Project Management
Estates and Facilities

University of Reading

Standard Technical Specification

Periodic inspection and testing of fixed electrical installations (Parts 1, 2 and 3)

Amendments and Revisions

This document remains valid until 1/1/17, at which time it shall be reviewed.

This document is Version Number 1.1

Date	Comment	Name	Next Review Date
09/09/2015	Amendments and revisions to text	NC	
09/09/2015	Updated re-issue following revisions	DGRY	01/01/2017

Contents:

This University of Reading (UoR) specification consists of four parts. This document contains Parts 1, 2 and 3. The Appendix is issued as a separate Word document to enable contractors to use the forms in the Appendix.

Part 1- General Conduct of the Contract

1.1 GENERAL INSTRUCTIONS

1.1.1 Contractor Registration

All consultants, Contractors and sub-Contractors carrying out work either directly or indirectly for the UoR must be approved by Estates and Facilities (E&F) and be registered in the current "List of Selected Tenderers" in the UoR Wren database.

1.1.2 Specification

The Contractor shall comply with all the requirements of this Specification

1.1.3 National Standards

The Contractor shall at all times comply with the requirements of the current issue of relevant UK National standards in particular BS 7671 Requirements for Electrical Installations. The Contractor shall adhere to best practice as described in guides issued by the IET (previously the IEE) and NICEIC in particular the IET Guidance Note 3 Inspection and Testing.

1.1.4 Discrepancies

The University of Reading will issue information to Contractors typically in the form of tables and drawings. Where discrepancies exist between the Specification and the issued information, the issued information shall take precedence. Where discrepancies exist between the issued information and the existing physical layout, the physical layout shall take precedence.

1.1.5 Site Inspection

It is essential that all Contractors visit the site during the tender period. Contractors will be deemed to have carried out a full site survey to identify all items of electrical distribution equipment and calculate the number of circuits involved, in order to submit a realistic tender.

1.1.6 Access

Access to all areas is by prior arrangement only, by contacting the UoR Project Manager.

1.2 HAZARDS AND RISK ASSESSMENT

1.2.1 Contractor's Responsibility

Contractors are responsible at all times for the safety and wellbeing of their staff when on the University of Reading property. It is the Contractor's responsibility to ensure that adequate discovery of and understanding of the hazards present in and around the UoR property in which they will be working is achieved. Reference must be made to the relevant UK National Standards relating to Health and Safety. The Contractor is also to take account of the activities of other contractors who may be working in the vicinity of their own work area and to liaise with these contractors. The Contractor shall comply with the requirements of the University's Health and Safety guides.

1.2.2 Construction (Design & Management) Regulations (CDM)

All projects are controlled by the CDM regulations. In the unlikely event that the work is CDM notifiable, the Contractor shall make allowance to fully comply with the current CDM Regulations and to liaise with the University's CDM Co-ordinator in planning the work. The Contractor shall be responsible for producing the Health and Safety Plan, carrying out all elements of work including co-ordination, compliance with the programme and liaison with the UoR Project Manager, Building Manager or any other appropriate parties.
The Contractor shall take on the role of Principal Designer and shall be responsible for ensuring compliance with the requirements of the Health and Safety.

1.2.3 Asbestos

The Contractor shall take all necessary precautions to ensure their works and operations are fully compliant with The Control of Asbestos Regulations 2006 and shall inspect the University's Asbestos Register relevant to the area or building before carrying out any works associated with the building. If the Contractor discovers previously unknown asbestos in the area in which work is being carried out, work should stop immediately and the UoR Project Manager should be informed. Access to the Asbestos Register can be obtained through the Project Manager.

1.2.4 Electrical Safety

In carrying out any urgent Remedial Work, the Contractor shall observe the requirements of the University of Reading Standard Technical Specification for Electrical Services.

1.2.5 Fire Precautions

The Contractor shall liaise with the Building Manager and familiarise himself and his staff with all the fire alarm call points, firefighting appliances and emergency exit routes. The Contractor must keep all emergency escape routes clear throughout the whole contract.

1.2.6 Warning Signs

The Contractor shall be responsible for ensuring that adequate warning notices are displayed at each entry point, confirming the status of each site area and prohibiting when appropriate unauthorised personnel from entering.

1.2.7 Access Equipment, Hoisting and Materials Handling

The Contractor shall be responsible for ensuring that all equipment is used in a proper and safe manner and compliance with all codes issued by the Health and Safety Executive.

1.3 STAFFING

1.3.1 Personal Identification

All consultants, Contractors and sub-Contractors must carry means of identification (ID) displaying the company name, company telephone number and current photograph of the bearer, the name and title of the bearer. Personnel without appropriate ID will not be allowed to remain on campus. The University will not be liable for any delay, loss or expense occurred as a result.

1.3.2 Sub Contract or Agency Staff

The Contractor shall not employ agency or subcontract for any part of the works described in this specification, except with the specific prior agreement of the University of Reading Project Manager.

1.3.3 Signing in and out of buildings

The Contractor is to ensure that Contractor's staff follow UoR local procedures for signing in and out of buildings. Such procedures are essential for the safety of all personnel in the event of fire or other emergency, in order to establish who might be trapped in a building. Where no such procedure exists, the Contractor is to establish his own procedure to ensure the safety of the Contractor's employees.

1.3.4 Parking

Parking space is limited at the UoR. Contractor's vehicles must display a valid Contractors pass – issued by E&F department reception. Vehicles should be parked in marked spaces except where materials and / or equipment is being unloaded and loaded.

1.4 PERFORMANCE OF THE CONTRACT

The Contractor shall take account of all the information contained in and referred to by this Specification in performing the Contract.

Part 2- Methods, Requirements and Procedures

Index of Part 2

2.1 INSTALLATION SURVEY AND LABELLING

Contractors are required to carry out a survey of each Electrical Installation prior to Inspecting and Testing. The survey results are to be recorded in the format provided at Annexe A9 to this specification.

Contractors are required to Label the installation as defined in Reference A.

Where correct labels are already in place, Contractors need not replace them. Where new labels are to be required, the old labels should be removed to avoid confusion.

The contractor is required to mark up a Building Plan (provided by the UoR) with the location of all EVLDBs and similar Assets.

2.2 ELECTRICAL SERVICES ISOLATION

2.2.1 Introduction

To reduce inconvenience when isolation of electrical services is carried out, the Contractor shall follow a procedure for informing the various bodies affected by the proposed electrical isolation.

2.2.2 Services Affected

The following list of services can be affected by the isolation of local electrical circuits, distribution boards, or the building main electrical supply.

Intruder alarms	Mechanical services control systems
Loop alarms for equipment protection	Fume extract systems
CCTV security cameras and recorders	Lift installations and associated control equipment
Security screens	Data network communications racks
Emergency escape doors	Fire alarm systems
Door access systems	Emergency escape lighting
Mechanical services plant	User's equipment

Intruder Alarms - Properly installed and maintained alarms have a battery backup. However, as it is not uncommon for these batteries to be old and in need of replacement, the system operator should be informed of the planned power outage.

Loop Alarms - Most systems have battery backup, but there are some without or may have defective batteries, there is a need therefore to inform the system operator of the power outage.

CCTV Security Cameras - The software associated with CCTV systems requires a controlled power down to protect the software and the equipment.

Security Screens – As these generally do not have any battery backup, the system users need to be aware that the system will not be operational during the power outage.

Emergency Escape Doors - Within the University, several buildings have doors that are

electrically held open and which are released in an emergency, or may be part of the building's access control. Some doors have battery backup, but the duration that they will remain operational is unknown. The system users therefore need to be aware that the door holders may not be fully operational during the power outage.

Door Access Systems - Door access systems may or may not have battery backup. The system users need to be aware that the access system may not be fully operational during the power outage.

Mechanical Services Plant – As isolation of the electrical supplies to plant can cause problems if not shut down in a controlled manner, plant operators and maintenance services need to be informed of the proposed power outage.

Mechanical Services Control Systems - Control systems often use software requiring a battery back-up to maintain power, but this may not be sufficient to cover the period during which the electric supply is switched off. To reduce any difficulty in re-starting such systems after a prolonged power outage, the plant operators need to be informed prior to isolating the electricity supply, should any preventative measures need to be taken.

Fume Extract Fans - The isolation of fume extract fans may cause a hazard should fumes build up whilst the extract system is not running. The system operator needs to be advised as early as possible so the situation can be addressed and any hazardous substances can be removed whilst the fume extract system is not operational.

Lift Installations and Associated Control Equipment - Where the electrical supply to a lift installation is likely to be affected by a power shutdown, the lift(s) must be brought to a standstill (usually on the ground floor) before being switched off and the system shut down.

Data Networks - Loss of power to data hubs or servers will shut down the local computer network served by these, and may also affect users outside the area that has been electrical isolated. ITS must be made aware of any likely power interruptions at an early stage, in order to evaluate the situation and take the appropriate action.

Fire Alarm Systems - Fire alarm systems should provide adequate power back up from their own batteries to run the system for some considerable period. Security Services should be informed of any planned shutdown that may affect the electrical supply to a fire alarm system.

Emergency Escape Lighting - Isolating the electrical supply to the emergency escape lighting initially does not present an immediate problem. However, should the batteries fully discharge (and where the emergency escape lighting is essential to the safe occupation of a building) the building should not be re-occupied until the batteries have been sufficiently recharged.

User's Equipment - Within departments, users may have specialised equipment such as constant temperature cabinets, refrigerators and freezers etc. that will be affected by the loss of electricity. There may also be research projects that need a programmed shutdown before the electricity may be switched off. Such users must be given adequate notice and be made aware of any equipment within their area of control

where the loss of electricity would have a detrimental effect. Unless specifically requested, Contractors shall not be responsible for providing temporary power facilities to user's equipment.

2.2.3 Notification to Users and System Administrator

Prior to carrying out any electrical isolation the Contractor shall notify all parties as detailed in Appendix 1.

This schedule shall be used by the Contractor as a checklist for notification to the various bodies affected by the electrical isolation.

The Contractor shall ensure all personnel have been contacted and are aware of the intended isolation of electrical supplies. If, after giving notification, the Contractor has concerns that the appropriate personnel have not responded to the notification of the intended electrical supply isolation, the Contractor shall advise the University of Reading Project Manager accordingly.

2.2.4 Notification to Other Building Users

Where the electrical supply isolation may affect other buildings and users, the Contractor shall advise the University of Reading Project Manager when planning the proposed shutdown.

2.3 ELECTRICAL INSTALLATION - CABLE COLOURS

2.3.1 Introduction

In April 2004 BS7671:2001 Amendment No.2 2004 (now superseded by the "17th edition") was published detailing the harmonisation for the colours of cables used in electrical installations.

As part of the University of Reading Facilities Management Directorate's strategy for the introduction of the new cable colours and harmonisation with their existing electrical installations, all Contractors carrying out new installation works, alterations, or extensions to existing installations shall do so in accordance with BS 7671.

Note: the Contractor is not required to carry out any rewiring or to label, re-label or mark any existing cables during the Periodic Inspection & Testing procedure.

2.3.2 Cable Colours Adoption Policy

To be read in conjunction with 'New Fixed Wiring Colours - A Practical Guide' issued by NICEIC – Spring 2004, and 'Snags and Solutions - A Practical Guide to Everyday Electrical Problems' - Part 2 - Wiring Systems.

2.3.3 Installation Types – Cables for Mains 230/400 Volt Systems

Installation Type: - Single core cables in conduit and trunking

Phase conductors: Brown/Black/Grey. Neutral: Blue. At termination points the cables shall also be labelled L1, L2, and L3.

Two–way switching. When single-core cables are installed in trunking or conduit, all live conductors (strappers) shall be wired using brown cable.

Installation Type: - PVC/PVC ('Twin and Earth' installation)

Cables will be supplied Brown and Blue, Brown and Brown, or Brown, Blue and Grey, all with bare circuit protective conductor (CPC). These cables shall only be used for single-phase circuits. Where appropriate black and grey are "live" cables they shall be sleeved with brown sleeving.

Where a three-core and CPC cable is used where two of the cores are "live" and one the neutral conductor, the black conductor shall be sleeved brown and the grey conductor shall be sleeved blue and used as the neutral. This colour marking is as per the NICEIC 'Snags and Solutions' (Part 2 - Wiring Systems - Item No 9. etc. Bathroom Extract Fans and Emergency Lighting).

Installation Type: - XPLE/SWA/XPLE or PVC/SWA/PVC Plus other composite multi-core cables

4-core cable. Phase conductors: Brown/Black/Grey. Neutral: Blue For a three-core cable where used for single-phase circuits, the brown will be live, black sleeved. Green/yellow to be the circuit protective conductor and the grey shall be sleeved blue and used as the neutral. This colour marking is proposed by the NICEIC in 'Snags and Solutions' (Part 2 - Wiring Systems - Item No 52).

Installation Type: - Multi core MICC

Phase conductors: Brown/Black/Grey. Neutral: Blue.
At termination points the cables shall also be labelled L1, L2, and L3.

2.3.4 Existing Circuit Re-Labelling

When a Contractor carries out any installation or remedial work on existing circuits, all new cables shall be colour-coded using brown, black, grey and blue sleeving and the cables marked L1, L2, and L3 as appropriate. Purpose-manufactured printed cable identification sleeves should be used. Hand-written labelling or PVC tape is not acceptable.

Phase conductors in three-phase distribution boards shall be identified L1, L2, L3 or Brown, Black, Grey and not Red, Yellow, Blue (BS 7671 2001 Amendment No. 2, 2004 Harmonised Cable Colours and clause 2.10.3 'Electrical Installation Cable Colours Changes').

2.3.5 Warning Notices

For existing distribution boards where circuit wiring colour coding is mixed, the Contractor shall position a warning notice as detailed in BS 7671:2008 Regulation 514.14.1:

"CAUTION – This installation has wiring colours to two versions of BS 7671. Great care should be taken before undertaking extension, alteration or repair that all conductors

are correctly identified".

2.3.6 Fire Alarm Systems

MICC are addressed in Paragraph 2.3.10, for fire alarm systems which are operating at ELV (BS7671 definition: 50 Volts AC or 120 Volts ripple-free DC) the colour coding of cables is as follows: positive (live): brown, black, red, yellow, violet, orange, grey, white, pink and turquoise. The negative or mid-point shall be blue. As fire alarm systems have various cable functions, the colour identification requirement are covered separately for each individual system.

As an example, permanent negative and positive: red and blue, sounder circuit: yellow and blue, alarm circuits: white and grey. Where the colour requirements are different from what has been detailed this shall be identified in the Section 3 Particular Specification.

The sheath of cables used for Fire Alarm Circuits shall be coloured **Red**, and where contained within PVC mini trunking this shall also be coloured **Red**.

2.3.7 Wiring for Mechanical Services – Extra Low Voltage Sensors

For BMS systems and sensor wiring the Contractor shall use Belden 8760NH single twisted pair, polythene insulated stranded conductors Low Smoke Halogen Free (LSOH/LSZH).

The cable cores are coloured black and transparent and it is not necessary to provide any additional colour marking unless this has been specified.

2.3.8 DC and Invertor Wiring Low Voltage

The Contractor shall carry out wiring on these circuits using colour coding and alphanumeric notification in accordance with Table 51 BS 7671:2001 Amendment No 2 2004.

Two-wire unearthed DC power circuit. The live conductor (positive L+) shall be Brown and the negative (L-) Grey.

Two-wire earthed DC power circuit (Negative Earthed). The live conductor positive (L+) shall be Brown and the negative (L-) Grey.

At termination points on a DC system the Contractor shall provide sleeves over the cables marked L- or L+ as appropriate.

Example: central battery systems for emergency lighting. For an existing system the Contractor shall establish the connection arrangements for earthing.

2.3.9 AC or DC Wiring Extra Low Voltage (50 volts AC or 120 volts ripple free DC)

The live conductor on an extra low voltage AC system shall be coloured Red and the positive cable on a DC system shall also be Red.

Where the conductor is earthed as a negative or neutral that cable shall be coloured Blue.
At termination points on a DC system, the Contractor shall provide a sleeve over the cable marked – or + as appropriate.

2.3.10 Existing Mineral Insulated Cables and VIR

Marking of existing MICC and VIR cables that are over 30 years old shall be made with extreme caution and the Contractor shall take guidance from the UoR Project Manager who shall consider the use of marking cables using PVC coloured insulation tape.

2.4 PERIODIC ELECTRICAL INSPECTION AND TESTING

2.4.1 Programming of Works and Progress Meeting

A programme of the sequence of works shall be agreed between the users and the University of Reading Project Manager. The Contractor must allow in their tender the full costs associated with the agreed programme as detailed within the specification.

Prior to commencement on site, the Contractor shall allow for attending a pre-contract meeting with the client end user(s) and the University of Reading Project Manager and also allow for attending fortnightly progress meetings.

The pre-contract meeting will be to discuss the detailed day- to-day arrangements of the Contractor's safe methods of working, including liaison with the Department, Safety Officers or their appointed representatives, prior to each stage of the works.

Notes of any decisions taken will be circulated and incorporated into the contract arrangements.

At the end of each week the Contractor shall email a report to the University of Reading Project Manager outlining the progress that has been made during the week.

2.4.2 Method of Inspection and Testing

The Contractor shall carry out a Risk Assessment and generate a Method Statement of their intended inspection and testing process.

The Contractor shall test the building or areas as detailed in Part 3 "Supplementary Specification - Scope of Works" fully in accordance with the requirements in the current edition of IET Document 'Inspection and Testing - Guidance Note 3', in particular Section 1 – General Requirements and Section 3 – Periodic Inspection and Testing.

In every case the Contractor shall inspect and test all circuits and make all reasonable attempts to identify the full extent of the circuit. Circuits that remain unknown shall be identified as such and as many details as are known shall be recorded on the test sheets.

In addition, the Contractor shall make all reasonable attempts to identify causes of circuit faults found, including disconnection of fixed equipment or luminaires as necessary.

It is not practical to inspect every joint and termination in an electrical installation. However, the Contractor shall inspect every termination within distribution systems and distribution boards to ensure that the connections of the conductors are properly installed and secure.

A sample inspection shall be made of all accessible parts of the electrical installation. The Contractor shall make allowance to inspect at least 10% of the termination points per power circuit and at least one luminaire and one switch per lighting circuit. At least one socket outlet in every room should be inspected, regardless of room size.

2.4.3 Warning Signs

The Contractor shall be responsible for ensuring that adequate warning notices are displayed at each entry point, confirming the status of each site area and prohibiting when appropriate unauthorised personnel from entering.

2.4.4 Electrical Safety

In addition to the advice given in the HSE Best Practice Guide "***Guidance on Safe Isolation Procedures for Low Voltage Installations",*** the Contractor shall take account of the following UoR requirements:

During the period of the electrical testing, the Contractor shall ensure the safety of the electrical installation and that control of the electrical danger within the area of the contract is the responsibility of a Competent Person in his employ.

The electrical installations will be formally delegated to the Competent Person identified by the Contractor at the start of the contract and upon completion will be "handed back", with the transfer of responsibility being recorded on the standard forms issued by the University.

The Contractor shall not work on any electrical circuit in which all phase (live and neutral) conductors have not been isolated, except where this is necessary to carry out a particular test or procedure (for example: polarity, earth fault loop impedance and the functional testing of RCDs, RCBOs, switchgear and control gear).

Before commencing work, isolation shall have been carried out by either physically removing the links or fuses and by a locking device securing the isolation in an "off" position.

Substantial warning notices shall be securely fixed to the control device clearly labelled "DO NOT SWITCH ON - MEN WORKING". These notices are to include the Contractor's trading title together with the name of the duty holder who is responsible for the electrical safety within the area, and throughout the duration of the contract a 24-hour contact telephone number.

2.4.5 Switching off supplies

The Periodic Inspection and Testing procedure will require isolation of all electrical circuits for various periods of time.

It is the responsibility of the Contractor performing this task to liaise directly with the building occupants prior to switching off any electrical supplies to agree upon suitable

dates and timescales.

Prior to isolation of electrical circuits the Contractor should follow the procedures detailed in Section 2.2 'Electrical Services Isolation'.

When agreeing the programme of circuit isolation with the occupants, the Contractor shall make it clear to the occupants that they require total isolation of the electricity supplies to enable the testing to be carried out correctly and in safety as required by the Electricity at Work Regulations (1989).

In cases of difficulty in agreeing a time with the occupants and users, the Contractor shall advise the University of Reading Project Manager.

Once a timescale has been agreed, this should be strictly adhered to. In the event of a project over-running, the Contractor should be prepared to temporarily cease operations until further agreement has been reached with the occupants.

The Contractor must consider the effects on adjacent buildings and systems of such isolations and advise accordingly i.e. Fire Detection and Alarm Systems, Communication Systems, Data Hubs, Computer Systems and Security Systems.

This information shall be made available to the University of Reading Project Manager by the Contractor prior to the commencement of the works.

As the buildings being tested are almost all in use, the Contractor must make every effort to minimise the disruption to supplies, particularly to essential equipment.

2.4.6 Temporary Supplies

Where required, the Contractor shall make allowance in their tender to provide temporary supplies to the specific locations previously agreed with the users, for use when these area(s) need to be isolated for testing. Any such areas will be defined in Part 3 - Supplementary Specification.

2.4.7 Re- Energisation

It is the responsibility of the Contractor to ensure that all circuits are operational on re-energisation.
Time clocks for heating must be reset to the correct time and reprogrammed as necessary.

Fire Detection and Security systems shall be checked and left operational; any concerns regarding these systems must be reported to the University of Reading Project Manager.

2.4.8 Mechanical Services Plant

The Contractor is to exclude from his testing regime any low voltage (mains) power and control cables beyond (i.e. "downstream" of) the isolator associated with the Mechanical Services Installation. The inspection and testing shall be carried out up to the isolator which may be a separate item or be included within the Control Panel. Where the Control Panel includes the isolator, the Control Panel shall be given an Asset Reference.

2.4.9 Minor Repairs

No minor repairs will be included as part of the testing and inspection procedure.

2.4.10 Major Repairs

No major repairs will be included as part of the testing and inspection procedure.

2.4.12 Dangerous Installations

Where the Contractor determines that the condition or particular circumstances relating to an electrical installation represents immediate danger to his own employees or any other person property or livestock, the Contractor shall take immediate action sufficient to remove the danger. The Contractor shall contact the UoR Project Manager to inform him of the dangerous installation and to agree and authorise the necessary subsequent action. This may include temporarily isolating the equipment, installing warning labels etc.

2.5 CERTIFICATES & REPORTS

2.5.1 Record Documentation

The Contractor will provide all the required record documentation in both hard copy (paper) and electronic format. Delivery of the Documentation is to be to the times given in the table at Part 3.

2.5.2 Hard Copy

All paperwork shall be contained in size A4 plastic- covered, loose leaf, four-ring binder(s) with hard covers, all indexed and divided with appropriate cover titles.

List of Contents

Distribution Board Schedule (EVLDB number / page number)

Periodic Inspection Report, including limitations.

Summary of Deviations

Distribution Board Circuit Charts

Building floor plans (marked up with distribution board positions)

Asset Survey Results (Asset References and Asset Numbers)

Electrical Installation Schematic Diagram

Note: all the above should be A4 in size except the building floor plans, distribution board location drawings and the schematic diagrams, which should be sized so that they can be easily read without magnification.

Please refer to the Appendix for details of the required formats.

Any drawings needed to illustrate or locate items mentioned in the Manual, where larger than A4, are to be folded and accommodated within the binders, preferably so that they may be unfolded without being detached from the rings.

The certificates and reports shall be in the standard format issued by the National Inspection Council for Electrical Installation Contracting, the Electrical Contractors Association or AMTECH unless otherwise agreed. The results may be printed or handwritten, but must in all cases be fully legible and understandable. Any abbreviations must be explained.

2.5.3 Deviation Reports

As soon as possible after completion, the Contractor shall provide to the UoR Project Manager a complete 'Summary of Deviations', as per the revised Microsoft Excel format (illustrated at Appendix 8), with prices shown against work which the Contractor wishes to carry out. For speed this should be emailed in the first instance, the UoR Project Manager will give authority to proceed on the agreed Remediation work as soon as possible following receipt. This initial "Summary of Deviations" shall also be included on the CD / DVD.

2.5.4 Installation Schematic Diagram, and Drawings

The University of Reading Project Manager will provide the Contractor with building floor plans. As part of the circuit identification and labelling process, the Contractor shall provide the University of Reading Project Manager with marked up prints identifying all the distributions boards and other main switchgear (but not wiring accessories) located within the areas tested.
The Contractor will also produce a schematic diagram of the electrical installation distribution system covering all the areas tested, which should include all the following information:

Main and sub-main cables, type, size and approximate length

All devices: type, size and manufacturer.

All distribution boards: type, size and manufacturer.

At each point of distribution provide details of the maximum prospective short circuit current and the earth fault loop impedance.

The size and type of the main equipotential bonding conductors and a description of their point of connection to the relevant service or building structure.

The schematic diagram should be accurate and legible without artificial magnification. This may require larger pages than A4 (up to size A1 is acceptable) and/or multiple pages to be used.
The Contractor shall also provide the schematic diagram(s) in electronic format (AutoCAD .DWG files – please refer to the Appendix), each one being a stand-alone file.

2.5.5 Electronic Records File Format

All documents and drawings shall be supplied only in the formats and with the folders as specified below. All documents should be provided in Microsoft® Word (.DOC or .DOCX) format except where shown. Please refer to the Appendices and Reference A for examples. Appendix A5 contains a graphic depicting the required file structure.

Format: Optical media (CD or DVD)

Information on label: Building Number / Building Name
Job (Wren) Number
Fixed Wiring Test Records
Date

Folder: Test Certificate

Folder reference: Building Number, Bldg Name, Title
Example: W033_URS_Test Certificate
Files in folder: List of Contents
Distribution Board index
NICEIC/ECA Periodic Inspection Report (.pdf format)
Limitations

Folder: Circuit Charts

Folder reference: Building number, Bldg Name, Asset Reference, Title
Example: W033_URS_EVLDB1234_Circuit Charts
Files in Folder: Distribution board charts
(note: each chart should be a separate document)

Folder: List of Deviations

Folder reference: Building Number, Bldg Name, Title
Example: W033_URS_Deviations List
Files in Folder: Summary of Deviations

Folder: Schematic Diagrams

Folder reference: Building Number, Bldg Name, Title
Example: W033_URS_Electrical Schematic
Files in folder: Electrical schematic diagram(s) (.DWG format: AutoCAD® 2006 or LT)

(The following folder is optional, should the Contractor wish to be considered for carrying out any subsequent remedial work).

Folder: List of Remedial Works

File reference: Building Number, Bldg Name, Title
Example: W033_URS_Remedials List
Files in folder: Summary of Remedial Work (same format as Summary of Deviations)

2.6 PROVISION OF DOCUMENTATION AND PAYMENT STRUCTURE

Upon the completion of the inspection and testing, the Contractor will provide the University with all the required documentation and electronic data to the times given in the table at Part 3.

Owing to the importance of the provision of this information, the University reserves the right to withhold full payment to the Contractor until such time as all the required data has been received. The following payment structure will therefore apply, except in extenuating circumstances.

For projects below £3,000, payment will be made upon final completion.

For projects of £3,000 to £6,000, a maximum of 60% will be paid until final completion of the documentation.

For projects of £6,000 and over, a maximum of 75% will be paid until final completion of the documentation.

However, where the UoR is unable to provide the Contractor with access, data or any other resource or information necessary for the Contractor to comply with the requirements of the specification in providing the required information, payment will not be unnecessarily withheld.

Part 3- Supplementary Specification (Scope of Works) and Tenderer's Response
For [*building no*] [*building name*]

THIS PART IS INTENDED TO BE USED AS THE BASIS OF INVITATIONS TO TENDER

Index of Part 3

University of Reading

3.1. INSPECTION, TESTING, LABELLING and REPORTING REQUIREMENT

3.1.1 All work pertains to the [building(s) or areas to be specified here].

- Identify and locate all circuits, electrical distribution equipment and associated wiring accessories.

- Perform a thorough electrical Periodic Inspection and Test

- Compile Reports and Charts as per requirement defined in Part 2

- Label Equipment and Accessories as defined in Part 2

- Provide all reports, drawings, "soft" copy of reports and drawings as per the table below within the times stated

	Hard Copy in A4 hard backed Folder by 20 working days from end of programme	Soft Copy by email by	Soft Copy on CD by 20 working days from end of programme	See Section/Para
Inspection and Testing Reporting				
Index Sheet for Hard Copy Folder				Appendix A10
Periodic Inspection Reports covering all Distribution Circuits and Final Circuits in the building	Required	Not Required	Required	2.4, 2.5
List of limitations to inspection and testing	Required	Not Required	Required	2.4, 2.5
Category 1 Deviations	Immediately by telephone to UoR Project Manager			2.4.12
Deviation Report in specified format	Excel Spreadsheet in soft copy only required	5 working days from end of insp. and test programme	Required	2.5.3 Appendix A8
Survey Information				
Plan of building annotated with location of all DBs and related electrical items (not accessories) Plan provided by UoR	Required	Not Required	Not Required	2.5.4

Schedule of Distribution Boards and Other Electrical Assets	Required	Not Required	Required	2.5.2 Reference A, Appendix C
Revised E&F Asset list linking Asset Number and Asset Reference (e.g.) EVLDB number (in order to update the E&F data base)	Required	Not Required	Not Required	Appendix A9
Distribution Schematic Drawing showing all entities such as Distribution Boards and their interconnection in format per specification	Required	Not Required	Required	2.5.4 Appendix A4
Labelling	Labels fixed in place by:		Soft copy on CD by:	
Service Ducts and rooms containing Distribution Boards and other electrical assets labelled as per Reference A	20 working days from end of insp. and test programme		Not Required	2.1.8
All Distribution Boards and similar to be labelled with a unique and correct Asset Number (list and any labels required to be obtained from E&F)	By the end of insp. and test programme		Not Required	2.1.6
All Distribution Boards and similar to be labelled per Reference A	By the end of insp. and test programme		Not Required	2.1.3
Circuit Charts per Reference A	10 working days from end of insp. and test programme		20 working days from end of insp. and test programme	2.1.7 Reference A, Appendix A, Appendix B
All accessories to be labelled per Reference A	By the end of insp. and test programme		Not Required	2.1.5

3.1.2 Buildings and/or areas to be inspected etc.

The inspection test labelling and reporting is to be carried out on the building(s) listed below:

Building Number	Building Name	Campus

3.2 INFORMATION PROVIDED BY THE UoR

Tender specific information to be listed here

3.3 AREAS TO BE TESTED

Unless otherwise stated, all areas of the building shall be tested including all power wiring associated with the mechanical services plant and emergency lighting.

3.4 TEMPORARY SUPPLIES

Some parts of the installation under test may require temporary supplies to be provided whilst the test of the main fixed installation proceeds and the main supply is either off or at risk of disruption: The Contractor is to arrange for provision of these supplies. For this Building the following Temporary Supplies are required:

Area	Period

3.5 PROGRAMME OF WORK

A programme of work is to be submitted by the Tenderer showing the proposed duration of the work and the number and grade of technician to be employed at any one time. The programme should provide for the required delivery and completion times as indicated in the table above. The Contractor shall allow in their tender to provide sufficient operatives to maintain the programme and sequence of work, including circuit identification, labelling and circuit charts as required.

3.6 WORKING HOURS

For the purposes of tendering, the Contractor shall assume that all work will be carried out during normal working hours. The Contractor is required to provide details of his Daywork rates to cover all eventualities, by completing the appropriate form provided in the Tenderer's Response.

Where it is found necessary or desirable to carry out any work outside of normal working hours, the Contractor will provide the UoR Project Manager with a detailed quotation for such work, using the appropriate Daywork rates previously provided. Any such quotation will include a calculation showing the account taken of the original quoted price and the justification for additional cost for work outside normal working hours.

The Contractor will then forward Daywork sheets to the University of Reading Project Manager for verification, providing particulars of the hours worked for each type of operative. These details must be provided no later than the week following that in which the work is executed. All Daywork sheets shall be complete, legible, signed by the Contractor's lead operative and numbered in sequence.

The Contractor will give notice to the University of Reading Project Manager of the commencement and completion of any work for which it is intended to submit Daywork sheets.

3.7 TENDERER'S RESPONSE

A format is provided in the next section for Tenderer's responses. It is mandatory for consideration that Tenderer's complete the Tenderer's Response and return a printed original signed Part 3 complete to the UoR Project Manager by the closing time stated in the Tenderer's Response.

3.8 ALTERNATIVE RESPONSES

Although it is mandatory for a fair comparison of competitive tenders that Tenderers submit their tender as required at Paragraph 3.7, the UoR welcomes additional alternative quotations where the Tenderer believes a more beneficial or novel solution is available by (e.g.) varying the UoR requirement.

3.9 UoR E TENDERS

Part 3 may be used as the basis for e tenders issued through the internet by the UoR. In this case, and where the requirements of the e tender conflict with those of Part 3, the e tender rules shall apply.

3.10 REQUESTS FOR INFORMATION

Where Tenderers require further information to clarify or expand the information provided in the Specification, they should write to the UoR Project Manager giving details of their enquiry. The detail of any such requests and the UoR answer will be circulated to all companies which have been invited to tender. Submission of a Request for Information in no way relaxes the UoR requirement for Tenderers to respond by the closing date; the UoR may however choose to delay the closing date to enable Requests for Information and the UoR response to them.

3.7

Tenderer's Response CLOSING TIME AND DATE FOR THE RECEIPT OF TENDERS:

Time:

Date:

Responding Contractor:	Primary contact: Company Name: Address: Telephone: Fax: Email:

Tenderer's price for the entire contract excluding VAT:	

Tenderer's Proposed Programme:	Include: Programme Duration Earliest Start Date Staffing Numbers In a suitable format as determined by the Tenderer

DAYWORKS

The Contractor is required to provide a list of Daywork charge-out rates for all grades of operative applicable to the contract, by completing the following form.

The list should include both non-premium (base rate) and all premium (overtime) rates, indicating when they apply.

DAYWORKS				
Operative type (e.g.) Test Electrician	Hourly charge-out Daywork rate (£)			
	Rate 1 (Base Rate)	Rate 2	Rate 3	Rate 4
When applicable? (e.g.) 08:00- 17:00 Mon to Fri				
Signature Block	Name Appointment Signature Date			