actions raised in previous audit reports.

f. The local procedures intended to prevent unauthorised change.

g. Unauthorised changes that have occurred and where relevant, the organisation responsible.

0213. On completion of a configuration audit, a report of the results, including recommended actions to correct non-compliance, will be issued to all 'interested parties'.

Annex A - CIDA Service Levels

1. Configuration Management (CM) requires resources and thus must be directed where the gain is most tangible. The CIDA Service Levels for MOD facilities are designed to ensure that areas with the highest business importance are afforded the most significant protection. This gives the greatest benefit to operational capability, safety and security. Their application also helps to identify those sites that require CM but where it is not currently being delivered, thereby increasing the understanding of existing and future resource requirements.

2. In recognition of the above, 3 levels of provision have been devised to reflect the degree of effort required to comply with the requirements. Service Levels are assigned through consultation between CIDA, TSCIDA where appropriate, the facility stakeholders and the SCIDA. The facility stakeholders may include, but not necessarily be limited to, the Engineering and Operational Sponsors and Local Engineering Staff. Once assigned, a Service Level may be reassigned by agreement of all relevant agencies. A site may contain separate areas assigned differing service levels.

3. The SCIDA Inspection regime is directly related to the assigned CIDA Service Levels.

4. The Defence CIDA Service Levels are defined as follows:

a. **CIDA SERVICE LEVEL 1**

- MOD facilities directly supporting Operational Capability, **OR**
- Facilities where short term or extended denial of service would cause significant disruption to operational or direct operational support capability, **OR**
- Facilities having a **high population** of data processing equipment accredited at **SECRET** or higher, **OR**
- Flight Safety related facilities.

b. **CIDA SERVICE LEVEL 2**

- Facilities not directly supporting Operational Capability **AND** having a **low population** of equipment accredited at **SECRET** or higher, **OR**
- Facilities not directly supporting Operational Capability **AND** having a **high population** of equipment accredited at **OFFICIAL**.

c. **CIDA SERVICE LEVEL 3**

- Facilities not directly supporting Operational Capability **AND** having a **low population** of equipment accredited at **OFFICIAL**.

5. MOD facilities that only contain telephones, accredited at OFFICIAL, or internet installations are not necessarily subject to CM. However, all wireless installations are to be the subject of SCIDA control.

6. All cross site ducting and cables are to be subject to CM and will be treated as Service Level 2 as a minimum.

7. Notwithstanding the CM requirements of CIDA, the full Radio Site Protection (RSP) procedures are to be followed where applicable.

8. Table 2-1 is an overview of the minimum CM requirements at sites with different service levels. Table 2-2 is an alternative way of viewing the minimum CM requirements.

Table 2-1 Service Levels, Depth of CM and Frequency of Inspection (Note 1)

Service Level	Extent of Change Control	Minimum Frequency of Facility Inspections by SCIDA	Requirement for CM Drawings
1	Establish/maintain CM Baseline Full ECR process mandatory	**1** yearly	Full CM drawing set established and maintained
2	Full ECR process is mandatory. Note 1	**2** yearly	Full TEMPEST drawing set established and maintained IDA As Fitted drawings held, alternatively, CM drawings
3	**All** changes **must** be assessed ECR Pt 1 Mandatory Pts 2-5 at SCIDA discretion. Note 2	Sample inspections may take place from time to time	IDA 'As Fitted' drawings may be held, CM drawings optional

Notes:

For traditional telephone extensions (Plain Old Telephone Service [POTS]):

1. SCIDA must be notified of the proposed works (ECR 1). ECRs 2 - 5 at SCIDA discretion dependant on proposed change effect on existing ICT.

2. ECR Pts 1-5 at SCIDA discretion. The ATO is to ensure full liaison with the SCIDA to identify System Service Levels.

Table 2-2 Minimum SCIDA CM Requirement

Item	Activity	Service Level 1	Service Level 2	Service Level 3
1	**SCIDA Advice**			
2	**Change Control Process**			Note 1
3	**Maintain Drawings & Information**		Note 2	Note 3
4	**Conduct SCIDA Inspections**	Note 4	Note 5	Note 6
5	**Establish the Facility's CM Baseline**			

Notes:

1. Notification of all Change (ECR Pt 1 or equivalent) is mandatory. The need for ECR Pts 2 – 5 will be determined by SCIDA. Decisions not to proceed to ECR Part 5 will require a form of written design endorsement to the Design Agency and written installation conformance to the Security Accreditor.
2. Create & maintain TEMPEST drawings for all ICT systems processing information at SECRET or higher. IDA 'As Fitted' Drawings, or alternatively CM Drawings, are to be held.
3. IDA 'As Fitted' Drawings may be held.
4. Mandatory yearly inspection of all ICT systems by SCIDA.
5. Mandatory 2 yearly inspection of all ICT systems by SCIDA.
6. Inspections by SCIDA on request from site.

CHAPTER 03 – Deleted

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CHAPTER 04 - The CIDA Engineering Change Process

Introduction

0401. A change may be initiated from within a site or by a Project Team (PT), a customer, contractor or supplier and, in accordance with the guidelines contained within JSP 945 "*MOD Policy for Configuration Management"*, all change proposals shall be documented in order to protect the integrity of the effected system. It is incumbent on all change designers to initiate change control procedures through the SCIDA as early as possible in the change design cycle to enable protection of the effected installation against conflicting requirements.

0402. To comply with CIS Security Requirements**,** successful security accreditation of any Information and Communications Technology (ICT) affected by any 'Change' within a MOD site is dependant upon Installation Approval being granted by CIDA. This requirement is satisfied through the issue of a CIDA Certificate of Installation Conformance to the relevant System Security Officer. On MOD sites this is the responsibility of the SCIDA appointed by the Head of Establishment (HOE) who will be responsible for Configuration Management (CM) of the ICT systems within their site and keeping Defence CIDA informed of their site CM status.

0403. Any organisation that initiates change to any ICT, its environment or Radio Site Protection Zone is to ensure that CIDA installation standards and Change Control requirements are mandated and used for the associated work. This applies to all tasks from major projects to local engineering changes and will be correctly specified by mandating **JSP 604:4800** requirements in the related contract or work instruction.

0404. It is important that CIDA are made aware and consulted about proposed changes before an Invitation to Tender (ITT) process or a formal contract has been agreed to ensure appropriate requirements are part of any proposed change. Subsequent CIDA approval may be problematic if there has not been an involvement at the start of a change life cycle.

CIDA Change Control Procedures

0405. CIDA has identified a 5 stage Change Control model for use at all MOD sites. Local Change Control systems may be used where preferred to the CIDA model but they must contain all the elements of paragraph 0407 and the non-compliance procedure at paragraph 0419. All facilities must be able to use the CIDA model Engineering Change Request (ECR) because those PTs that role out systems across defence will use it. Use of the complete ECR process is dependent upon the SCIDA Service Level assigned to each individual facility (see guidelines at annex A to chapter 02 for details)

0406. In addition to the following Change Control procedures, all changes affecting Radio Site Restriction zones, the sites occupied by Microwave Links, Navigation Aids, Radars and Radios or similar C-E equipment must be separately notified to **MOD-RSP** in accordance with paragraph 0426.

CIDA Engineering Change Request

0407. The CIDA ECR process consists of five parts, each of which has a specific purpose in the Change Control of ICT facilities. The five parts for the ECR process are as follows

a. Part 1 ~ Initial Project Information.

b. Part 2 ~ Change Proposal and Request for Design Endorsement.

c. Part 3 ~ Design Endorsement of a Change Proposal.

d. Part 4 ~ Installation Completion Statement.

e. Part 5 ~ Certificate of Installation Conformance.

0408. To supplement the ECR process and ensure tight CM, the following procedures may also be applied:

a. Retrospective ECR.

b. CIDA Approval for Future Use.

c. CIDA Unsatisfactory Feature Report.

d. Quick Reaction Fax Approval.

e. IDA Self Certification for sites without SCIDA cover (Leaflet 4803 refers).

0409. The CIDA CM process model is explored in more detail below, with example ECR forms reproduced at the end of this chapter.

ECR Part 1 ~ Initial Project Information

0410. **Part 1** of the ECR process is designed to involve CIDA at the earliest possible stage of a project. It is to include sufficient detail to enable CIDA to safeguard the change against the effects of any conflicting work. It also serves as a request for CIDA Change Control drawings and other relevant information that may assist the change designer.

ECR Part 2 ~ Change Proposal & Request for Design Endorsement

0411. **Part 2** is used to provide detailed design proposals to CIDA in order to obtain CIDA approval and is to include all relevant detail and a comprehensive list of all statutory requirements, standards, codes of practice, equipment specific installation requirements, reports and guidance that the proposed change will comply with in sufficient detail to allow CIDA to assess whether the change is likely to meet the necessary requirements. (Drawings detailing the proposal, in accordance with the requirements of Chapter 12 are normally required to support this activity). For minor changes, Parts 1 & 2 may be combined.

ECR Part 3 ~ Design Endorsement of a Change Proposal

0412. If the design of the change proposal is in accordance with all CIDA requirements, the change is endorsed and **Part 3** will be issued to the IDA. The Part 3 will always have a time limitation imposed, normally 6 months, to maintain effective CM. If the proposed change does not meet all requirements, SCIDA will liaise with the designer to achieve conformance.

0413. The ECR **Part 3** is issued to the design agency as confirmation that the proposed change and its implementation will not breach any standards or requirements that are applicable to the subject facility. It has no contractual standing and is not to be construed as an Authority to Proceed (ATP). ATP may only be conferred by the facility owner in conjunction with the relevant budget holder.

ECR Part 4 ~ Installation Completion Statement

0414. **Part 4** of the ECR process requires a statement from the IDA that the change has been completed in accordance with the endorsed design and CIDA installation standards. Neither the change itself, nor any associated contracts are to be considered as being complete until “As Fitted” CM drawings, in AutoCAD compatible and/or hard copy format, have been approved by and lodged with the SCIDA. The Change Implementer or Change Designer shall liaise with SCIDA to enable SCIDA assessment of the physically completed change before the change Implementer leaves the site.

ECR Part 5 ~ Certificate of Installation Conformance

0415. If, after inspection, all aspects of the installed change are considered by CIDA to be satisfactory and in conformance with all requirements, the change will be certified as being conformant by the issue of **Part 5** of the ECR process.

Non-Compliance & Risk Management

0416. If, during the change control cycle, a non-compliance with any relevant regulation is identified, it must be confirmed whether, under existing Health & Safety at Work Regulations as defined in Statutory Instruments (SI), there is an absolute duty to comply with those Regulations. Where an Absolute Duty to Comply exists, the non-compliance must be rectified prior to handover of the system. The SCIDA is to provide full written detail of the non-compliance to the Change Initiator. In such cases where rectification is delayed, the Duty Holder, normally the HOE, shall be made aware of the non-compliance.

0417. In other cases, where there is no absolute duty to comply, and all avenues of resolution have been exhausted, then that non-compliance may be risk managed. The SCIDA is to provide full written detail of the non-compliance, including any detrimental effect the non-compliance may have on other ICT, to the Change Initiator. The Change Initiator, with assistance from and agreement of SCIDA, shall identify the appropriate Risk Owner. Where there is contention, Defence CIDA shall arbitrate. The Risk Owner shall consider the full impact of the non-compliance before accepting or declining the associated risk.

0418. An accepted risk shall be formalised by a Risk Management Statement which is to be referenced by and become part of the CIDA Design Endorsement or Installation Conformance Certificate. A declined risk shall be formalised by the Risk Owner providing direction, relative to the resolution of the risk, to the Change Initiator.

Retrospective Engineering Change Request

0419. A Retrospective ECR (RECR) is to be raised when a change is suspected to have occurred without the required CIDA approval process having taken place. Submission of an RECR will ensure that, where required, the ring-fence around a facility can be adjusted to prevent a repeat of similar unauthorised change in the future. The RECR procedure will also attempt to identify those responsible for any remedial work necessary to correct installations that either fall below acceptable standards or where a CIDA authorised installation or the CIDA overall plan for a facility is compromised.

CIDA Approval for Future Use

0420. When a requirement exists to retain cable, spare capacity or equipment for future use, a CIDA Approval for Future Use (CAFU) form shall be submitted to CIDA. CIDA will authorise retention or require recovery as appropriate, after taking account of any formal agreements with other authorities who have a vested interest. A CAFU number must be obtained, before any unused ICT equipment or cables are left in-situ.

CIDA Unsatisfactory Feature Report

0421. Installations may exist that do not fully meet all CIDA requirements as mandated by this publication. These installations will be evaluated on a case by case basis through the CIDA Unsatisfactory Feature Report (CUFR) process and concessions agreed or remedial action initiated as deemed appropriate. If a concession is agreed that permits an installation to remain in a sub-standard condition, any future Change proposals for that installation are to include corrective actions sufficient to bring the installation into full compliance with CIDA Installation Standards.

CIDA Quick Reaction Fax Approval

0422. Use of a Quick Reaction Fax Approval (QRFA) is in itself a commitment that the Change Designer will initiate full ECR procedure within 10 working days and, when the full ECR has been processed, the Change Initiator will manage the implementation of any modification that is necessary to bring the installation into conformance with CIDA requirements. This caveat is necessary because imposed time constraints may preclude detailed assessment of the proposal. The following are acceptable situations appropriate to the use of a QRFA:

a. Where a proposed change could not have been foreseen and is required in response to an Urgent Operational Requirement (UOR) or Urgent Engineering Requirement (UER).

b. In exceptional circumstance where it is deemed to be overwhelmingly beneficial to MOD.

0423. In extreme circumstances, a change may take place without even a QRFA. The commitments mandated by the use of the QRFA will also apply.

Documentation Availability

0424. A full set of documentation detailing all applicable statutory requirements, standards, codes of practice, maintenance procedures, system design, installation design and equipment specific installation requirements, is to be available locally following all changes to all ICT facilities. Additionally, SCIDA are to hold “As Fitted” drawings and connectivity data relating to the facilities affected by the change.

Additional Requirements Relating to C-E Facilities

0425. The following aspects of CM are frequently overlooked by organisations submitting change proposals that affect C-E or C4I hardware, its environment or Radio Site Restriction Zone. All proposals that effect these aspects are to be brought to the attention of **MOD-RSP** at the earliest possible stage of a change:

a. Radio Site Clearance and Safeguarding.

b. MOD Register of Radio Sites.

c. Site Plans or Navigation Aid, Radar and Radio, Location Maps

Radio Site Clearance, Site Safeguarding & MOD Register of Radio Sites

0426. All requirements to apply change to Radio Frequency (RF) emitters/receivers on MOD sites must include an early application, in accordance with **JSP 604:3032** Radio Site Clearance to **MOD-RSP** for approval, Radio Site Clearance and amendment of the Register of Radio Sites (RRS). Information on any RF propagation path safeguarding requirements must be included in these applications to enable protection, for each site, against degradation by future development or installation.

Ministry of Defence

CO-ORDINATING INSTALLATION DESIGN AUTHORITY
ENGINEERING CHANGE REQUEST
Part 1
INITIAL PROJECT INFORMATION

Project Title:

Originators Ref No: CIDA Ref

Proposed Start Anticipated End

Sites That Will Be Effected By Proposed Change:

First Site

Main Site: Sub-site:

Building Room Names:

Building Room Nos:

CIDA: TSCIDA: SCIDA:

Second Site

Main Site: Sub-site:

Building Room Names:

Building Room Nos:

CIDA: TSCIDA: SCIDA:

Third Site

Main Site: Sub-site:

Building Room Names:

Building Room Nos:

CIDA: TSCIDA: SCIDA:

If more than three sites are effected please attach additional sheet(s)

Overview of Proposed Change:

Main System(s) Involved:

Synopsis of Work:

If proposed change is temporary, date due for removal:

PTO

Request For Copies Of Configuration Control Drawings & Maps

Drawings Requested:	Format(s)

Please forward copies of the above drawings to the undersigned

Contract Specifications:

Have CIDA requirements been specified in the ITT or equivalent documentation? Yes ☐ No ☐ Not Applicable ☐

DETAILS of MAIN CONTACTS: *[Where Known]*

Instigator Of Proposed Change: *[normally IPT for major projects or Local Engineering*

Name:		Post:	
Address:		Telephone	
		Fax:	
		e-mail:	

Design Organisation Representative: *[normally the effected system IDA]]*

Name:		Post:	
Address:		Telephone	
		Fax:	
		e-mail:	

Proposed Installation Organisation Representative:

Name:		Post:	
Address:		Telephone	
		Fax:	
		e-mail:	

Engineering Change Request Originator Details: *[your details]*

Name:		Post:	
Address:		Telephone	
		Fax:	
		e-mail:	

Signature: **Date:**

REVIEW CLASSIFICATION BEFORE DISPATCH

Ministry of Defence

CO-ORDINATING INSTALLATION DESIGN AUTHORITY

ENGINEERING CHANGE REQUEST

Part 2

CHANGE PROPOSAL & REQUEST FOR DESIGN ENDORSEMENT

Project Title:

Originators Ref No: CIDA Ref

Proposed Start Anticipated End

Location of Proposed Change:

Main Site: Sub-site:

Building Room

Building Room

CIDA: TSCIDA: SCIDA:

SCIDA Details:

Name: Post:

Address: Telephone

Fax:

e-mail:

Inventory of all supporting documentation:

Document Reference:	**Document Title:**

If proposed change is temporary, date due for removal:

PTO

ADATS Form 468 'MOD Radio Site Clearance Request'

	Yes	No	Not Applicable
iaw **JSP 604:3032 Radio Site Clearance** a completed **F 468** is included with this proposal	☐	☐	☐

If **NO**, state the reference relating to an earlier submission or the reason for non inclusion

Cable Duct Route Approval:

	Yes	No	Not Applicable
An approval request for provision of, or change to, a duct or cable route is included with this proposal	☐	☐	☐

If **NO**, state the reference relating to an earlier submission or the reason for non inclusion

	Yes	No	Not Applicable
The on-site **Duct Manager** has been involved in this proposal	☐	☐	☐

If **NO**, state reason for non involvement

Siting Board Findings:

	Yes	No	Not Applicable
The findings of the Siting Board associated with this 'change' are included with this proposal	☐	☐	☐

If **NO**, state the reference relating to an earlier submission or the reason for non inclusion

Associated Design Restrictions:

Equipment Involved:	**Associated Restriction:**

Change Designers Details & Statement of Conformance:

Name: Post:

Address: Telephone

Fax:

e-mail:

This proposal conforms with the requirements of JSP 440 & JSP 604 Leaflet 4800 as amended by any specific CIDA requirements established in response to Part 1. Other Designers with a vested interest, as notified by CIDA, are content with this proposal.

Signature: **Date:**

REVIEW CLASSIFICATION BEFORE DISPATCH

ENGINEERING CHANGE REQUEST – PART 3

DESIGN ENDORSEMENT of a CHANGE PROPOSAL

issued on behalf of DAIS Assurance CIDA

Certificate Number: **CIDA/ECR/**

Dated:

Site Address: **System:**

Building/s:

Rooms:

Local Change Serial No: **Valid for:**

Certified Change:

References :

A. JSP 604: Pt2 Vol2 Leaflet 4800 'Manual of Regulations for Installation of Communication and Information Systems'

B. Design Documentation Ref:

C. JSP 440 'The Defence Manual of Security'.

D. SDIP 29 'Facility Design Criteria and Installation of Equipment for the Processing of Classified Information'.

1. In accordance with the requirements of Reference A Chapter 4, the change proposal detailed at Reference B has been assessed against the standards and mandates of References A, C and D.

2. This design is Endorsed as fully compliant with all relevant regulations. *[This statement OR following statement]*

This design is NOT fully compliant with all relevant regulations. It is Endorsed on the basis of the Risk Management Statement identified below.

3. Any deviation or amendment to that detailed in the design documentation at Reference B or the subject facility detailed above, subsequent to the issue of this Design Endorsement of a Change Proposal, is to be the subject of a re-submitted Change Proposal.

4. This document is issued to the Change Designer and the Facility Owner as confirmation that the proposed change and its implementation will not breach any standards or requirements that are applicable to the facility. It has no contractual standing and is **not to be construed** as an Authority To Proceed (ATP). ATP may only be conferred by the Facility Owner in conjunction with the relevant Budget Holder.

Risk Management Statement Reference and Owner:

Issuing Authority Post: **Name:**

DAISSRAAsrnc-CIDA **Signature:**

Date:

THIS ENDORSEMENT IS TO BE AVAILABLE FOR INSPECTION BY THE UNIT SECURITY OFFICER	***Version 19 Nov 17***

REVIEW CLASSIFICATION BEFORE DISPATCH

Intentionally Blank

Ministry of Defence

CO-ORDINATING INSTALLATION DESIGN AUTHORITY

ENGINEERING CHANGE REQUEST

Part 4

INSTALLATION COMPLETION STATEMENT

Project Title:			
Originators Ref No:		CIDA Ref	
Actual Start Date:		Completion Date:	

Location of Change:

Main Site:		Sub-site:	
Building		Room	
Building		Room	
CIDA:		TSCIDA:	SCIDA:

CIDA/SCIDA Details:

Name:		Post:	
Address:		Telephone	
		Fax:	
		e-mail:	

Change Implementers Details & Certificate of Completion:

Name:		Post:	
Address:		Telephone	
		Fax:	
		e-mail:	

Except for this Risk Management Statement, the proposal at Part 2 of this ECR has been completed in conformance with the requirements of JSP 440 & JSP 604 Leaflet 4800.

Date by which 'As Fitted' drawings will be lodged

Signature:

Date:

REVIEW CLASSIFICATION BEFORE DISPATCH

ENGINEERING CHANGE REQUEST – PART 5

CERTIFICATE of
INSTALLATION CONFORMANCE

issued on behalf of DAIS Assurance CIDA

Certificate Number:
CIDA/ECR/

Dated:

Location:

Local Change Serial No:

Unit/Site :

Rooms:

System:

Certificated Change:

References:

A. JSP 604 Pt2 Vol2 Leaflet 4800 'Manual of Regulations for Installation of Communication and Information Systems'

B. JSP 440 'The Defence Manual of Security'

C. SDIP 29 'Facility Design Criteria and Installation of Equipment for the Processing of Classified Information'

D. Design Proposal Documentation Ref

E. CIDA Design Endorsement:

F. Installation Completion Statement:

1. In accordance with the requirements, standards and mandates of References A to C, the Change (Reference D), as Endorsed (Reference E) and Confirmed as complete (Reference F), has been Inspected.

2. The implementation of the subject Change is fully compliant with all relevant regulations, and is therefore deemed conformant. *[This statement OR following statement]*
The implementation of the subject Change is NOT fully compliant with all relevant regulations. It is accepted on the basis of the Risk Management Statement detailed below.

3. The continued conformance of the completed installation is dependent on no uncontrolled changes being implemented. Any changes, subsequent to the issue of this Certificate of Installation Conformance, requires a Change Proposal to be raised in accordance with the requirements of Reference A Chapter 4.

Risk Management Statement Reference and Owner:

Issuing Authority

Name:

Post:

Signature:

Date:

THIS CERTIFICATE IS TO BE RETAINED BY THE SYSTEM SECURITY OFFICER	***Version 19 Nov 17***

REVIEW CLASSIFICATION BEFORE DISPATCH

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CHAPTER 05 - Fire Hazard Designation of Cables & Materials

Introduction

0501. This Chapter details the MOD requirements for the Fire Prevention measures concerned with ICT installations, and the **contents are determined by the Senior Fire Safety Manager (DIO).**

0502. Cables and materials rarely initiate fires, however they may propagate the fire and significantly increase the damage caused. Until recently the flame retardence of cables was achieved by the use of halogenated flame retardants which are effective fire suppressants, but which unfortunately produce dense smoke and corrosive acid gases when burned. These effects can greatly increase the consequences of the fire and therefore are highly undesirable. They will hinder evacuation and firefighting, endanger life and cause corrosion damage to expensive and vital equipment.

0503. The terms Limited Fire Hazard (LFH), Low Smoke & Fume (LSF), Low Smoke Halogen Free (LSHF) and Low Smoke Zero Halogen (LSZH or LS0H) have been used by manufacturers as Fire Hazard (FH) designations and industry trade marks. With effect from the 1st July 2017 manufacturers will now use the Euro Class codification system for its infrastructure cabling.

0504. MOD facilities containing ICT range from small, isolated, single room buildings with multiple escape routes, to complex multi-room underground bunkers with limited means of egress. ICT assets within these facilities can range from a single stand-alone management support PC, with no operational significance, to large multi-cabinet systems which are operationally essential. Equally, to reflect MOD business, various working arrangements are practised across the MOD estate, and include '9 to 5' working, 24/7 manning and cases where staff 'live in'. It is within this context that the MOD perspective on the FH designation of cables, now referred to as Euro Class cables, FH designated materials and the types of facility where they can be installed, are detailed in Table 5–1 and Table 5-2. Legacy installations are not subject to retrospective compliance, however any new installation changes must comply with these standards.

0505. Euro Class cable standards only apply to the sheathing of internal fixed infrastructure Data and Telephony cabling. Non-Permanent cables e.g. Patch Leads, Power Leads will continue to use the FH designation as laid down Column 4 of Table 5-1. Due to standards applied to the designation LFH differing between countries of manufacture, the designation LFH is not to be used in MOD Installations.

0506. Good design practice places legal requirement to specify Euro Class cables and FH designated materials to limit the spread of fire and fumes, the formation of Acrid Smoke, Flaming Droplets and Toxic Gases. Therefore, their use is a legal requirement in specific facilities.

Cable and Material Designation

0507. Cables and materials are tested by independent test houses to determine if they comply with defined FH standards. A data sheet is produced for each cable type, containing information in regard to the standards the cable complies with, as shown in Table 5–3.

0508. The Euro Class cable designations as listed in Table 5-1 are the minimum level of FH protection for each specification of cable (e.g. Cat 5e) to be installed.

0509. Cables and materials for MOD installations are to be used only if they comply with the standards as listed in table 5–3. From 1st July 2017 all cables will be marked with the CE mark and the “Euro Class category for the cable marked on the cable sheath. Each manufacturer shall make available a Declaration of Performance (DOP) certificate available upon request. (IAW - BS EN 50575:2014+A1:2016). This will provide clear guidance as to their suitability for use. The new standard for all Euro Class cables is the Construction Product Regulation (CPR) 305/2011.

0510. All cables and materials used for MOD installations must meet the stringent testing conditions for Smoke emission, Flaming Droplet and Acid toxicity emission as shown in Table 5–3. To meet MOD FH standards and qualify for use in MOD installations, cables and materials must meet the Standards as shown.

Requirements

Underground Accommodation

0511. In accordance with Crown Fire Standard E8 (see paragraph 0517), for underground or windowless, manned facilities which may include limited means of escape and forced air ventilation, all system cables, cabinet wiring and Permanent mains voltage power cables for ICT systems & office equipment are to be designated as shown in Column 2 of Table 5-1, Non-Permanent cables e.g. power leads, patch leads are to be LSHF.

Fire Stopping

0512. One of the most important fire related aspects of ICT installations is correct maintenance of the fire-integrity of fire barriers that are subject to cable penetration, BS 7671 Clause 527.2 refers. All walls and all floors in MOD facilities are classed as fire barriers (with a fire integrity rating). It is therefore a requirement that an equivalent rated fire-stopping and/or penetration sealing system be used at all penetrations, to maintain the original fire integrity of the fire barrier.

Installation Conformance

0513. When planning to install a permanent cable or material into a particular type of room on the MOD estate, the cable or material must comply with the FH designations in accordance with tables 5-1 & 5-2.

TABLE 5-1 Cable and Material Designation and Use.	Fire Stopping and/or Penetration Sealing System	System Infrastructure Cables & Permanent Cabinet Wiring (MINIMUM Standards)	Non-Permanent Wiring & Non-Metallic Cable Containment	Supplementary Equipment Wiring and Material
Underground or Windowless, manned Facilities Subject to Close-Down Activity (Note 1)	All Walls & All Floors	**Euro Class** Cca S1b d2 A2 (Note 2)	Low Smoke Halogen free (LSHF)	LSHF
Underground or Windowless, manned Facilities NOT Subject to Close-Down Activity. (Note 1)	All Walls & All Floors		LSHF	Low Smoke and Fume (LSF)
All Other Buildings, Including Small Enclosed Buildings, occupied only for maintenance, ISO Containers & Vehicles.	All Walls & All Floors		LSF	LSF

Notes:

1. The accepted approach for these facilities is predicated on minimising fire & toxic effluent primarily for protection of **life**.

2. The Euro Class cable designations refer to **ALL** grades and categories of Infrastructure telecommunications and data cables, ie, Cat5, Cat5e, Cat6, Cat6a, Cat6A, Cat7, Cat7A and Fibre Optic.

Euro Class Cable Designations

TABLE 5-2	ADDITIONAL CLASSIFICATIONS		
EURO CLASS	**Smoke Production**	**Flaming Droplets**	**Acidity**
B2ca Cca	s1a s1b s2 s3	d0 d1 d2	a1 a2
Notes:	s1 is the most demanding classification s1a is more demanding than s1b.	d0 is the most demanding classification.	a1 is the most demanding classification.

0514. The use of cables and materials not designated LSHF or for new installations not marked with a Euro Class classification will, upon burning, produce toxic and acidic effluent which may cause damage to the printed circuit boards (PCBs) of adjacent equipment exposed to such gases. Further information is contained in BS 8492. For all installations the use of Euro Class cables should be specified for unmanned NERs where it is required to protect equipment from such damage but consideration should be given to the presence of any existing non LSHF materials.

0515. IAW BS 7671: For cables installed along emergency evacuation routes not supported by fire-resistant materials, non-metallic cable ties, clips or trunking are not to be used. This will help prevent cables falling in the event of a fire and therefore hindering evacuation and firefighting activities.

Cable and Material Designation Standards

0516. Cables and Materials used for the installation of ICT systems on the MOD estate shall comply with the standards listed below:

a. Cables – **BSI/ISO 11801 2.2 Ae 3.**

b. Telecommunications Equipment & Cabling – **BS8492:2009.**

c. **BS EN 50600 (especially Part 2-4 Section 2-3).**

d. **"The Construction Product Regulation" (CPR 305/2011).**

Fire Hazard Testing Standards

TABLE 5-3	EURO CLASS STANDARD 305/2011
Smoke Production	BS EN 61034-2 (2005) +A1 2013
Flaming Droplets	BS EN 50399-2011 +A1 2016
Acidity	BS EN ISO 60754 Part II:2014

Standards and Publications

0517. Crown Fire Standard E8 'Underground Accommodation'. This Fire Standard deals with the provisions for fire safety in underground and windowless accommodation on the Defence Estate. It addresses active and passive measures in relation to safety of life and property protection. General requirements applicable to all types of underground accommodation are provided, with an appendix outlining additional requirements for accommodation which may be considered of higher risk in terms of building usage, for example, sleeping accommodation and building with a "close down" facility.

0518. When using COTS equipment for ICT installations within windowless, manned buildings, the IDA is to use equipment manufactured using Euro Class cabling and LSHF materials. Where compliance with this requirement is not possible, an exemption should be sought from the DIO Senior Fire Safety Manager through the Project Fire Safety Officer. The request should provide evidence of the efforts made to meet the requirement.

0519. **BS EN 60332** "Code of Practice for Electricity (Wiring) Regulations". This is a comprehensive Standard providing Standards for the whole subject area and consists of a number of parts. Parts (1-2 & 3-24) deal with the Testing of electric and optical fibre cables under fire conditions.

Chapter 06- The ICT Physical Environment

Introduction

0601. It is desirable that the installation of any Information and Communications Technology (ICT) into any area will have a net zero impact on the environment of the immediate area. To this end, the environmental impact, particularly in terms of space, heat and noise output, of the addition of ICT is to be fully explored and measures put in place to negate any deleterious effect.

Direction

0602. All ICT installations are to conform to the requirements contained within **BS EN 60297-3-100, BS EN 62368-1:2014, BS EN 60529, BS EN 12825** and **SI 1998 No 2306**.

0603. All cabinets, with respect to space and accessibility, are to conform to the requirements of paragraphs 0623 to 0625.

0604. Information Technology (IT) furniture is to conform to the requirements contained within **BS 6396** and **JSP 375.**

0605. To ensure that equipment placement, cooling, power and earthing aspects do not require re-engineering as requirements evolve, all equipment cabinets, including those that are in essence a single equipment (such as USAS II or CICT Server cabinets), are to be installed in accordance with the requirements of this publication.

Requirements

Space & Accessibility

0606. **SI 1989 No 635** 'Electricity at Work Regulations' require adequate working space, means of access and adequate lighting to prevent injury. **BS EN 50174** requires a minimum clearance of 1200mm on all cabinet faces, where access is required.

0607. MOD policy for compliance with the foregoing apparent confliction requires that:

a. Single cabinets and single rows of cabinets are to be installed such that all doors, where access is required, may be opened through a full 90 degrees and unobstructed access to the interior is provided or an unobstructed clearance of 1200 mm is provided, whichever is the greater.

b. Multiple rows of cabinets are to be installed such that an unobstructed passageway, at least 1200 mm wide, is preserved between rows.

c. Wall mounting double hinged cabinets are to be installed such that the equipment containment portion of the cabinet may be opened through a full 90 degrees and are to be positioned such that they pose no Health & Safety hazard.

0608. Clearance distances are to be increased by an appropriate figure in situations where equipment that is designed to be withdrawn on runners or particularly heavy or bulky equipment is to be accommodated.

Equipment Cabinets

0609. All cabinets are to conform to **BS EN 60297-3-100** and **BS EN 62368-1:2014**. In addition they are to provide protection to both equipment and personnel relevant to the physical environmental conditions of the installed location, in accordance with **BS EN 60529**.

0610. All new installations of cabinets shall fit in with the ergonomics and aesthetics of the associated area and provide optimum spare capacity to assist in the economic use of the available space. For example, full height as opposed to half height cabinets shall be provided and these shall be positioned in accordance with the SCIDAs' overall plan for the facility. Additions to extant suites of equipment cabinets shall, within the above constraints and requirements, conform to the design and colour scheme of the existing cabinets.

0611. Cabinets are to have metal or glass doors, which must be lockable by a common key. Lockable glass front, and metal rear door is the preferred configuration. Cabinets intended for rack mount test & measuring equipment do not need to be fitted with a front door unless required for cooling or EMC purposes. A fitted front door remains the preferred configuration even for test and measurement use.

0612. All cabinets are to be installed with an internal power outlet block, complete with an external earth terminal, of sufficient capacity to supply all equipment in a fully populated rack. 12 power outlets shall be a minimum for racks of 42U in height, or greater. There shall always be at least 2 spare power outlets following initial rack population.

0613. All cabinets are to be installed with an Earthing Bus-Bar (see paragraph 0625) of sufficient size and placement to allow all cabinet components and all installed equipment to be independently bonded with minimal length bonding straps.

0614. All cabinets are to be installed with an internal cable management system of sufficient capacity to manage the cabling of a fully populated cabinet, including possible TEMPEST/EMC separation requirements.

0615. All cabinets are to be installed with front and rear equipment attachment vertical members that are mounted such that sufficient space is available for equipment handles, cable connectors and the necessary bend radii of both fibre optic and metallic cables to allow the cabinet doors to close without pressing against cables, connectors, etc.

0616. All cabinets are to be installed with a suitably placed identification label for recording information, including a unique cabinet identifier with the highest protective marking of equipment or data being processed within. Additionally, it is recommended that the cabinet identification labelling include detail of the power supply to the cabinet. Note: If power supply detail is not included in the cabinet identification label it must be provided in a clearly visible manner elsewhere on the cabinet.

0617. To assist with future proofing and the flexibility of a facility, and to ensure maintainable inter-cabinet cable routing, individual cabinets that are destined to be installed alongside other cabinets are, wherever possible, to retain their side panels in situ. Retention of correctly bonded side panels will also assist with EMC/TEMPEST screening, even though such screening may not be a requirement at the time of installation.

Stability

0618. Requirements for the stability and safety of work equipment are specified in **SI 1998 No 2306** and **BS EN 62368-1:2014.**

0619. All installations are to meet the requirements of **BS EN 62368-1:2014.** Floor mounted equipment cabinets are to meet the requirement of **Clause 8.6** by being securely fixed to the fabric of the building in a manner appropriate to the material and structure and the total weight and distribution of equipment that may be installed in a fully populated enclosure. When racks are mounted on a false floor, proprietary rack fixing systems designed for this facility may be employed providing the manufacturer's instructions are followed and the floor is checked for suitability beforehand. To provide additional stability, and wherever possible, enclosures mounted immediately adjacent to one another are to be secured together using approved fixtures and fittings. All wall and ceiling mounted ICT equipment is to be certified as meeting the requirement of **Clause 8.7**.

0620. Unless a cabinet has an integral plinth, a timber mounting plinth is to be used at all locations not having raised access floors (modular computer floors). Where cabinets are mounted on raised access floors, the overall design and installation/maintenance procedures are to ensure safety from all perspectives including the stability, functionality and strength of the design when floor panels are removed to allow access to under-floor cables and plant. The required characteristics and performance standards for raised access floors can be found in **BS EN 12825.**

0621. All equipment installed within a cabinet is to be secured against unintentional movement by the use of approved brackets, shelving, slides or runner assemblies as necessary, according to the size, weight and design of the equipment. The use of cable ties or 'Velcro' for securing small items that do not have a recognised 'rack mount adaptor' accessory may be permitted provided there is no risk to the installation.

Main Earthing Terminal and Earthing Bus-Bars

0622. All cabinets are to be fitted with a Main Earthing Terminal (MET). These cabinet METs are often referred to as Earthing Bus-Bars. They allow all cabinet components and all installed equipment to be independently bonded.

0623. An MET is provided for the connection of protective bonding conductors, earthing conductors, protective conductors and functional earthing conductors, if relevant, to the means of earthing and is typically found installed in building entrance facilities, communication rooms, network equipment rooms and cabinets.

0624. The location of an MET shall be accessible. If the location of the MET is hidden or not easily accessible (e.g. under a raised floor or above a suspended ceiling) then a label indicating its location shall be provided in an accessible position and in close proximity to the MET. Each conductor shall be able to be disconnected individually and the connection to the MET shall be reliable and disconnectable only by means of a tool

0625. A typical MET is fabricated of solid hard drawn copper, approximately 6 mm thick, 32 mm wide and 300 mm long or of sufficient length for immediate requirements and a 20% allowance for future growth. An Earthing Bus-Bar in an equipment cabinet will normally be constructed of solid hard drawn copper, approximately 6 mm thick, 16 mm wide and run for the full height of the cabinet. However, a solid metal structural element of the framework of a cabinet may be utilised as an Earthing Bus-Bar if it simultaneously satisfies the following three requirements:

a. The electrical continuity shall be assured by construction so as to ensure protection against mechanical, chemical or electrochemical deterioration;

b. The material and dimensions provide electrical characteristics not less than that of the Circuit Protective Conductor (CPC);

c. It shall provide a clean flat metallic surface for the connection of protective conductors which shall present a junction resistance no greater than 0.05 ohms.

Equipment mounting and stacking

0626. Unless manufacturers' installation design standards specifically allow, equipment designed for desk-top or shelf mounting is not to be stacked. This applies wherever the equipment is to be located. Units designed for stacking shall not be mounted more than 2 equipment high without SCIDA agreement. Dissimilar sized units shall not be stacked. Where desk-top or shelf mounting is desired, cable management, shall be applied along the complete cable length. Whenever there is a perceived requirement to stack desk-top or shelf mounting units not designed for stacking, suitable shelving must be used and this will normally be within an equipment cabinet. For situations where a small number of these items require mounting and 19 inch rack shelving is not appropriate, low-profile wall cabinets are recommended.

0627. Deployable equipment may be stacked more than 2 equipment's high if necessary, as long as it is secured and in accordance with manufacturer's instructions.

0628. To maximise the available capacity within a cabinet designed for 19 inch rack mounted equipment, where possible, equipment should only be located at complete U intervals. For the installation of a particular equipment, other intervals may be used where that positioning would maximise useable rack space.

Impact on ambient temperature

0629. Cabinet internal air temperatures are not to exceed 5ºC above the related ambient room temperature and in all circumstances are to be kept below 40ºC. Office accommodation, as opposed to equipment rooms, shall not have equipment installed that would cause the room temperature to become uncomfortable or to rise above 30ºC. The change initiator whose change would cause higher temperatures is responsible for resolving the problem.

Manufacturers' installation standards

0630. Whenever possible, manufacturers' installation standards are to be provided to SCIDA at the design proposal stage of an installation. These should identify aspects such as cooling requirements, ventilation space requirements or EMC issues that may require safeguarding by SCIDA throughout the in-service life of the equipment.

IT Furniture

0631. IT furniture is a generic term for office desks that incorporate provision for electrical power, data and telecommunications distribution systems. All IT furniture in MOD facilities shall conform to, and be installed, inspected, tested and maintained in accordance with, the requirements of **BS 6396** and **JSP 375.**

Additional Requirements

0632. In addition, all ICT used for storing, forwarding or processing MOD information is to be installed in accordance with the appropriate mandates of **JSP 604:3000** and **SDIP 29.**

Standards and Publications

0633. **SI 1989 No 635** '*The Electricity at Work Regulations*' requires at **Regulation 15** *'For the purposes of enabling injury to be prevented, adequate working space, adequate means of access, and adequate lighting shall be provided at all electrical equipment on which or near which work is being done in circumstances which may give rise to danger'*.

0634. **SI 1998 No 2306** '*The Provision and Use of Work Equipment Regulations*' requires at **Regulation 20** *'Work equipment or part of work equipment is stabilised by clamping or otherwise where necessary for purposes of health and safety'.*

0635. **BS EN 12825** *'Raised access floors'.* This standard specifies the characteristics and performance requirements of raised floors and is applicable to modular, factory made flooring elements, comprising panels and pedestals.

0636. **BS EN 50174-1** *'Information technology-Cabling installation ~ Installation specification and quality assurance'.* This standard requires at **Clause 4.2.5.1** that *'The location of cabinets, frames and racks shall provide a minimum clearance of 1.2 m on all faces where access is required'*

0637. **BS EN 60297-3-100** *'Mechanical structures for electronic equipment ~ Dimensions of mechanical structures of the 482.6 mm (19 in) series'.* This standard specifies the basic dimensions of front panels, sub racks, chassis, racks and cabinets of the 482.6 mm (19 in) series.

0638. **BS EN 60529** *'Degree of protection provided by enclosures (IP code)'.* This standard applies to the classification of degrees of protection provided by enclosures for electrical equipment with a rated voltage not exceeding 72.5kV.

0639. **BS EN 62368-1:2014** *'Audio/Video, Information and Communication Technology Equipment Part 1: Safety requirements'.* This standard specifies the requirements intended to reduce risks of fire, electric shock or injury to personnel who may come into contact with IT equipment. **BS 6396** *'Electrical systems in office furniture and educational furniture - Specification'.* This standard specifies the requirements for the safe provision and assembly of electrical power, data and telecommunications distribution systems in office furniture, educational furniture and office screens.

0640. **CESG GPG No14 '***Electromagnetic Security'.*

0641. **SDIP 29 "***FACILITY Design Criteria and Installation of Equipment for Processing of Classified Information".*

0642. **JSP 604** *'CIS Security Requirements'.*

0643. **JSP 375** *'MOD Health & Safety Handbook',* **Part 2, Volume 1, Chapter 23.** '*Inspection and Testing of Portable Electrical Appliances*'.

CHAPTER 07 - The ICT Electrical Environment

Introduction

0701. All Cabinet electrical systems are to be designed, installed and certified in accordance with the requirements of **BS 7671** *'Requirements for Electrical Installations ~ IET Wiring Regulations'.*

0702. **BS 7671** has been extensively referred to in **Health and Safety Executive** (HSE) guidance over the years. Electrical installations that conform to this standard are regarded by the HSE as likely to achieve conformity with the relevant parts of the **Electricity at Work Regulations.**

0703. The following paragraphs, therefore, are provided to tailor and highlight the requirements from the MOD perspective. Compliance with the requirements of this chapter will ensure that cabinet installations meet Health & Safety legal mandates whilst providing the MOD with durable and flexible ICT.

0704. When buildings containing ICT installations are being built or are undergoing major refurbishment then bonding installation up to the buildings main MET should be IAW **BS50310**.

Equipment Cabinets

0705. Equipment cabinets installed in accordance with Chapter 06, including correctly installed electrical equipment within, shall be classed as fixed electrical equipment. Initial responsibility for the electrical testing of these cabinets shall fall to the IDA or system owner. Once the equipment cabinets have achieved electrical certification, responsibility of electrical safety of the cabinet is then passed to the site Head of Establishment. This shall include inspection of the cabinets the requirements detailed at Para 0701.

Bonding & Earthing

0706. The subject of bonding and earthing conductors is fully examined, with requirements identified, at:

a. **BS 7671** 'Requirements for Electrical Installations ~ IEE Wiring Regulations', **Chapter 54** 'Earthing Arrangements and Protective Conductors'.

0707. **SI 1989 No 635** *'The Electricity at Work Regulations'* requires at:

a. **Regulation 8** 'Precautions shall be taken, either by earthing or by other suitable means, to prevent danger arising when any conductor (other than a circuit conductor) which may reasonably foreseeably become charged as a result of either the use of a system, or a fault in a system, become so charged',

b. **Regulation 9** 'If a circuit conductor is connected to earth or to any other reference point, nothing which might reasonably be expected to give rise to danger by breaking the electrical continuity or introducing high impedance shall be placed in that conductor unless suitable precautions are taken to prevent that danger'.

0708. To comply with **Regulations 8 & 9**, all parts of the cabinet, including doors, side panels and blanking panels are to be individually bonded to the cabinet Earthing Bus-Bar by insulated multi-strand flexible cables with cross sectional area not less than 4 mm^2 (or 2.5 mm^2 if mechanical protection in addition to green/yellow insulation is provided). Additional bonding is to be made to

all equipment cases provided with an earth terminal unless the terminal is provided for Functional Earthing (FE), in which case FE paragraphs 0708 and 0709 apply. Earthing is to be provided to connect each PDU earth terminal to the cabinet MET.

0709. BS7671-543.7.1.203 states: “The wiring of every final circuit and distribution circuit intended to supply one or more items of equipment, such that the total protective conductor current is likely to exceed 10mA, shall have a high integrity protective connection”. Therefore, the Circuit Protective Conductor (CPC) to the Cabinet shall be 4mm^2 when mechanically protected or 10mm^2 if not. The distribution board supplying cabinets subject to High Earth Leakage Current (HELC) shall be labelled i.a.w. BS 7671 - 543.7.1.205.

0710. For MOD ICT installations, this regulation shall apply to any cabinet larger than 15U, however, the SCIDA has ultimate control of the ICT within their site and may identify, through test or other method, that a smaller cabinet in a particular circumstance may also be subject to HELC installation standards.

Requirement for a Second Circuit Protective Conductor

0711. Provided that there are no plug/socket combinations in the power feed to a cabinet and the Circuit Protective Conductor (CPC) meets the requirements of BS 7671 and is not less than 2.5 mm^2, the CPC incorporated within the supply cable is deemed to provide the earth connection (via the earth lead from the power distribution strip) between the cabinet Earthing Bus-Bar (see paragraph 0626) and the main building MET. However, if the power feed incorporates a plug/socket combination, OR the CPC is less than 2.5 mm^2, OR the power distribution strip does not incorporate an earthing point, a second CPC with cross sectional area iaw **BS 7671** and not less than 4 mm^2 (2.5 mm^2 if mechanically protected), is to be provided. The CPC is to be provided with a permanent label, with the words ‘*Safety Electrical Connection – Do Not Remove*’, at the cabinet Earthing Bus-Bar termination point. Figure 7-1 ‘Cabinet Earthing and Bonding Requirements’ refers.

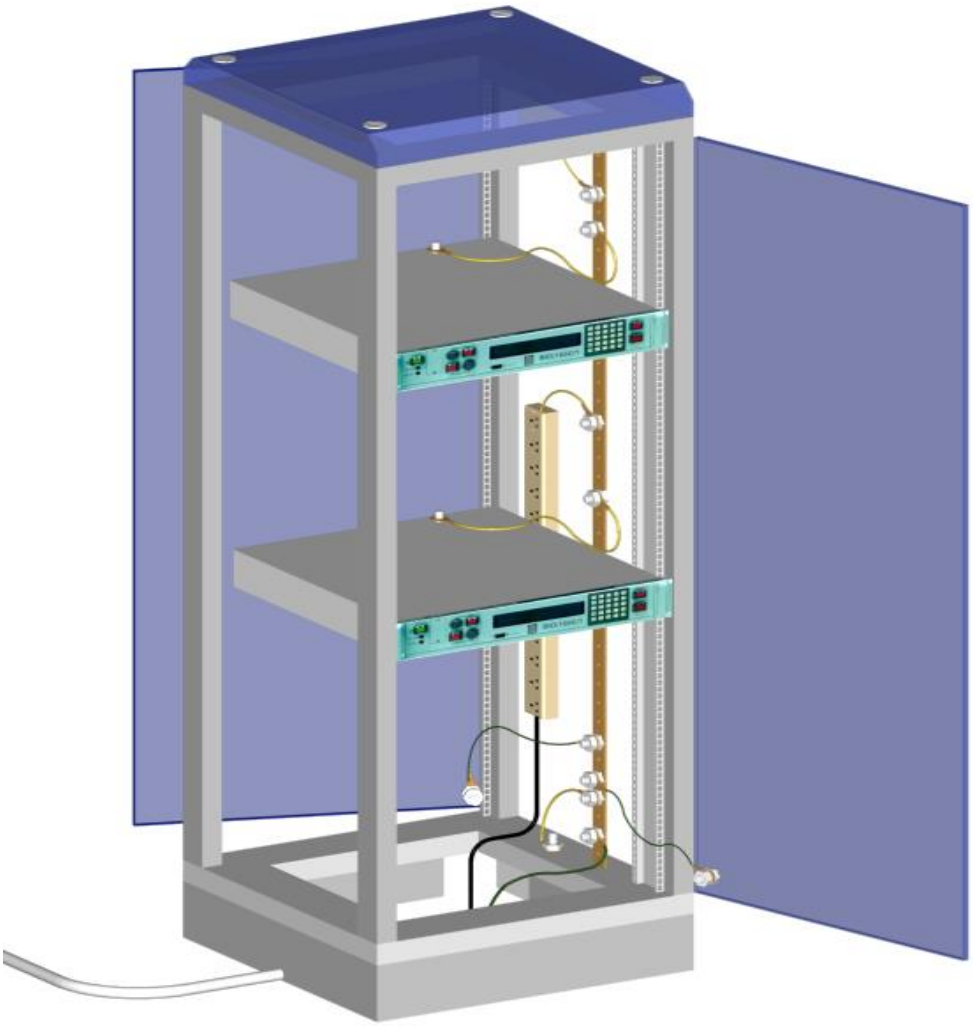

Figure 7-1 Cabinet Earthing and Bonding Requirements

(diagrammatic representation only)

Functional Earthing of Cabinets

0712. Where the equipment manufacturer or supplier specifies Functional Earthing (FE) requirements for EMC purposes, an FE conductor shall be provided in accordance with **BS 6701**.

Metal Pathways

0713. The above requirements are equally applicable to all internal and external pathways.

Lightning Protection

0714. If an external pathway falls inside the protected volume of the building lightning protection system (LPS) there is no requirement to bond pathways to the LPS. Bonding is only required where the distance between the down conductor and the pathway is insufficient to isolate the pathway from the effects of a lightning discharge. Further details can be found in **BS EN 62305-3** and **BS IEC 61000-5-2.**

Cabinet Power Supplies, Isolation and Switching

0715. The subject of protection, isolation and switching is fully examined, with requirements identified in the **BS 7671, Provision and Use of Work Equipment Regulations** and **Electricity at Work Regulations.**

0716. To comply with the above regulations, each equipment cabinet is to be supplied with power via a suitably located and identified switching device. Each equipment cabinet shall be capable of being individually isolated in accordance with **BS 7671, Clause 537.2** and shall utilise isolators with sufficient poles to enable the required isolation. Where an isolator is remote from the cabinet it protects, it must be possible to secure the isolator in the off position. Securing in the off position can be by locking off or, where suitable arrangements and proper control procedures are in place, by the removal and safe-keeping of fuses or links and the application of warning notices. Guidance on the selection of suitable isolation devices, emergency switching devices and functional switching devices are listed in **BS 7671 Table 53.4**.

0717. All cabinets and their related switching are to be clearly identified with function and supply detail.

0718. When it is deemed necessary to supply a cabinet with multiple power feeds, then it is an MOD requirement that isolation of all circuits concerned is achieved by a single switch or suitable interlocking arrangement.

0719. All Power cabling to a cabinet is to be mechanically protected throughout, and if the cabinet is fed by multi-power feeds a clearly legible notice should be displayed.

Emergency Power Off (EPO)

0720. EPO controls in IT rooms generally shut down all equipment, although these are not requirements of **BS 7671**. Where, through a risk assessment process, EPO controls are used, consideration should be given to avoiding accidental operation.

Non Use of 13 Amp Sockets

0721. 13A sockets are not to be utilised to provide power to cabinets. The Installation Design Authority (IDA) is to determine whether equipment cabinets are to be powered by either a fused spur from a ring circuit, which may suffer interruption due to faulty domestic or operational equipment sharing the circuit, or an individual radial circuit from the distribution board, which is the

recommended option for operational systems where it is particularly important to maintain mains power.

Use of Residual Current Devices

0722. There are a number of situations where protection by a Residual Current Device (RCD) is required; these are detailed **in BS 7671, On Site Guide**.

0723. The **On Site Guide, Paragraph 3.6.1**, refers to the relevant clauses within **BS 7671**, and lists the specific instances where an installation is required to incorporate an RCD, RCCB (Residual Current Circuit Breaker), RCBO (Residual Current circuit Breaker with integral Over-current protection) or SRCD (Socket-outlet incorporating an RCD). RCDs may also be used to provide additional protection, but designers should recognise the potential disruption of service due to periodic testing requirements and the possibility of "nuisance" tripping.

Uninterruptable Power Supplies

0724. In accordance with the requirements of **BS EN 62040-1** all hard wired or rack mounted UPS are to incorporate controlled output switching or be installed complete with a 'Remote Power Off Device'. Whichever system is employed, it is to be integrated with the cabinet and/or facility Emergency Switching device.

0725. To comply with SI 1998 No 2306, all cabinets fitted with an internal UPS are to display a suitably sized hazard warning notice, posted in a prominent position at each entry to the cabinet, consisting of the electricity hazard symbol and a suitable supplementary text sign in accordance with the requirements of SI 1996 No 341 and BS 5499-5.

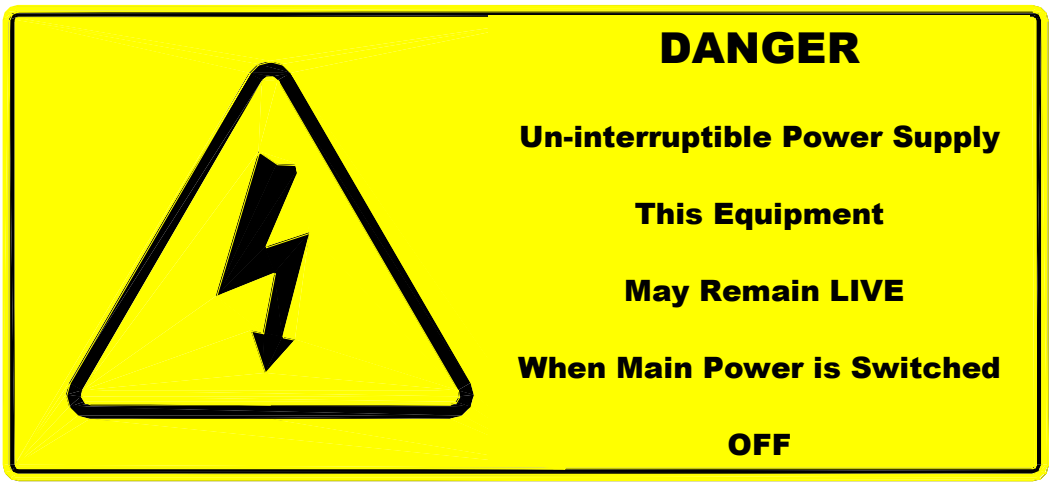

Figure 7-2 Example UPS Warning Label

Extension Leads/Adaptor Plugs

0726. In accordance with **JSP 375**, the use of extension leads is to be avoided wherever possible. If used, they shall be tested as a portable appliance. Their use shall be temporary, with

all permanent requirements being supported by a works order to upgrade to permanent socket-outlets.

0727. Daisy chained plug and socket extension leads shall not be used.

0728. It should be noted that a mechanically secured, hardwired power distribution block, within a cabinet, is not considered to be an extension lead. The addition of a single, mechanically secured, extension lead may be permitted within a hardwired equipment cabinet provided that SCIDA is in possession of a firm commitment to upgrade to a hardwired solution.

0729. The use of multi-way adaptor plug blocks is prohibited.

0730. In multi cabinet installations, each cabinet must be separately bonded to the facility MET, not daisy chained.

Standards and Publications

0731. **BS 50310** 'Telecommunications bonding networks for buildings and other structures'. This standard provides the requirements for Telecommunications bonding up to the main building MET.

0732. **BS 6701** *'Telecommunications equipment and telecommunications cabling – Specification for installation, operation and maintenance'.* This standard specifies the requirements for equipment and cabling other than cabling specified in BS EN 50174. It also specifies requirements beyond the scope of the BS EN 50174 series of standards for equipment. In particular **Section 5.2.2** '*Functional earthing*' discusses the requirement for a Functional Earth.

0733. **BS EN 62305-3** '*Protection against Lightning'.* This standard provides the requirements for protection of a structure against physical damage by means of a lightning protection system (LPS), and for protection against injury to living beings due to touch and step voltages in the vicinity of an LPS. In particular **Clause 6.2.3** gives details regarding '*Lightning equipotential bonding for external conductive parts'* and **Annex A** outlines the '*positioning of air-termination systems*'.

0734. **BS IEC 61000-5-2** *'Earthing and cabling'.* This technical report covers guidelines for the earthing and cabling of electrical and electronic systems and installations aimed at ensuring electromagnetic compatibility (EMC) among electrical and electronic apparatus or systems. In particular **Clause 6.3.3** '*Surface treatment'* discusses earthing connections and the requirement for clean metal surfaces.

0735. **JSP 375** *'MOD Health & Safety Handbook'*. The purpose of this publication is to provide the arrangements by which the MOD ensures the maintenance of acceptable standards of Health & Safety throughout the organisation. In particular, **Volume 1, Chapter 23,** discusses the use of Extension Leads and Adaptor Plugs.

0736. **BS 7671** *'Requirements for Electrical Installations'*. This standard, referred to as the *'IET Wiring Regulations'* is applicable to the design, erection and verification of electrical installations. In particular **Chapter 53** discusses protection, isolation, switching, control and monitoring.

0737. **SI 1998 No 2306** *'The Provision and Use of Work Equipment Regulations'*. These regulations lay down the requirements for employers regarding the safety and use of all work equipment. In particular:

a. **Regulation 15** requires that 'Every employer shall ensure that, where appropriate, work equipment is provided with one or more readily accessible controls, the operation of which will bring the work equipment to a safe condition in a safe manner'.

b. **Regulation 19** 'Isolation from sources of energy' states:

(1) 'Every employer shall ensure that, where appropriate, work equipment is provided with suitable means to isolate it from all its sources of energy'.

(2) Without prejudice to the generality of paragraph (1), the means mentioned in that paragraph shall not be suitable unless they are clearly identifiable and readily accessible.

c. **Regulation 23** requires that 'Every employer shall ensure that work equipment is marked in a clearly visible manner with any marking appropriate for reasons of Health and Safety'.

d. **Regulation 24** requires that 'Every employer shall ensure that work equipment incorporates any warnings or warning devices which are appropriate for reasons of health and safety'.

0738. **SI 1989 No 635** *'The Electricity at Work Regulations'*. These Regulations impose health and safety requirements with respect to electricity at work upon employers and employees. In particular:

a. **Regulation 8** requires that 'Precautions shall be taken, either by earthing or by other suitable means, to prevent danger arising when any conductor (other than a circuit conductor) which may reasonably foreseeable become charged as a result of either the use of a system, or a fault in a system, become so charged',

b. **Regulation 9** requires that 'If a circuit conductor is connected to earth or to any other reference point, nothing which might reasonably be expected to give rise to danger by breaking the electrical continuity or introducing high impedance shall be placed in that conductor unless suitable precautions are taken to prevent that danger'.

c. **Regulation 12** requires that 'Where necessary to prevent danger, suitable means (including, where appropriate, methods of identifying circuits) shall be available for cutting off the supply of electrical energy to any electrical equipment and the isolation of any electrical equipment'.

0739. **SI 1996 No 341** *'Safety Signs and Signals Regulations'.* These Regulations impose requirements in relation to the provision and use of safety signs and signals.

0740. **BS EN ISO 7010** '*Graphic symbols – Safety colours and safety signs – Registered safety signs (ISO 7010:2012+A5:2015).* This part of specifies safety signs using the system of geometric shapes and safety colours specified within this standard.

0741. **BS EN 62040-1** *'Uninterruptible power systems (UPS), General and safety requirements for UPS'* This standard specifies requirements to ensure safety for the operator and layman who may come into contact with the equipment. It is also intended to ensure the safety of the installed UPS. In particular **Clause 5.1.5,** *'Emergency switching (disconnect) device'* discusses the requirement for an integral single emergency switching device.

0742. **BS 7671, On Site Guide.** This document supplements **BS 7671** and acts as a guide for electrical installers. In particular **Section 3.6** gives guidance on Residual Current Devices (RCDs).

CHAPTER 08 - Cabling Systems

Introduction

0801. Within premises, the importance of information technology cabling infrastructure is similar to that of other fundamental building utilities such as heating, lighting and mains power supplies. As with other utilities, interruptions to service can have serious impact. Poor quality of service due to lack of planning, use of inappropriate components, incorrect installation, poor administration or inadequate support can threaten an organisation's effectiveness. The main requirements and direction are outlined below.

Direction

0802. All Information and Communications Technology (ICT) cabling is to be implemented in accordance with the specifications contained within **BS EN 50173, BS EN 50174, BSI/ISO 11810 2.2 Ae3, BS EN 50600, JSP 440** and **SDIP 29.**

0803. Planning for a successful install is paramount. The 4 phases are outlined at paragraph 0814.

0804. Security measures and TEMPEST countermeasures are to be applied to all cabling systems in accordance with the security classification of the ICT for which it is provided. All segments, internal, external and the transition between (building entrance facilities) are to be included. Applicable requirements are detailed in **JSP 440**, **SDIP 29/2** and **CESG GPG No14**.

Requirements

0805. Systems with differing protective marking are not to use common cabinets, patch panels or distribution facilities unless equipment design positively precludes inadvertent or deliberate cross-patching.

0806. Data and telephony with the same protective marking may use common patch and distribution facilities provided adherence to a documented scheme of using different colour patch cords for different services are demonstrated.

0807. The MOD requirement is that work area cords (i.e. cords connecting Telecommunications Outlets to Terminal Equipment) are to be limited to a length of 5m. On exception they may be longer after consultation and agreement with SCIDA. However, if the work area cord is greater than 5m it may be required to be contained.

0808. All cables are to be tested in accordance with **BS EN 50346**. Fibre Optic cable testing requirements are shown at paragraphs 0812 and 0813. **BS EN 7718/3**-"Approved Testing Methods" and **IEC 60793-2-10** should be referred to as appropriate to the installation.

Standards and Publications

0809. **BS EN 50173** *'Information technology ~ Generic cabling systems'.* This series of European Standards provides the specification for the design of generic cabling, in balanced copper or fibre optic, for use within premises which may comprise single or multiple buildings on a campus.

0810. **BS EN 50174** *'Information technology ~ cabling installation'.* This 3 part European Standard specifies the basic requirements for planning, implementation and operation of information technology cabling using balanced copper and fibre optic cabling. The standard is

applicable to cabling designed to support particular analogue and digital telecommunication services and generic cabling systems that are designed in accordance with **BS EN 50173** and intended to support a wide range of telecommunication services.

0811. Taken together, **BS EN 50173** and **BS EN 50174** specify:

a. The structure and minimum configuration for generic cabling;

b. Implementation requirements;

c. Performance requirements for individual cabling links;

d. Conformance requirements and verification procedures.

e. Requirements in relation to safe, efficient and correct working practices during installation and operation of fibre optic cabling.

0812. **BS EN 50346** *Information technology ~ Cabling installation ~ Testing of installed cabling',* in addition **BS EN 7718-3** *"approved Test Methods"..* These European Standards specify procedures for testing the transmission performance of installed IT cabling in premises. These procedures apply to both balanced and optical fibre cabling. Testing requirements for Fibre Optic cables are to be detailed in the Project Quality Plan and must conform to the following:

a. Horizontal cabling: 100% Light Source & Power Meter (LS&PM).

b. Backbone cabling: 100% LS&PM & 100% Optical Time Domain Reflectometer (OTDR).

c. Backbone and horizontal cabling re-use: 100% retest iaw the test requirements noted in sub-paragraphs a. and b. above.

d. Where an installation shall be of copper cables a "Link test" shall be the minimum test conducted and results provided in Raw format. Where an installation shall be tested in a "Channel test" the additional patch cables in the channel shall be of either LSHF or Euro class construction.

0813. Notwithstanding the above testing requirements, Project Managers may impose a stricter test regime.

0814. The 4 phases for the successful installation of information technology cabling, as stated in **BS EN 50173-1**, are:

a. **Design.** The selection of cabling components and their configuration.

b. **Specification.** The detailed requirement for the cabling, its accommodation and associated building services addressing specific environment(s) identified within the premises together with the quality assurance requirements to be applied.

c. **Installation.** The physical installation in accordance with the requirements of the specification.

d. **Operation.** The management of connectivity and the maintenance of transmission performance during the life of the cabling.

0815. An example of the Euro Class cable designation sheath marking is as follows:

B2cas1bd1a2. Further information can be found in Chapter 5.

CHAPTER 09 - Cable Identification

Introduction

0901. The proper management of cable infrastructures relies on being able to readily identify each cable and, where appropriate, each core. The preferred manner of cable identification is by using a clear and logical cable labelling system. Additionally, complete cable information is to be held on a database or other form of record.

Direction

0902. All cables that carry MOD data are to be labelled in an easily read permanent manner, at all points where cable identification could reasonably be expected to be required, but not less than 3 metre intervals i.a.w. BSI ISO 11801 2.2 Ae3.

0903. Cable identification records are to be provided in a clear, comprehensive and unambiguous manner.

Requirements

Cable labelling

0904. As a minimum, all cables shall be labelled at both ends and on both sides of any point at which the cable transits a sealed passage, i.e. a fire-stopped wall penetration.

0905. With the exception of cables fitted with factory pre-formed terminations, each separate core of a multi-core cable must be uniquely identified. This requirement will normally be satisfied by colour-coded or numbered cores.

0906. Cross-site and ducted cables are to be identified as they enter and leave each and every bore, using waterproof labels that will not deteriorate with continued immersion in water.

0907. Flexible cords and connector cables associated with desk top PCs do not require labels unless a high cable density within a furniture cable management system suggests there is benefit to doing so.

0908. Power cables from, to and within cabinets are to be identified in the same manner as all other cables.

0909. Green and yellow earth and bonding cables are to be labelled in accordance with this chapter in addition to any safety requirements.

0910. Where a cable is supplied with the cable type and number of cores imprinted on the cable sheath, it is not necessary for the cable label to repeat the information.

0911. System information is not required to be included on labels fixed to cables used for multiple systems, or which are intended for re-use by different systems (such as structured wiring systems).

0912. Plastic cable ties are not to be used for affixing labels as they are liable to cause damage to surrounding cables during installation and recovery activities, Velcro ties only are to be used.

0913. Where there is no current standard in operation, the cable labelling scheme shown at Figure 9-1 is offered as a preferred solution.

Cable Identification Records

0914. As a minimum, cable identification records should clearly state: originating location/connection, parenting system, type of cable, number of cores, unique serial number, and destination location/connection detail.

0915. It is desirable that cable identification records are capable of showing the allocated and unallocated capacity of cables. A different scheme may be proposed if deemed appropriate. However, any alternative must fulfil the requirement of unambiguous, positive identification and must be approved by SCIDA prior to implementation.

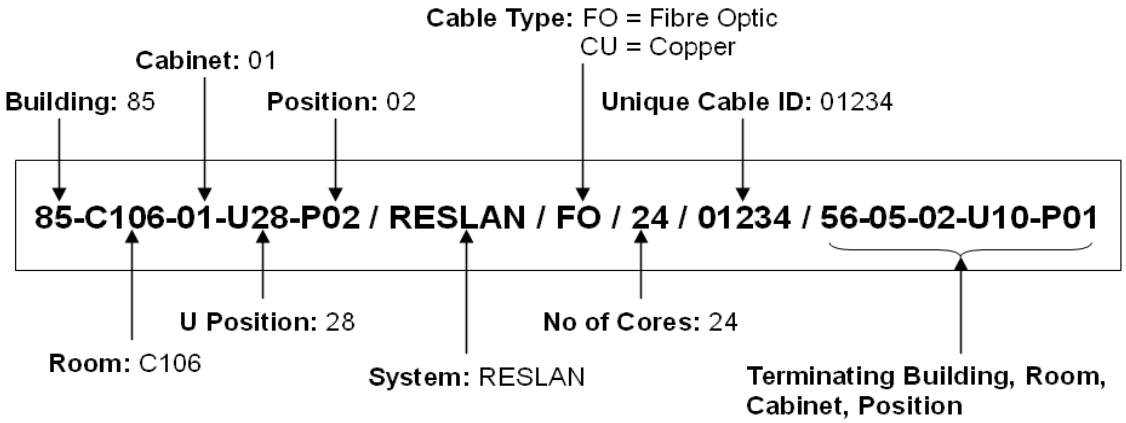

Figure 9-1 Cable label example

CHAPTER 10 - Cable Pathway And Cable Management Systems

Introduction

1001. A pathway is the term used to describe the defined route for cables between terminating points. A cable management system refers to the system utilised to support cables along a pathway and includes conduit, trunking, tray, basketwork and ladder systems.

1002. Within MOD sites, all cabling is to utilise a cable management system. The specific type to be employed will be dependent upon a number of factors, including requirements for: mechanical protection; physical and electronic security and Electromagnetic Compatibility (EMC). The main requirements and direction are outlined below.

Direction

1003. Design requirements, including usable capacity and cable bend radii restrictions, for cable pathway and cable management systems, are contained in **BS EN 50174-1** (see paragraph 1024) and **BS EN 50174-2** (see paragraph 1025).

1004. Guidance on segregation and the minimum separation distance requirement of copper telecommunication cables from power cables with respect to SAFETY can be found in **BS 6701** (see paragraph 1027).

1005. Consideration of segregation and separation to avoid electromagnetic interference (EMI) and of equipotential bonding relating to the design and installation of cables and cable management systems is explored in **BS EN 50174-2** (see paragraph 1026).

1006. Security measures and TEMPEST countermeasures are to be applied to all cabling systems in accordance with the security classification of the Information and Communications Technology (ICT) for which it is provided. All segments, internal, external and the transition between (building entrance facilities) are to be included. Applicable specifications are detailed in **JSP 440, SDIP 29/2** and **CESG GPG No14**.

Requirements

1007. The material selected for a cable management system is largely a matter of designers' choice. However, selected materials are to conform to the requirements stipulated in Chapter 05 'Fire Hazard Designation of Cables & Materials'.

1008. Where cables penetrate a fire barrier, fire-stopping and/or a penetration sealing system shall be utilised to maintain the integrity of the fire barrier.

1009. Where a multi-service installation is contemplated, then, within a 'controlled area,' multi-compartmented dado trunking may be utilised provided the required EMC separation of copper cables is maintained (see paragraph 1026).

1010. Where cable separation is called for, the separation distance required for safety may not agree with the separation distance desired with regard to EMI. In these circumstances, safety has highest priority but the more stringent requirement shall take precedence.

1011. Additions and extensions to extant cable management systems should, within the constraints and requirements of this publication, conform to the design, quality, materials and colour scheme of the existing system.

1012. Within existing Service Level 3 facilities, telephone services are required to be installed in conduit or trunking where this is already in place. Where conduit or trunking is not available, installers may follow existing building conventions, provided all safety requirements are met. New and refurbished facilities must always utilise containment for telephone extensions.

1013. Except where already installed, tray and ladder systems are not normally to be utilised in offices or corridors if they would be visible. Their use should be confined to above false ceilings or below false floors.

1014. A cable management system is not to be installed directly on, or attached to, false ceilings or floors, each section is to be supported by and secured to the fabric of the building by a minimum of three points i.e. at each end and in the middle, secured every 1500mm i.a.w. BS EN 50173 & 50174.

1015. Containment that is mounted with the lid facing down is to have cable retaining devices fitted to retain the cables when lids are removed.

1016. Cable trays are to be provided with a minimum clearance of 25 mm from the fixing surface to allow clearance for fixing and adjustment of cable retaining devices.

1017. The usable space within a cable management system should be twice that necessary to accommodate the initial quantity of cables. Subsequent addition of cables is permissible providing that the minimum bend radii of all cables are maintained, the maximum bend radii is 4 x the diameter of the outer jacket.

1018. All RED cable management systems are to be clearly identified as such.

1019. On exit from a 'controlled area,' all RED containment is to be tamper detectable and subject to regular inspections in accordance with **JSP 440**.

1020. All RED containment that traverses a ceiling or under-floor void or any other area where it would be difficult to complete an integrity inspection must be permanently sealed throughout the length of that traverse.

1021. Although discouraged, a single cable management system may contain both RED and BLACK fibres. Where this is the case the system is to be clearly identified as such and is to be managed as an 'Approved Circuit'

Standards and Publications

1022. **SDIP 29** *'Facility Design Criteria and Installation of Equipment for the Processing of Classified Information'.*

1023. **CESG GPG No14** *'Electromagnetic Security'.*

1024. **JSP 440** *'The Defence Manual of Security'*

1025. **BS EN 50174-1** *'Information technology ~ Cabling installation', 'Installation specification and quality assurance'* **Clause 4.3.2** *'Pathways'.*

1026. **BS EN 50174-2** *'Information technology ~ Cabling installation', 'Installation planning and practices inside buildings'*

1026. **BS 6701** 'Telecommunications equipment and telecommunications cabling - Specification for installation, operation and maintenance' **Clause 5.4.3.2** '*Separation between telecommunication cabling and electricity supply cabling'.*

1027. **IEC 60793-2-10** Optical fibres – Part 2-10 "Product specifications – Sectional specification for category A1 multimode fibres".

CHAPTER 11 - ICT Outside Plant

Introduction

1101. The importance of external information technology cabling infrastructure is the same as that of internal systems in terms of design, specification, implementation and operation, the requirements for which are covered in Chapter 08. Additional requirements, relating to underground and aerial cabling systems and infrastructure between buildings are specified in this chapter.

Direction

1102. All external cabling and plant used for the management of cables carrying MOD data is to be implemented in accordance with the specifications contained within **JSP 375, JSP 440, SDIP 29, BS EN 124:2015, BS EN 13101** and **BS EN 50174**.

1103. The MOD mandated policy for the preservation of data confidentiality, availability and integrity advocates the use of an underground rather than an aerial external cable infrastructure because of the inherent security, superior physical protection and flexibility towards future change afforded by a buried duct system. An aerial system for external cable infrastructure is therefore only to be considered under the most exceptional circumstances, and then, only with the agreement of the relevant SCIDA or CIDA.

1104. In certain specialist cases, such as a Range or extended area where no future growth is envisaged, and in the absence of an existing pit and duct system, a directly buried cable system may be provided with the agreement of the relevant SCIDA or CIDA. Consideration should be taken of the physical and environmental conditions that exist to ensure that the necessary installation standards are met to achieve the integrity and resilience of the cabling system.

1105. Security measures and TEMPEST countermeasures are to be applied to all cabling systems in accordance with the security classification of the Information and Communications Technology (ICT) for which it is provided. All segments, internal, external and the transition between building entry facilities are to be included. Applicable requirements are detailed in **JSP 440, SDIP 29/2** and **CESG GPG No14.**

1106. Mandated safety processes and procedures applicable to all work on the MOD Estate or involving MOD personnel are detailed in **JSP 375**.

1107. Requirements associated with the installation of MOD ICT outside plant for which there are no extant International, European or British Standards are also shown in the next section.

Requirements

Duct Requirements

1108. **Size of Duct.** The industry standard internal diameter dimension of underground duct is 90 mm. However, 50 mm and 100 mm duct may be utilised to conform to local site practice. Sub-ducts have been frequently used in situations where both copper and fibre cables have been required to share the same duct. Sub-ducts are not to be utilised on new duct routes as separate bores are to be provided for fibre and copper. Similarly, separate ducting systems are to be provided for Data and Power cables in order to comply with both safety and EMC requirements.

1109. **Linear Deviation.** Duct runs are, as far as is possible, to follow point-to-point straight lines with access pits provided along the route. Between any two access points including the premises boundary and the Building Entry Facility (BEF):

a. There shall not be more than one pre-formed bend of up to 90 degrees.

b. Deviations shall not exceed a total of 90 degrees.

c. Bends shall be a minimum of 600 mm radius

d. Bends in the conduit shall not contain any kinks or other discontinuities that may have a detrimental effect on the cable sheath during cable pulling operations. However, long, slow curves are permitted providing the maximum pulling weight of the cables to be installed will not be exceeded.

1110. **Depth of Bore.** Bore depth must be sufficient to protect the duct from physical harm and is therefore dependent upon the ground material and surface fabric above the duct. Bore depth is to follow the requirements of Table 11-1 which provides a minimum value for clearance between the ground surface and the upper part of the underground plant, dimension 'D' of Figure 11-1.

1111. **Testing and Proving.** New ducts are to be tested and proved with a mandrel, a brush and a test length of cable connected together and pulled through the duct on a draw line:

a. The mandrel is to be at least 250 mm long with a diameter at least 90% of the duct bore.

b. The brush should be at least 200 mm long with a diameter at least 110% of the duct bore.

c. The test cable is to be at least 3000 mm long.

1112. Each duct is to be left threaded with a 540 Newton minimum breaking strain nylon draw line, at least 4000 mm longer than the duct run.

Location of Pathway	Minimum depth of Bore[1,2] (Figure 11-1 - Dimension 'D')
Footpaths and grassed areas	0.5m
Roads – including parking areas	0.6m
Uncultivated or landscaped land	0.9m
Agricultural land[3] and airfield pathways	0.9m
Motorways, airfield runways and railways	1.0m[4]

Notes:

1. The depth of bore quoted shall be regarded as an absolute minimum over the full length of the segment.
2. A depth requirement extends 1 metre horizontally into an adjoining area having a lesser depth requirement.
3. Ducting routed through agricultural land should be avoided wherever practicable.
4. The depth of dig may be significantly greater than that shown in this table in order to allow any protective layers to be installed below the conduits.

Table 11-1 Depth of Bore – Minimum Requirement

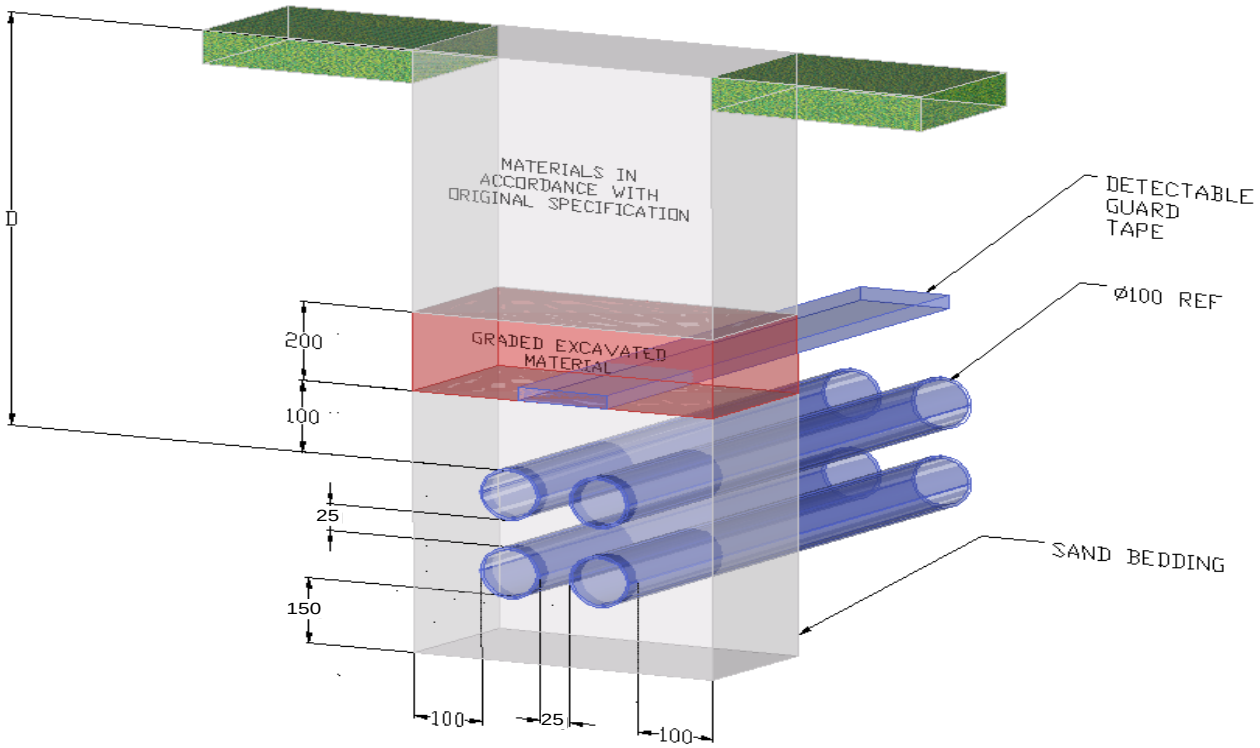

Figure 11-1 Section Through Typical Duct Run

Access Pits Requirements

1113. **Pit Locations.** Cable access pits shall be located to facilitate a safe and secure pathway system between buildings. They should be provided at both ends of a duct route, positioned as close as practicable (normally within 5 metres) to the external building walls and adjacent to the equipment room in which the cables terminate. Excepting in the case of directly buried cables, pits shall also be provided along a duct route at 100 metre intervals, either side of a road or rail crossing, and in accordance with the requirements of paragraph 1109.

1114. **Pit Dimensions.** All cable access pits are to be sized sufficient to allow unobstructed access for cable pulling; typical pit layout is illustrated at Figure 11-2. Actual size will depend on the number of duct entries the pit incorporates and its designated purpose:

a. Jointing pits are to be sized sufficient to house the joint closure of the largest planned cable and provide adequate working space for cable jointing personnel and equipment.

b. Turning pits are to be sized sufficient to accommodate the minimum bend radii of all planned cables.

c. Through, in-line pits are to be sized sufficient to allow rodding.

1115. **Construction.** Cable access pits may be either pre-fabricated from concrete or composite materials or built on site. Pits built on site are to be constructed of poured concrete, solid concrete block or Engineering Brick laid in English Bond. Breeze blocks or hollow concrete blocks are not acceptable materials for cable pit construction. Base thickness (of concrete) must be a minimum of 150 mm for pits up to 1800 mm deep, and 225 mm thick for pits between 1800 mm and 4500 mm deep. Concrete walls are to be a minimum of 225 mm thick. Walls built of Engineering Brick will be 215 mm thick. Strengthened, carriageway standard, pits are to be provided either side of a road crossing, train track etc.

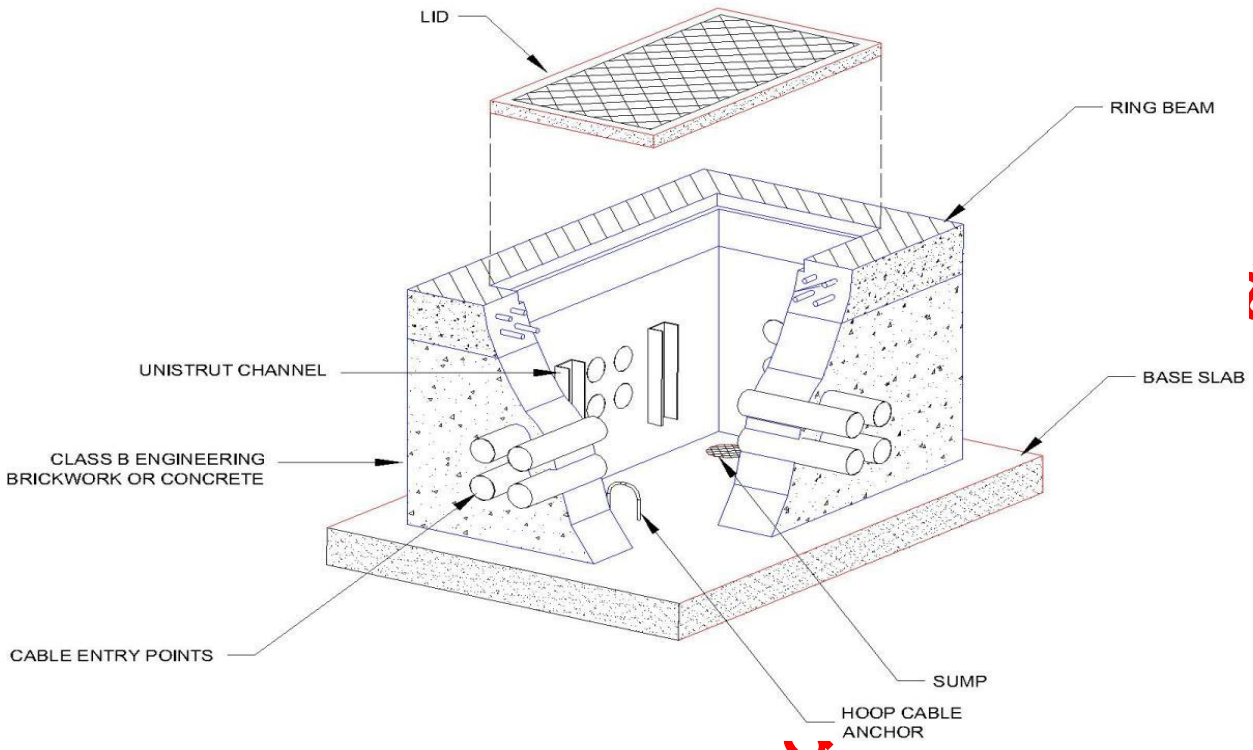

Figure 11-2 Typical Cable Pit Layout

1116. **Pit Lids.** In addition to meeting the requirements of **BS EN 124**:

a. Lids should require no more than 2 people to effect access to the pit.

b. Split lids are to interlock when closed to enable a single lock security mechanism.

c. Lids are to bear a permanent mark to denote pit ownership.

d. Pits that may become designated as a 'confined space' are to be securable against intrusion.

e. Pits associated with Approved Circuits shall be secured in accordance with **JSP 440.**

1117. **Pit Furniture.** For safety and cable management, the following items, manufactured from corrosion resistant materials or with corrosion resistant finishes, should be fitted in all cable pits:

a. **Cable bearers** are to be installed, on 0.5 metre centres, on all pit walls that exceed 0.9 metre in length, to allow optimal positioning of cable joints. Two sets of Cable bearers is the minimum number to be installed, large pits with many duct entries may require more. Cable bearer brackets, for supporting the cable and joints, need only be fitted as required.

b. **Ladders or Climbing Steps,** with non-slip treads, are to be fitted to all cable pits. The ladder option is to include a stable, non-slip mounting bar around the upper part of the pit to allow the ladder to be moved and secured as necessary. Where steps are employed, they are to meet the specification of **BS EN 13101.**

c. **Cable Anchors** of 12 mm diameter round section steel are to be secured in the pit base to facilitate anchorage of cable pulleys etc.

1118. **Drainage.** A 150 mm square or round soak away, excavated to at least 300 mm deep and filled with coarse gravel, is to be provided in one corner of the pit to allow water drainage. Alternatively, for areas with a high water table, a 250 mm deep pumping sump may be substituted. Either option is to be finished with a flush fitting protective grating.

1119. **Cable Duct Entries.** Entries into pits are to be spaced at least 25 mm apart, both vertically and horizontally, and at least 100 mm from adjacent side walls and 150 mm from the base. Eight way ducts are to be arranged in two horizontal rows of four, four way ducts arranged in a square formation and two way ducts in a horizontal formation. Ducts are to be cleanly cut, flush with the inside wall so there are no protrusions into the pit. To prevent water ingress, all unused duct entries are to be fitted with a short length of duct which has been sealed, with duct caps, at both ends.

Building Entry Specification

1120. Duct entries into buildings either shall be through the ground floor slab (Figure 11-3) or shall be via a Stainless Steel Pipe (SSP) through the external wall (Figure 11-4). The BEF should enter the same place as other utilities. Other BEF options can be considered, subject to the change approval process.

1121. The BEF shall not exceed a total area of 300mm square and should be located in an area that will least affect the structural specifications of the building. All penetrations into buildings shall conform to the Building Regulations.

1122. Installation of Entry/Exit ducts should enable the fitting of metal enclosures that are internally hinged, key lockable, earth bonded, and fitted covering each 100mm entry bore. They shall be of sufficient size to allow maximum cable capacity of the entry bore width and enable the manufacturer's specified bend radii of the cables.

1123. Each SSP used for building entries shall be earthed at the BEF with and approved earth. The SSPs shall penetrate the inner surface finished wall with a clearance of 15mm from the end face of the pipe to the finished wall surface and have a minimum bend radius of 140 – 160mm. They shall be securely fixed to the wall by brackets at intervals not exceeding 1.6 metres. Where SSPs are unable to fully penetrate the building due to depth of wall, the contractor shall build a brick or concrete pier around the pipes externally.

1124. Each entry duct shall provide 50% spare capacity, or approximately 12 cables and shall be sealed at both the BEF and the cable chamber pit.

1125. All underground building entry ducts shall have minimum bend radius of 600mm from the external chamber to the penetration point in the floor slab (Figure 11-5). The entry/exit point shall finish flush with the floor surface to enable the fitting of a cable entry/exit enclosure with unhindered access to vertical and horizontal trunking.

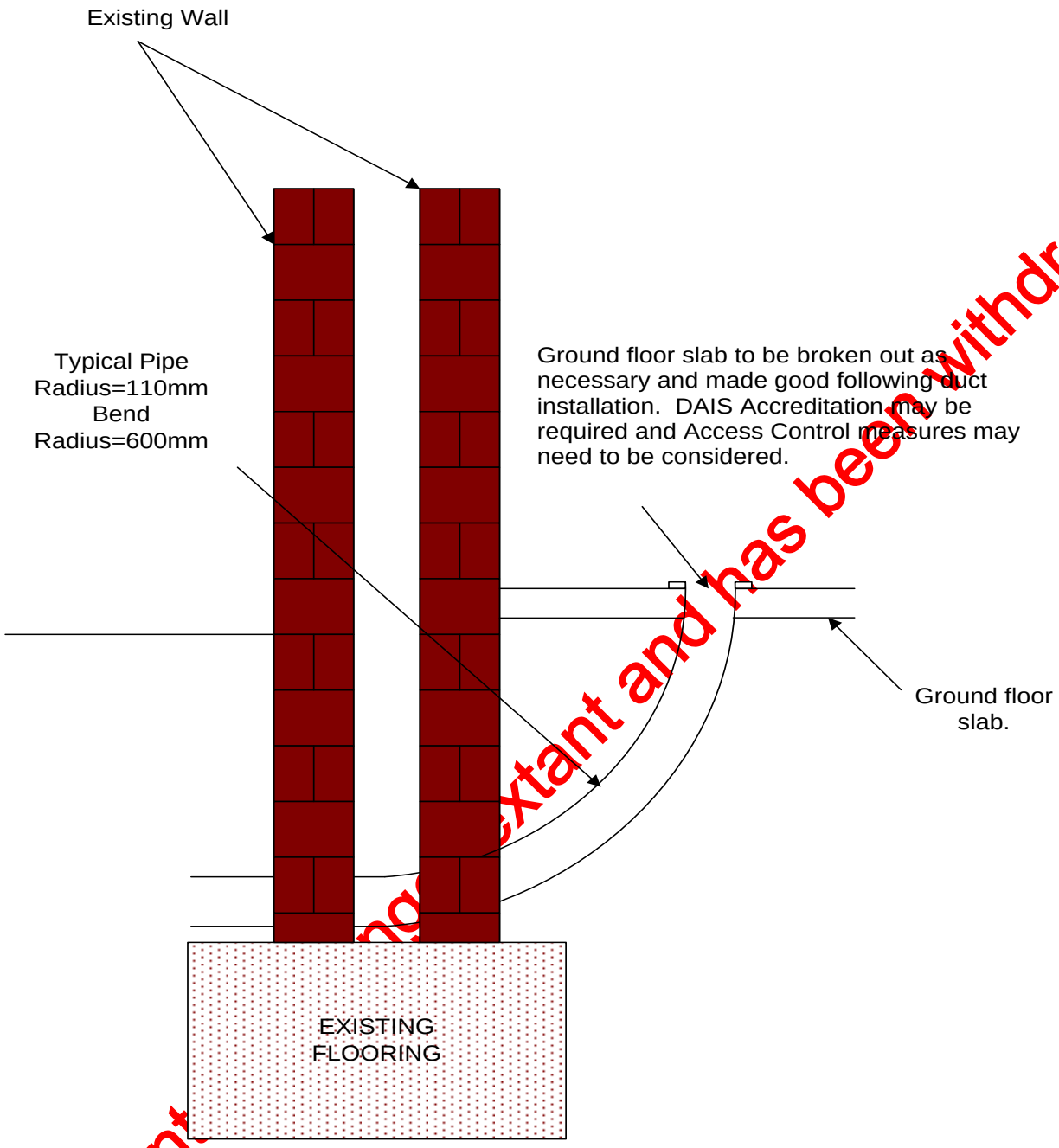

Figure 11-3 - Underground Building Entry Elevation

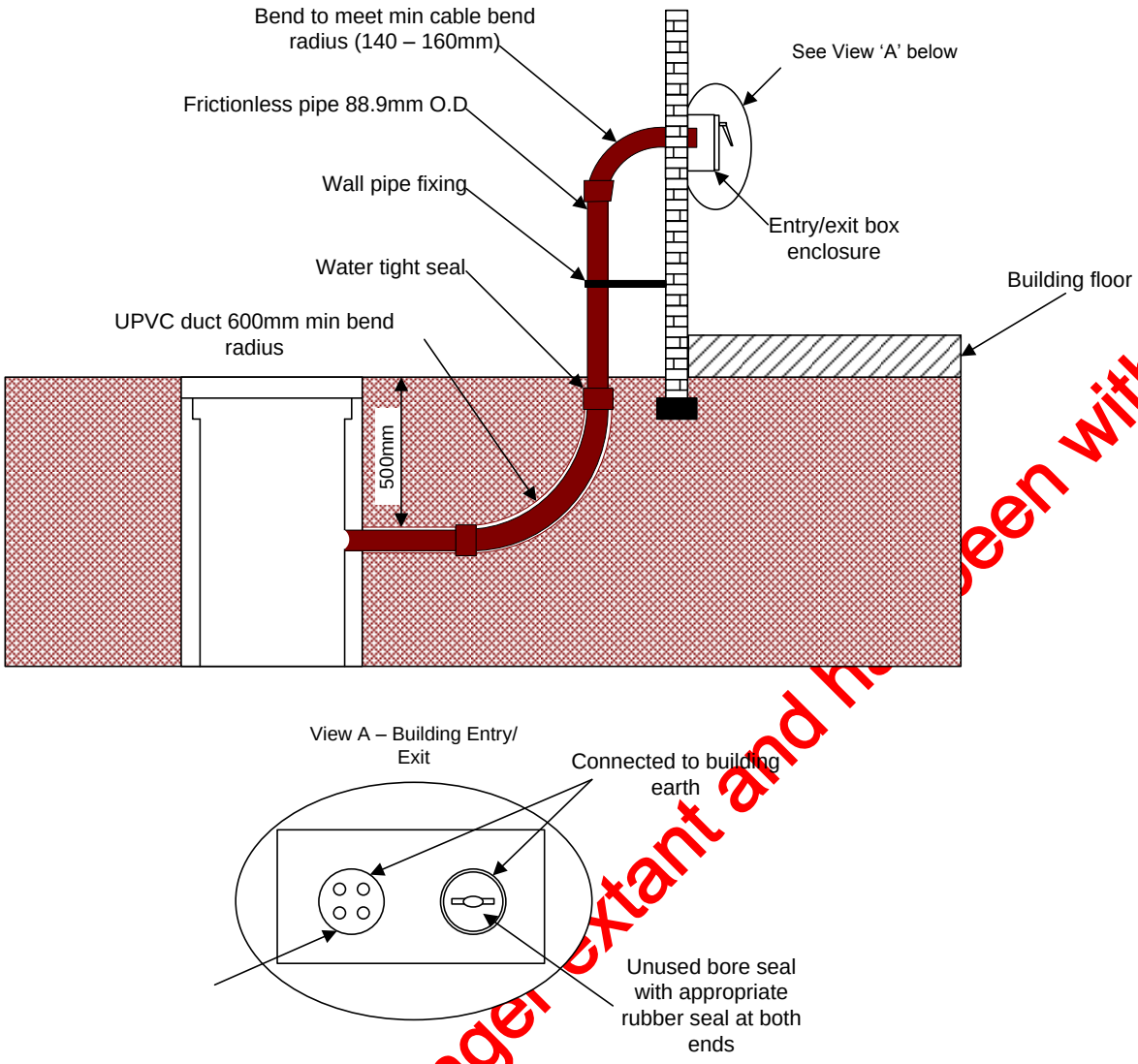

Figure 11 – 4 Building Entry Through Wall

Standards and Publications

1126. **BS EN 50174-3** *'Information technology ~ Cabling installation, Installation planning and practices outside buildings'.* This European Standard provides the detailed requirements and guidance relating to the installation planning and practices of outside cabling and plant by defining a planning strategy and guidance, design and installation rules for metallic and optical fibre cabling, requirements for satisfactory operation and the practices and procedures to be adopted to ensure that outside cabling and plant is installed in accordance with the specification.

1127. **BS EN 124** *'Gully tops and manhole tops for vehicular and pedestrian areas Design requirements, type testing, marking, quality control'.* This European Standard details the specification for pit lids (correctly termed manhole tops) for installation within areas subjected to pedestrian and/or vehicular traffic, in terms of definitions, classes, materials, design and testing requirements, marking and quality control.

1128. **BS EN 13101** *'Steps for underground man entry chambers, Requirements, marking, testing and evaluation of conformity'.* This European Standard details the specification for access steps for installation into cable pits.

1129. **SDIP 29** *'Facility Design Criteria and Installation of Equipment for Processing of Classified Information'.*

1130. **CESG GPG No14** *'Electromagnetic Security'.*

1131. **JSP 375** *'MOD Health & Safety Handbook',* **Volume 2:**

Leaflet 07, *'Working at Heights'.*

Leaflet 10, *'Work in Confined Spaces'.*

Leaflet 33, *'Safety in Excavation'.*

CHAPTER 12 - CIDA As Fitted CM Drawing Content & Standards

Introduction

1201. The CIDA Configuration Management (CM) 'product' is the physical facets of all MOD Information and Communications Technology (ICT) facilities, in terms of layout, and electrical connectivity. By far the most efficient way of documenting these facets is with 'As Fitted' drawings of the areas containing the subject facilities.

1202. 'As Fitted' drawings in support of CM, unlike drawings for most other purposes, are required to be readily and easily updateable as and when the facilities they represent evolve. Electronic Computer Aided Design (CAD) systems, in which representative information is maintained in a CAD model database file, with the required information 'viewed' to produce a specific layout drawing output, are ideally suited to this task.

Direction

1203. This chapter defines the drawing specifications and standards required for optimum CM of ICT installations at MOD sites and areas within civilian contractors' sites with systems storing, forwarding or processing MOD information.

1204. All drawings are to conform to the requirements contained within **BS 8888** and **JSP 440**. The following specific standards are pertinent to 'As Fitted' CM drawings: **BS EN ISO 128-20:2002, BS EN ISO 3098-1, BS EN ISO 4157, BS EN ISO 5455, BS 308, BS EN ISO 5457, BS EN ISO 7200, BS EN ISO 6433: 2012, BS ISO 7573, BS EN ISO 7519, BS EN ISO 9431.**

1205. The MOD preferred CAD package is AutoCAD. However, other similar CAD systems may be utilised, provided their model files are fully read compatible with the latest release of AutoCAD.

Requirements

The CAD Model File

1206. The importance of the CAD model file to the CM of an ICT facility requires that the CAD model file itself becomes a managed item. The timely and accurate completion of the file properties dialogue with all pertinent data and strict access control to ensure protection of the data file against accidental or unauthorised compromise is essential. This is in addition to file access restrictions evolving from any security related protective marking requirements that may be deemed necessary.

1207. To gain maximum advantage from a CAD system, drawings are to be structured such that all information representing a particular facility is recorded within the same CAD model file. This will not only reduce storage and retrieval time, but will also make future amendment quicker and easier. However, for speed of access and regeneration, CAD model files larger than 20 Mbytes should be avoided whenever possible.

1208. All drafting in the CAD model is to be scaled at 1:1 with the representation being as accurate as is possible within the constraints of the measuring tools employed. Although a CIDA 'As Fitted' CM drawing is not required to be a work of art, it should be a readily recognisable representation of the target facility. Recognisable representations of high incidence common items, like double 13 Amp mains power sockets, office furniture and PCs, should be produced as 'blocks' for use at all instances of the item throughout the model. Such blocks will not only help

minimise model file size but will improve readability by obviating the requirement to label the items in the plotted layout drawings.

1209. Maximum use is to be made of the 'Layers' facility and line colour option within the CAD package, by drafting differing systems, equipment types, building features etc. in different layers, to enable selection, and using differing colours, to improve clarity. With the advent of 'long name' layer identities in CAD packages, there is no requirement to follow the British Standard convention for layer naming. However, layer names should be chosen with care and kept descriptive but simple. Paragraph 1227 and Table 12-1 expand on CIDA layer requirements.

Baseline Information

1210. The following requirements for drawing content are intended to identify the baseline information required and should not be construed as license to omit detail that is obviously required in support of the CM or security requirement. A full 'As Fitted' CM drawing package should consist of, but not necessarily be limited to, the following layout drawings.

1211. **Site Map**. The site map is to detail the perimeter of the Inspectable Space, all buildings, cross site ducting & access chambers, inter building cables, RF emitters with their safety zones and any other relevant features that are within or may impinge on the CM boundaries of the site. The preferred scale for site plans is 1:2500.

1212. **Building Floor Plans**. Building floor plans are required for all buildings and all floors which have rooms and/or corridors containing ICT or its infrastructure. Floor plans are to detail all: walls (with fire resistivity highlighted); windows; doorways (with their opening arcs); controlled zone perimeters; cable entry points; containment and tray work routes (with fire stopping requirements highlighted); LAN and signal network; power distribution network; cabinet locations; TAP locations; ICT and associated office furniture.

1213. To enhance comprehension of building floor plans:

a. They are to be drawn, as far as is possible whilst keeping within the constraints of a landscape drawing sheet, with North (or near North) facing walls drawn parallel to the top edge of the drawing sheet and are to have an abbreviated compass rose included.

b. They are to include a reduced scale, key location site (or part site) plan, marked with cross reference identification of the relative building to the building plan.

1214. The preferred scale for floor plans is 1:20

1215. **Zone Perimeters Overlay**. The zone perimeters overlay diagram is to comprise of a diagram detailing the perimeters of any Inspectable Space, RF Safety zones, Controlled Space, TEMPEST Coupling Zones or boundaries and transmitter exclusion zones. The drawing should be an overlay of the building floor plan and separate overlays should be produced for each floor in multi-floor buildings. A comprehensive legend and tables detailing the relevant equipment build state, RF power, frequency etc. should be included.

1216. **ICT Cable Overlay**. The ICT cable overlay diagram is to comprise of a diagram of the physical routing of all ICT cable routes, both RED and BLACK, identifying the point of origin of the installation, all splice housings, distribution panels, patch panels, TAPs etc. The drawing should be an overlay of the building floor plan and separate overlays should be produced for each floor in multi-floor buildings. A comprehensive legend and table covering distribution panel and patch panel interconnectivity and cable detail schedules should be included.

1217. **Power Distribution Overlay**. The power distribution overlay diagram is to comprise of a line diagram of the physical routing of all power cable routes identifying the point of origin of the installation, the main and sub distribution boards, associated switchboards, filter equipment, power outlets etc. The drawing should be an overlay of the building floor plan and separate overlays should be produced for each floor in multi-floor buildings. A comprehensive legend and tables covering distribution board and switchboard fuse, MCB and RCD rating schedules should be included.

1218. **Room Wall Views**. Room wall views are only required for those walls associated with ICT related equipment or infrastructure. Where a wall view is drawn, it is to be drawn complete with all features, not just those related to ICT. To enhance comprehension, wall view drawings are to include a reduced scale, key location building (or part building) plan, marked with cross reference identification of the relative wall to the wall view. The preferred scale for wall view drawings is 1:20.

1219. **Cabinet Face Layouts**. Cabinet face layout drawings are to detail all mounted assemblies (noting their parent system or circuit) and all usable spare capacity. Face layouts are to have a vertical 'U' scale included to enable accurate positional reference. To enhance comprehension, face layout drawings are to include a reduced scale, key location floor plan, marked with cross reference identification of the relative cabinet to the face layout. The preferred scale for face layout drawings is 1:10.

1220. **System Schematic**. Individual system schematics are to consist of unit level interconnection diagrams, showing all input and output connectivity, and will normally be provided as part of the relevant system documentation package. However, where systems converge or overlap (cryptographic, patching jack-field & multiplexer racks etc.) then an overall systems schematic is to be produced and maintained in support of the CM process.

Detailed Drawing Content

1221. It must be emphasised that a drawing must detail complete systems, not merely infrastructure. A drawing package must convey sufficient information to the user for confident approval of system and installation design and modification proposals. To this end, spare capacity must be documented to the same standard as, but be delineated from, that which is in use.

1222. The amount of detail required to capture a facility varies according to the type and protective marking of ICT within that facility. Detailed recording of all approved routes is required to support and assist with integrity inspections in accordance with the requirements contained in **JSP 440**.

1223. The process for gaining and retaining security accreditation for, and hence authority to operate, ICT is dependent on the recorded availability of the information requirements listed in **JSP 440**.

Drawing Layouts

1224. Preferred scales have been selected to provide optimum clarity of detail for each specific layout which should be plotted to the smallest drawing sheet size commensurate with the size of the target facility. Only in exceptional circumstances should preferred scales be disregarded for the sake of drawing sheet size. Similarly, facilities should only be split across multiple drawing sheets when they are too large to fit to one A0 sheet. However, because of their unwieldy size, indiscriminate use of A0 drawing sheets should be avoided.

1225. Reduced scale A3 plots, though presenting a very respectable and aesthetically pleasing package when bound together, should only be regarded as indicative of the availability of full (preferred) size drawings. Their reduced scaling results in reduced prediction and inferior clarity and are therefore not considered suitable for CM purposes.

CAD File Layer Requirements

1226. To enable individual systems and subjects to be selectively processed, viewed and incorporated into particular layout drawings, a CAD model should have those separate systems and subjects drafted on separate layers. Because each facility differs in some respects from the next, a definitive list of layer names can not be specified for every eventuality. However, by way of example, Table 12-1 is a suggested minimum requirement for layer names to be used for CIDA 'As Fitted' CM drawings.

LAYER NAME	LAYER CONTENT
Building Fabric	Walls, Doors, Windows
Building Services	Air conditioners, Ductwork, Water pipes, Radiators, Fire & Security systems
Furniture	Tables, Desks, Chairs
Power BLACK	All BLACK power items; Cable entry, Distribution boards, Switchboards, Power sockets, Cable routes
Power DOMESTIC	All Domestic power items; Cable entry, Distribution boards, Switchboards, Power sockets, Cable routes
Power RED	All RED power items; Filters, Distribution boards, Switchboards, Power sockets, Cable routes
Signal BLACK COMMON	All BLACK COMMON items; Cabinets, Containment, Cables, Patching panels, Distribution Panels
Signal BLACK System A	All BLACK items for System A; Cabinets, Containment, Cables, Patching panels, Distribution Panels
Signal BLACK System B	All BLACK items for System B; Cabinets, Containment, Cables, Patching panels, Distribution Panels
Signal RED COMMON	All RED COMMON items; Cabinets, Containment, Cables, Patching panels, Distribution Panels
Signal RED System A	All RED items for System A; Cabinets, Containment, Cables, Patching panels, Distribution Panels
Signal RED System B	All RED items for System B; Cabinets, Racks, Containment, Cables, Patching panels, Distribution Panels
Zone/Space Controlled	The perimeter of designated controlled zones/spaces
Zone/Space Inspectable	The perimeter of designated inspectable zones/spaces
Zone/Space TEMPEST	The perimeter of designated TEMPEST zones/spaces

Table 12-1 Suggested Layer Names for CIDA 'As Fitted' CM Drawings

Standards and Publications

1227. **BS 8888** *'Technical product specification ~ Specification'.* This is the overarching 'umbrella' documentation standard to which all drawings are to conform.

1228. The following standards detail the specification for line types and widths to be used in drawings in order to ensure readability and faithful reducibility:

BS EN ISO 128-20 *'Technical drawings ~ General principals of presentation ~ Basic conventions for lines'.*

BS EN ISO 128-21 *'Technical drawings ~ General principals of presentation ~ Preparation of lines by CAD systems'.*

BS ISO 128-23 *'Technical drawings ~ General principals of presentation ~ Lines on construction drawings'.*

1229. **BS ISO 128-30** *'Technical drawings ~ General principals of presentation ~ Basic conventions for views'.* This standard details the specification and accepted convention for presenting views, applicable to all kinds of technical drawing, including mechanical, electrical, architectural, civil engineering, etc.

1230. The following standards detail the specification and general requirements for lettering on technical drawings. In addition to the fonts specified in the standard, other clear, clean, 'sans serif' fonts, similar to 'Arial', may be used on CIDA 'As Fitted' drawings:

BS EN ISO 3098-1 *'Technical product documentation ~ Lettering ~ General requirements'.*

BS EN ISO 3098-5 *'Technical product documentation ~ Lettering ~ CAD lettering of the Latin alphabet, numerals and marks'.*

1231. **BS EN ISO 4157-2** *'Construction drawings ~ Designation systems ~ Room names and numbers'.* This standard details the specification for identification and representation of room names on construction drawings.

1232. **BS EN ISO 5455:1995, BS 308-1.4** *'Technical drawings ~ Scales'.* These standards detail the specification for acceptable scales and their designation for use on all technical drawings in any field of engineering.

1233. The following standards detail the specification for the size and layout of title blocks, frames and drawing sheets for technical drawings in any field of engineering, including those produced by computer:

BS EN ISO 5457 *'Technical product documentation ~ Sizes and layout of drawing sheets'.*

BS EN ISO 7200 *'Technical product documentation ~ Data fields in title blocks and document headers'.*

1234. The following standards detail the rules, guidance and recommendations on the establishment, application and presentation of item references and item lists on technical drawings:

BS EN ISO 6433, BS 308-1.8 *'Technical drawings ~ Item references'.*

BS EN ISO 7573 *'Technical product documentation ~ Parts lists'.*

1235. **BS EN ISO 7519** *'Technical drawings ~ Construction drawings ~ General principles of presentation for general arrangement and assembly drawings'.* This standard details the specification for the representation of slopes, ramps, stairways, doors and windows on construction drawings.

1236. **BS EN ISO 9431** *'Construction drawings ~ Spaces for drawing and for text, and title blocks on drawing sheets'.* This standard details the specification for the layout of drawings, text and title blocks on construction drawings.

1237. **JSP 440** *'The Defence Manual of Security'.*