

25117: 54 Stockheath Road Leigh Park, Havant, PO9 5HQ

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Revision Schedule

Revn	Comment	Date	By
T1	Initial Issue	31/10/25	BH

Earthing and bonding systems

Systems

1. Ss_70_30_25_25 Earthing and bonding systems

1. **Generally:** The Contractor shall design, supply, install, test and commission a complete earthing system in full compliance with BS7671 The 18th Edition IET Wiring Regulations including all amendments, BS 7430 and the local District Network Operator's (DNO) requirements.

All specifications are to be read in conjunction with preliminaries/general conditions, relevant drawings, and schedules of equipment.

All services shall be installed in accordance with the product manufacturer's guidelines.

2. Description

The existing 3 phase power supply to the building shall be adapted and reused to serve the new arrangement.

The incoming armoured cable shall have the steel wire armour glanded off and shall be connected to a suitable earth point from the gland termination point, and the associated CPC (fully sized) which acts as the safety functional earth is connected to an appropriate dedicated earth bar.

A new LSZH cable with yellow/green sheathing shall be installed from the intake to the new earth bar. This earth bar shall be N way (contractors design) with single disconnection point.

The new earth shall be extended from the new incoming power supply and serve the main house and grounds facilities.

Generally

The Contractor shall bond all new services in accordance with BS 7671.

This shall include, but not be limited to the following items:

- New and existing building Structure
- Incoming cold-water supplies
- Each distribution board earth bar
- Remote grounds buildings and facilities.

Circuit Protective Conductors

All circuits shall be provided with their own dedicated circuit protective conductor (CPC) as denoted on the schematic.

Supplementary circuit protective conductors shall be provided to all metallic pipework at each sink location. These shall be wired using 4mm² (minimum csa) LSF single core cabling.

3. **Main incoming earth:** Establish with the Electricity Distributor.
4. **Main protective bonding conductors:** *Pr_65_70_48_75 Single-core non-sheathed (LHSF) insulated cables*
5. **Supplementary bonding conductors:** *Pr_65_70_48_75 Single-core non-sheathed (LHSF) insulated cables*
6. **Circuit protective conductors:** Core of cable. Cable armour.

7. **Earth terminal type:** *Pr_65_70_46_24 Earth bars*

8. **Accessories:** *Pr_65_70_46_29 Earthing clamps*

9. **Electrical identification:** *Pr_40_10_57_29 Equipment labels and warning notices*

10. **Execution:** *Ss_70_30_25/620 Measurement of characteristics of existing installations; Ss_70_30_25/630 General installation; Ss_70_30_25/660 Installing earthing conductor; Ss_70_30_25/670 Installing main protective bonding conductors; Ss_70_30_25/680 Installing supplementary bonding conductors; Ss_70_30_25/610 Removing earthing and bonding systems; Ss_70_30_25/630 General installation*

11. **System completion:** *Ss_70_30_25/810 Inspection and testing; Ss_70_30_25/820 Documentation*

Products

2. Pr_40_10_57_29 Equipment labels and warning notices

1. **Description:** Distribution board references
2. **Manufacturer:** Contractor to confirm
3. **Material:** Engraved anodized aluminium. Face engraved rigid plastic laminate.
4. **Label size:** Contractor to provide a technical submittal showing proposed labels
5. **Colour**
 - 5.1. **Background:** White.
 - 5.2. **Lettering:** Black.
6. **Typography**
 - 6.1. **Font:** Arial
 - 6.2. **Size:** 5mm

3. Pr_65_70_46_24 Earth bars

1. **Manufacturer:** Omega Furse
2. **Material**
 - 2.1. **Bar type:** Hard drawn copper to BS EN 13601.
 - 2.2. **Finish:** Bare.
 - 2.3. **Support:** PVC-U.
3. **Size**
 - 3.1. **Profile:** 50 x 3 mm.
 - 3.2. **Length:** 1025 mm.
4. **Predrilled connections (minimum):** 16.
5. **Disconnecting links:** One.
6. **Execution:** *Pr_65_70_46/610 Installing earth bars*

4. Pr_65_70_46_29 Earthing clamps

1. **Manufacturer:** Submit proposals
2. **Standard:** To BS 951.
3. **Material:** Metallic non-corrosive.
4. **Pipe diameter (minimum):** 15mm
5. **Cable capacity (minimum):** 1 x 16 mm² conductor.

5. Pr_65_70_48_75 Single-core non-sheathed (LHSF) insulated cables

1. **Standards:** To BS EN 50525-1 and BS EN 50525-3-41.
2. **Third-party certification:** British Approvals Service for Cables (BASEC)-certified.
3. **Cable type:** H05Z-U.
4. **Size:** minimum 4mm²
5. **Execution:** *Pr_65_70_48/635 Installing low-voltage cables*

Execution

6. *Pr_65_70_46/610* Installing earth bars

1. **Standards:** In accordance with BS 7671 and BS 7430.
2. **Main earth bar location:** Next to the incoming electricity point of supply.
3. **Mounting**
 - 3.1. **Orientation:** Horizontal.
 - 3.2. **Spacers:** Ceramic.
 - 3.3. **Support spacing (maximum):** 300 mm for 25 mm bar, and 450 mm for 50 mm bar.
 - 3.4. **Clearance between wall and earth bar (minimum):** 30 mm.

7. *Pr_65_70_48/635* Installing low-voltage cables

1. **Standard:** In accordance with BS 7671.
2. **Timing:** Do not start internal cabling until building enclosure provides permanently dry conditions.
3. **Preparation:** Store cables above 5°C for 24 hours before installation.
Clear cable path of debris.
4. **Installation temperature (minimum):** 5°C.
5. **Cables:** Install in one length. Dress cables flat, free from twists, kinks and strain.
6. **Cable pulling:** Do not overstress. Prevent kinks and twisting of the cable.
7. **Cable protection:** Cables passing through walls and floors to be sleeved with conduit or pipeduct to a minimum of 300 mm. Bush at both ends. Ensure that appropriate fire stopping materials are used to maintain the original fire integrity of the wall or floor around the penetration.
8. **Concealed cable runs to wall accessories:** Run vertically from the accessory.
9. **Distance from other services running parallel (minimum):** 150 mm. Position cables below heating pipes.
10. **Jointing and termination**
 - 10.1. **Final circuit cables:** At electrical accessories only.
 - 10.2. **Core connections:** Using compression lugs to equipment without integral clamping terminals.
 - 10.3. **Terminating cables when not using glands:** Take sheathing of cables into accessory boxes and equipment and protect against abrasion with grommets.

8. *Ss_70_30_25/610* Removing earthing and bonding systems

1. **Scope:** Complete installation.

9. *Ss_70_30_25/620* Measurement of characteristics of existing installations

1. **External earth fault loop impedance (Ze):** Direct measurement.
2. **Earth fault loop impedance (Zs):** Direct measurement.
3. **Results:** Submit.

10. *Ss_70_30_25/630* General installation

1. **Standards:** In accordance with BS 7430 and BS 7671.

11. Ss_70_30_25/660 Installing earthing conductor

1. **Conductor location:** Install between the main incoming earth and the main earthing terminal in one continuous length.
2. **Connection:** Make with compression lugs and phosphor bronze nuts and bolts and spring washers.
3. **Earthing conductor route:** To be determined on site
4. **Connection to earth electrodes:** Heavy duty copper alloy mechanical clamps.

12. Ss_70_30_25/670 Installing main protective bonding conductors

1. **Separate and continuous connections:** Install between each service and the main earth terminal.
2. **Bonding conductor routes:** To be determined on site
3. **Bonding connections at main earth terminal:** Connect with compression lugs and phosphor bronze nuts and bolts and spring washers.

13. Ss_70_30_25/680 Installing supplementary bonding conductors

1. **Earth connections:** Connect with compression lugs.

System completion

14. Ss_70_30_25/810 Inspection and testing

1. **Standards:** In accordance with BS 7430 and BS 7671.
2. **Notice before commencing tests (minimum):** 5 working days
3. **Continuity of protective conductors**
 - 3.1. **Parallel earth paths:** Isolate before testing.
 - 3.2. **Equipment:** Continuity tester with short circuit current not less than 200 mA, and a no load d.c. or a.c. voltage between 4 V and 24 V.
4. **External earth fault loop impedance (Z_e):** Direct measurement.
5. **Earth fault loop impedance (Z_s):** Direct measurement.

15. Ss_70_30_25/820 Documentation

1. **Operating and maintenance instructions**
 - 1.1. **Scope:** Submit for the system giving optimum settings for controls.
 - 1.2. **Product information:** Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
 - 1.3. **Format:** Electronic.
 - 1.4. **Number of copies:** Two.
2. **Record drawings**
 - 2.1. **Content:** Location of earth terminals.
 - 2.2. **Format:** Electronic drawing.
 - 2.3. **Number of copies:** Two.
3. **Submittal date:** At handover.

Ss_70_30_45_40**Low-voltage site connection systems****Systems****1. Ss_70_30_45_40 Low-voltage site connection systems****1. Generally:**

The Contractor shall supply, design, install, test and commission a complete new site connection system in full compliance with BS7671 The 18th Edition IET Wiring Regulations including all amendments.

All specifications are to be read in conjunction with preliminaries/general conditions, relevant drawings, and schedules of equipment.

All services shall be installed in accordance with the product manufacturer's guidelines.

2. Description

The existing incoming three phase electrical supply shall be retained and adapted to serve the new arrangement to the building.

The incoming service terminates in a service head; this will serve a BNO distribution arrangement, to consist of a distribution fuseboard, serving individual consumer units in each of the rooms and all Landlord services.

The Contractor shall include for all applications and all liaison with the clients preferred electrical energy supplier to obtain a new meter for the service. The meters shall be located adjacent to the new distribution board. Direct costs for the meters shall be paid by the client.

The Contractor shall utilise the proposed Landlord service to provide a temporary site power supply to allow construction work to proceed, and then to disconnect the site power at an appropriate time during the works.

3. System performance: Ss_70_30_45/220 Supply characteristics**4. Nature of current:** Alternating.**5. Phase:** Three phase 4 wire.**6. Voltage:** 400 V.**7. Electricity distributor** Scottish and Southern Energy Power Distribution Limited. (SSE)**8. Electricity supplier:** To be advised**9. Metering:** Single meter.**10. Execution:** *Ss_70_30_45/630 Management of electricity distributor; Ss_70_30_45/640 Location of incoming point of supply; Ss_70_30_45/660 Earthing arrangement***11. System completion:** *Ss_70_30_45/820 Phase sequence; Ss_70_30_45/810 Site supply characteristics; Ss_70_30_45/830 Documentation***System performance****2. Ss_70_30_45/220 Supply characteristics****1. Anticipated maximum demand (kV·A):** 69 kVA**2. Earthing type:** TN-C-S.**3. Maximum prospective short-circuit current:** TBC Anticipated 10kA**4. Maximum external earth fault loop impedance:** TBC Anticipated 0.15 ohm.**5. Overcurrent device at incoming point of supply**

5.1. **Type:** Fuse to BS EN 60269-1 and BS HD 60269-2.

5.2. **Rating:**100 A.

6. **Spare capacity:** 5% of maximum demand.

Execution

3. Ss_70_30_45/630 Management of electricity distributor

1. **Establishing the supply:** Manage and liaise with the Electricity Distributor to establish an incoming electricity supply.
2. **Evidence of liaison:** Submit.

4. Ss_70_30_45/640 Location of incoming point of supply

1. **Incoming point of supply:** Coordinate the location and establish the spatial requirements for the Electricity Distributor's equipment and metering.
2. **Location and colour coding of equipment:** In accordance with NJUG guidelines on the positioning of underground apparatus for new development sites. Volume 2.

5. Ss_70_30_45/660 Earthing arrangement

1. **Incoming earthing arrangement:** Establish with the Electricity Distributor.

System completion

6. Ss_70_30_45/810 Site supply characteristics

1. **Prospective short-circuit current (Psc):** Measure and submit results.
2. **External earth fault loop impedance (Ze):** Measure and submit results.

7. Ss_70_30_45/820 Phase sequence

1. **Phase sequence:** Verify.
2. **Means of identification:** Describe within the operation and maintenance manual.

8. Ss_70_30_45/830 Documentation

1. **Operating and maintenance instructions**
 - 1.1. **Scope:** Submit for the system giving optimum settings for controls.
 - 1.2. **Product information:** Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
 - 1.3. **Format:** Electronic.
 - 1.4. **Number of copies:** Two.
2. **Record drawings**
 - 2.1. **Content:** For all low voltage distribution circuits, the cable origin at the site boundary, route to service cut out, method of installation, depth of trench, details of ducts including sizes and position of cable joints.
 - 2.2. **Drawing format:** Electronic drawing.
 - 2.3. **Number of copies:** Two.
3. **Submittal date:** At handover.

Ss_70_30_45_45**Low-voltage distribution systems****Systems****1. Ss_70_30_45_45 Low-voltage distribution systems****1. Generally:**

The Contractor shall design, install, test and commission a complete new low voltage distribution system in full compliance with BS7671 The 18th Edition IET Wiring Regulations.

All specifications are to be read in conjunction with preliminaries/general conditions, relevant drawings, and schedules of equipment.

All services shall be installed in accordance with the product manufacturer's guidelines.

2. Description:**Sub Mains to Residential Units**

The Contractor shall design, install, test and commission the low voltage distribution system as detailed on the design intent drawings.

Extend power from the main distribution board to each of the residences, the commercial units and the Landlord service. Supplies originating at the main distribution board shall each be protected by a 40A type C mcb and shall consist of armoured submain cables to the individual consumer units.

3. Switchgear: *Pr_60_70_22_22 Distribution boards; Pr_60_70_48_47 Low-voltage switch-disconnectors***4. Protective devices :** *Pr_65_72_27_52 Miniature circuit breakers; Pr_65_72_27_73 Residual current circuit breakers with integral overcurrent protection; Pr_65_72_27_47 Low-voltage fuse links*

Provide ADFF (Arc Fault Protection Devices) to all small power socket outlet circuits.

5. Distribution circuit cabling: *Pr_65_70_48_90 Thermosetting-insulated and thermoplastic-sheathed (LSHF) armoured cables***6. Cable accessories:** *Pr_65_70_11_15 Cable ties; Pr_40_10_57_96 Warning marker tapes***7. Containment:** *Pr_65_70_11_17 Cable trays***8. Concealed installation:** Required.**9. Monitoring and metering:** *Pr_80_51_51_22 Digital metering equipment***10. Electrical identification:** *Pr_40_10_57_23 Electrical diagrams; Pr_40_10_57_29 Equipment labels and warning notices***11. Execution:** *Ss_70_30_45/625 Installing low-voltage distribution systems; Ss_70_30_45/650 Connection to the incoming supply***12. System completion:** *Ss_70_30_45/811 Inspecting, testing and commissioning of switchgear generally; Ss_70_30_45/821 Documentation; Ss_70_30_45/831 Spares and consumables; Ss_70_30_45/840 Maintenance***Products****2. Pr_40_10_57_23 Electrical diagrams****1. Material:** Engraved plastics laminate.**2. Format:** Single line engineering drawings to BS EN 61082-1.

3. **Information to be included:** Supply characteristics. Maximum demand. Cable types and sizes. Protective device types, ratings and function. Circuits containing equipment vulnerable to testing.
4. **Size:** A3.

3. Pr_40_10_57_29 Equipment labels and warning notices

1. **Description:** Distribution board references
2. **Manufacturer:** Contractor to confirm
3. **Material:** Engraved anodized aluminium. Face engraved rigid plastic laminate.
4. **Label size:** Contractor to provide a technical submittal showing proposed labels
5. **Colour**
 - 5.1. **Background:** White.
 - 5.2. **Lettering:** Black.
6. **Typography**
 - 6.1. **Font:** Arial
 - 6.2. **Size:** 5mm

4. Pr_40_10_57_96 Warning marker tapes

1. **Standard:** To BS EN 12613, Type 1.
2. **Material:** Polyethylene.
3. **Size**
 - 3.1. **Length:** as necessary
 - 3.2. **Width:** 75 mm.
 - 3.3. **Thickness:** 0.1 mm.
4. **Joining method:** Peg.
5. **Format**
 - 5.1. **Background colour:** Yellow.
 - 5.2. **Text colour:** Black.
6. **Legend:** 'CAUTION – ELECTRIC CABLE BELOW' every 300 mm along the tape length.
7. **Execution:** *Pr_40_10_57/700 Installing warning devices for underground cables and pipelines*

5. Pr_60_70_22_22 Distribution boards

1. **Standards:** To BS EN 61439-1 and BS EN 61439-3.
2. **Manufacturer:** Schneider Electric
3. **Third-party certification:** ASTA Type test certification.
4. **Rated operational voltage (Ue):** 415 V a.c.
5. **Incoming device:** Switch-disconnectors.
6. **Outgoing devices**
 - 6.1. **Type:** As circuit schedules.
 - 6.2. **Quantity:** As circuit schedules.
7. **Busbars and connections**
 - 7.1. **Type:** Fully shrouded.
 - 7.2. **Rated operational current (Ie):** 125 A.
 - 7.3. **Rated short-time withstand current (Icw) for 1 s:** 25 kA.

8. **Neutral and earth bars:** Individual terminal for each outgoing circuit.

9. **Neutral terminations:** Match current carrying capacity of phase conductor.

10. **Spare ways:** Fit with blank plates.

11. **Enclosure**

11.1. **Ingress protection (minimum):** To BS EN 60529, IP31.

11.2. **Material:** Steel.

11.3. **Finish:** Polyester powder-coated.

11.4. **Colour:** Manufacturers standard

11.5. **Locking mechanism:** Cylinder locks with a standard key type.

12. **Accessories:** Minimum of 2 No. keys

13. **Execution:** *Pr_60_70_22/665 Installing switchgear generally; Pr_60_70_22/676 Circuit schedules*

6. **Pr_60_70_48_47** Low-voltage switch-disconnectors

1. **Standards:** To BS EN 60947-1 and BS EN 60947-3.

2. **Third-party certification:** ASTA Type test certification.

3. **Rated operational voltage (Ue):** 415 V.

4. **Rated operational current (In):** 100 A.

5. **Rated operational frequency:** 50 Hz.

6. **Switch arrangement:** TPN.

7. **Utilization category:** AC-20A.

8. **Terminals:** Suitable for the connection of copper conductors.

9. **Mechanical interlocking:** Rotary handle capable of accepting up to three padlocks.

10. **Enclosure**

10.1. **Ingress protection (minimum):** To BS EN 60529, IP41.

10.2. **Impact protection (minimum):** To BS EN 62262, IK08.

10.3. **Material:** Sheet steel.

10.4. **Finish:** Powder-coated.

10.5. **Colour:** Manufacturers standard

10.6. **Gland plates:** Fully removable to top and bottom faces.

11. **Execution:** *Pr_60_70_22/665 Installing switchgear generally*

7. **Pr_65_70_11_15** Cable ties

1. **Standard:** To BS EN IEC 62275.

2. **Format:** Wrap around self-locking non-releasable not liable to collapse in the event of a fire.

3. **Material:** Metal.

4. **Loop tensile strength (minimum):** 50 N.

5. **Temperatures for permanent installation**

5.1. **Maximum:** 105°C.

5.2. **Minimum:** -15°C.

6. **Contribution to fire :** Non-flame-propagating.

7. **Environmental influences**

7.1. Metallic and composite components: Resistant to corrosion.**8. Pr_65_70_11_17** Cable trays

1. **Standard:** To BS EN 61537.
2. **Material:** Metal.
3. **Resistance against flame propagation:** Non-flame-propagating.
4. **Electrical properties**
 - 4.1. **Continuity characteristics:** With electrical continuity.
 - 4.2. **Conductivity characteristics:** With electrical conductive system component.
5. **Coating material:** Hot-dip-galvanized.
6. **Temperature properties for transport, storage, installation and application**
 - 6.1. **Minimum:** -15°C.
 - 6.2. **Maximum:** 105°C.
7. **Width:** 100 mm
8. **Features**
 - 8.1. **Flange type:** Plain.
 - 8.2. **Segregation:** Not required.
 - 8.3. **Protective cover:** Not required.
9. **Execution:** *Pr_65_70_11/621 Installing cable tray and cable ladder*

9. Pr_65_70_48_90 Thermosetting-insulated and thermoplastic-sheathed (LSHF) armoured cables

1. **Standard:** To BS 6724.
2. **Third-party certification:** British Approvals Service for Cables (BASEC)-certified.
3. **Size:** As circuit schedules
4. **Insulation:** EI 5.
5. **Sheath colour:** Black.
6. **Execution:** *Pr_65_70_48/680 Installing low-voltage armoured cables*

10. Pr_65_72_27_47 Low-voltage fuse links

1. **Standards:** To BS EN 60269-1 and BS HD 60269-2.
2. **Third party certification:** ASTA Type test certification.
3. **Fuse type:** System E.
4. **Breaking range and utilization categories:** gG.
5. **Rated operational current (In):** As Circuit schedules.
6. **Rated operational voltage (Ue):** 400 V a.c.
7. **Rated breaking capacity:** 80 kA.

11. Pr_65_72_27_52 Miniature circuit breakers

1. **Manufacturer:** Schneider as appropriate
2. **Standards:** To BS EN 60898-1.
3. **Third party certification:** ASTA Type test certification.
4. **Rated operational current (In):** As Circuit schedules.

5. Rated operational voltage (Ue): 230 V a.c. 400 V a.c.
6. Rated impulse withstand voltage (Uimp) : 8 kV.
7. Rated frequency: 50 Hz.
8. Number of poles: One. Three.
9. Rated short-circuit capacity (Icn): 10 kA.
10. Tripping characteristic: Type C.
11. Pollution degree category: 2.
12. Mounting method: DIN rail.

12. Pr_65_72_27_73 Residual current circuit breakers with integral overcurrent protection

1. Manufacturer: Schneider as appropriate
2. Standards: To BS EN 61009-1.
3. Operating characteristic: AC.
4. Tripping characteristic: Type C.
5. Rated operational current (In): As Circuit schedules.
6. Rated operational voltage (Ue): 230 V a.c.
7. Rated impulse withstand voltage (Uimp) : 4 kV.
8. Rated frequency: 50 Hz.
9. Number of poles: One + neutral.
10. Rated short-circuit capacity (Icn): 10 kA.
11. Rated residual operating current: 30 mA.
12. Pollution degree category: 2.
13. Mounting method: DIN rail.

13. Pr_80_51_51_22 Digital metering equipment

1. Manufacturer: To match distribution board manufacturer
2. Standard: To BS EN 50470-1.
3. Third party certification: Measuring Instruments Directive approved.
4. Display: As suppliers standard Seven-digit (including two decimal places) and display of import/ export arrow via backlit LCD; with imp/ kWh LED.
5. Rated voltage: 230 V a.c. 400 V a.c.
6. Phase arrangement: Three phase, four-wire.
7. Current measuring range: 0.5-10(100) A'
8. Rated frequency: 50 Hz.
9. Metering functions: Voltage between phases (V). Voltage between phases and neutral (V). Phase currents (A). Frequency (Hz). Power factor cos ϕ . Active power (kW). Reactive power (kVA(r)). Active energy (kWh).
10. Mounting: Surface mounted.
11. Ingress protection (minimum): To BS EN 60529, IP51.
12. Outputs: Not required.
13. Execution: *Pr_80_51_51/620 Installing electrical monitoring and metering equipment*

Execution

14. Pr_40_10_57/700 Installing warning devices for underground cables and pipelines

1. **Installation:** Lay along the route of underground cables during backfilling of excavation, end-to-end of service with no gaps.
2. **Marker position**
 - 2.1. **Cables:** Lay tape 150 mm below finished ground level.

15. Pr_60_70_22/665 Installing switchgear generally

1. **General requirements:** *Pr_60_70_22/675 Labelling switchgear*
2. **Switchgear cubicles:** Arrange in modular form to facilitate future extension.
3. **Clearance (minimum)**
 - 3.1. **Front access switchgear:** 1000 mm in front of switchgear.
4. **Fixing equipment**
 - 4.1. **Generally:** Fix independently of wiring installation with zinc electroplated fasteners.
 - 4.2. **Indoor equipment:** Fix using internal lugs.
 - 4.3. **Outdoor equipment:** Fix using external lugs.
5. **Orientation:** Accurate and square to vertical and horizontal axes. Align adjacent items of switchgear on the same horizontal axis.
6. **Extension boxes:** Provide where necessary.
7. **Gland plates:** Non-ferrous for single core cables.
8. **Interconnection of close coupled switchgear**
 - 8.1. **Cable type:** Single core PVC-insulated cables for switchgear and control gear.
 - 8.2. **Containment:** Cable trunking and cable ducting for wall and ceiling mounting.
9. **Identification**
 - 9.1. **Neutral and earth bar terminals:** Label with the outgoing circuit reference.
 - 9.2. **Cable terminations:** Label with circuit reference, with push-on plastics markers.

16. Pr_60_70_22/675 Labelling switchgear

1. **Switchgear terminals:** To BS EN 60445.

17. Pr_60_70_22/676 Circuit schedules

1. **Circuit schedules:** Include an A4-sized typed circuit schedule within a clear plastic wallet, securely fixed to the inside cover of each cubicle switchboard and consumer unit. The circuit schedule is to include a description of each outgoing circuit, its circuit reference number, the rating of the circuit breaker or fuse and the size and type of cable.

18. Pr_65_70_11/621 Installing cable tray and cable ladder

1. **Standards:** In accordance with BS 7671 and IET Guidance Note 1.
2. **Preparation**
 - 2.1. **Burrs and sharp edges:** Make smooth.
 - 2.2. **Cutting:** Minimize and make good edges. Cuts to cable tray to be square along an unperforated line.
 - 2.3. **Treatment of cut surface:** Extend 25 mm beyond the cut. Match finish of cable supports.
3. **Access:** Provide space around cable ladder and tray to permit access for installing and maintaining cables.
4. **Joints and expansion couplers**
 - 4.1. **Position:** Locate between the bracket support and the quarter point.

- 4.2. **Number of joints:** Minimize.
- 4.3. **Lengths of cable ladder and tray:** Maximize.
- 4.4. **Ends:** Blank with end plates.
5. **Changes of size and direction:** Manufacturer's accessories of the same material type, pattern, finish and thickness as cable supports.
6. **Fire barriers:** Provide where required to maintain fire performance of fabric.
7. **Protective covers:** Provide to cables requiring mechanical protection.
8. **Support**
 - 8.1. **Fixing arrangement:** Independently fix and support from building structure using threaded rod fixed to channel cable support with shake proof washers and hex nuts.
 - 8.2. **Clearance from building fabric (minimum):** 20 mm.
9. **Components:** Avoid contact between dissimilar metals.
10. **Routing of cable ladder and tray:** Submit drawings showing the proposed routes of cable ladder and cable tray.

19. Pr_65_70_11/630 Installing cable basket

1. **Standards:** In accordance with BS 7671 and IET Guidance Note 1.
2. **Joints:** Cut adjacent cross basket wires. Make smooth any burrs or edges.
3. **Accessories:** Form on site and connect with basket manufacturer's coupling components.
4. **Fire barriers:** Provide where required to maintain fire performance of fabric.
5. **Support**
 - 5.1. **Fixing arrangement:** Independently fix and support from building structure using threaded rod fixed into expanding anchors.
 - 5.2. **Clearance from building fabric (minimum):** 20 mm.
6. **Components:** Avoid contact between dissimilar metals.
7. **Routing of cable basket:** Submit drawings showing the proposed routes.

20. Pr_65_70_48/635 Installing low-voltage cables

1. **Standard:** In accordance with BS 7671.
2. **Timing:** Do not start internal cabling until building enclosure provides permanently dry conditions.
3. **Preparation:** Store cables above 5°C for 24 hours before installation.

Clear cable path of debris.
4. **Installation temperature (minimum):** 5°C.
5. **Cables:** Install in one length. Dress cables flat, free from twists, kinks and strain.
6. **Cable pulling:** Do not overstress. Prevent kinks and twisting of the cable.
7. **Cable protection:** Cables passing through walls and floors to be sleeved with conduit or pipeduct to a minimum of 300 mm. Bush at both ends. Ensure that appropriate fire stopping materials are used to maintain the original fire integrity of the wall or floor around the penetration.
8. **Concealed cable runs to wall accessories:** Run vertically from the accessory.
9. **Distance from other services running parallel (minimum):** 150 mm. Position cables below heating pipes.
10. **Jointing and termination**
 - 10.1. **Final circuit cables:** At electrical accessories only.
 - 10.2. **Core connections:** Using compression lugs to equipment without integral clamping terminals.
 - 10.3. **Terminating cables when not using glands:** Take sheathing of cables into accessory boxes and

equipment and protect against abrasion with grommets.

21. Pr_65_70_48/680 Installing low-voltage armoured cables

1. **General requirements:** *Pr_65_70_48/635 Installing low-voltage cables*
2. **Earthing:** Bond armour to equipment and main earthing system.
3. **Connections to apparatus:** Moisture proof, sealed glands and shrouds.

22. Pr_80_51_51/620 Installing electrical monitoring and metering equipment

1. **Standard:** In accordance with BS 7671.
2. **Digital metering equipment:** Connect to building management system.

23. Ss_70_30_45/625 Installing low-voltage distribution systems

1. **Standard:** In accordance with BS 7671.
2. **Layout:** Position cabling and equipment to provide safe and easy access for operation and maintenance.

24. Ss_70_30_45/650 Connection to the incoming supply

1. **Customer's installation:** Connect low-voltage distribution to incoming supply at electricity supplier's metering equipment

System completion

25. Ss_70_30_45/811 Inspecting, testing and commissioning of switchgear generally

1. **Standard:** In accordance with BS 7671.
2. **Notice before testing and commissioning:** Seven days.
3. **Switches and circuit breakers:** Clean to remove all visible traces of dust.
4. **Protective devices settings:** Configure to match the grading study.
5. **Switchboard monitoring:** Continuous for 30 minutes following first energizing.
6. **Additional inspecting and testing:** Manually operate protective devices. Check operation of instruments and metering devices. Check clearance of live parts from direct contact. Check polarity and phase sequence of protective devices. Carry out earth fault protection simulation tests. Check functional operation of circuit breakers.
7. **Testing and commissioning results:** Submit two copies.
8. **Certificates of calibration for meters and instruments:** Submit.

26. Ss_70_30_45/821 Documentation

1. **Operating and maintenance instructions**
 - 1.1. **Scope:** Submit for the system giving optimum settings for controls.
 - 1.2. **Product information:** Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
 - 1.3. **Format:** Electronic.
 - 1.4. **Number of copies:** Two.
2. **Record drawings**
 - 2.1. **Content:** For all low-voltage distribution circuits: the cable origin, circuit designation, route, loading, conductor material and c.s.a., insulation type and colour, number of cores per cable, number of cables in trunking and conduit. Whether cables are run on surface, concealed in walls, floors,

above suspended ceilings or within roof spaces. Location, route and depth of underground cables. Location of LV switchgear including distribution boards. Routes of trunking, conduit, cable tray and cable ladders. Schematic drawings showing all low-voltage distribution circuits: the cable origin, circuit designation, cable type, size, number of cores, size and type of overcurrent protective device.

2.2. **Drawing format:** A1 paper print drawing.

2.3. **Number of copies:** Two.

3. **Submittal date:** At handover.

27. Ss_70_30_45/831 Spares and consumables

1. **Supply the following spares**

1.1. **Fuses:** Two of each type and rating used.

1.2. **Operating handles for circuit breakers and switches:** One per device.

28. Ss_70_30_45/840 Maintenance

1. **Servicing and maintenance:** Undertake.

2. **Duration:** Until 12 months after practical completion.

Ω End of System

Ss_70_30_80_35**Hardwired low-voltage small power systems****Systems****1. Ss_70_30_80_35 Hardwired low-voltage small power systems****Generally**

The Contractor shall design, supply, deliver, store on site, distribute on site, erect, install, test and commission the hardwired low voltage small power system.

All specifications are to be read in conjunction with preliminaries/general conditions, relevant drawings, and schedules of equipment.

All services shall be installed in accordance with the product manufacturer's guidelines.

Description

As the building is a HMO, all circuits serving socket outlets shall be protected by an appropriate Arc Fault Detection Device (AFDD).

Generally, outlets shall be flush mounted as manufactured by MK Electric of their Logic Plus range. The contractor is referred to the Project Architect's schedules which will detail their requirements.

1. Samples shall be provided of switch plates, socket outlets and fused connection units.
2. The contractor shall ensure that the installation is flush. Cables shall be installed at least 50mm from the surface of a wall, where this is not possible, they shall be provided with mechanical protection sufficient to prevent the penetration of a nail or screw, installed in earthed steel conduit or metallic covering. Generally, all final circuits shall be protected by a AFDD/mcb/RCD (30 mA) combination unit installed in accordance with IET BS7671.

Switched socket outlets shall be:

- Wired as ring circuits with no spurs from the ring (except for the socket mounted adjacent to the BT intake, which shall be wired as a radial circuit).
- Contained in metallic boxes of minimum depth 35mm.
- Of single manufacturer throughout.
- Provided generally as the electrical layout drawing
- Provided with integral dual USB outlets where shown.

Fused connection units system shall be:

- Provided to meet the requirements as scheduled above for switched socket outlets.
- Fitted with a fuse of the appropriate rating to the appliance served.
- Permanently and indelibly engraved to indicate the appliance served.
- Incorporate integral switch, fuse, neon pilot light, flex outlet and cord grip to the front plate.

Isolating switches shall be double pole and be:

- Provided for all items of apparatus and equipment exceeding 13 Amp single phase electrical service.
- Individually served by cables and MCB/RCBO unit, sized to take account of the maximum rating of the isolator.

Kitchen grid plate system

- Provided for all items of apparatus and equipment located in kitchen as follows:-

Dishwasher

Fridge freezer

Kitchen Hood

- Permanently and indelibly engraved to indicate the appliance served.
- Contained in metallic box of minimum depth 35mm.
- Of single manufacturer throughout.
- Provided generally as the electrical layout drawing

The hobs shall be served by a dedicated 45A isolator in each case.

The final location of kitchen switches and outlets shall be confirmed with the kitchen specialist prior to installation.

Isolating Switches to Single Extract Fans

- Shall be three pole to accommodate the permanent live for timer operation.

All socket outlets shall generally be located at 450mm AFFL except for those located above worktop/bedside cabinets. In this case then sockets shall be mounted 1050mm AFFL (to bottom of the outlet). The heights shall be in accordance with Approved Document M of the Building Regulations and agreed in advance of installation with the Client.

The contractor shall note that the small power system is to be fully flush mounted, with accessories subject to maintaining the fire, thermal and acoustic integrity of the structure for the walls, floors, and ceilings.

Radial circuits shall be provided for the mechanical equipment and the hob.

The external vehicle charging points shall be provided on dedicated radial circuits.

3. **System performance:** *Ss_70_30_80/215 Low voltage small power cables generally*
4. **Final circuit cabling:** *Pr_65_70_48_91 Thermosetting-insulated and thermoplastic-sheathed (LSHF) cables*
5. **Cable accessories:** *Pr_65_70_11_15 Cable ties*
6. **Containment:** *Pr_65_70_11_12 Cable baskets*
7. **Concealed installation:** Required.
8. **Final connections:** *Pr_65_70_48_58 Ordinary-duty heat-resistant PVC-insulated and sheathed flexible cables*
9. **Electrical accessories and outlets:** *Pr_65_72_97_23 Double pole switches; Pr_65_72_97_30 Fan isolators; Pr_65_72_97_31 Fused connection units; Pr_65_72_97_78 Shaver supply units; Pr_65_72_97_84 Standard socket outlets; Pr_65_72_97_83 Surface and concealed wiring enclosures; Pr_65_72_97_31 Fused connection units Type A; Pr_65_72_97_29 Electric vehicle charging points; Pr_65_72_97_20 Cooker control units; Pr_65_72_97_84 Standard socket outlets Type A*
10. **Electrical identification:** *Pr_40_10_57_29 Equipment labels and warning notices*
11. **Execution:** *Ss_70_30_80/620 Small power installation; Ss_70_30_80/630 Installing cabling to socket outlets*
12. **System completion:** *Ss_70_30_80/820 Documentation; Ss_70_30_80/830 Spares; Ss_70_30_80/840 Maintenance*

System performance

2. Ss_70_30_80/215 Low voltage small power cables generally

1. **Standard:** In accordance with BS 7671.
2. **Proposed selection of low voltage cables:** Submit drawings, technical information, calculations and manufacturers' literature.
3. **Conductor sizes (minimum):** 2.5 mm².
4. **Cable sizes not stated:** Submit.

Products

3. Pr_40_10_57_29 Equipment labels and warning notices

1. **Description:** Distribution board references
2. **Manufacturer:** Contractor to confirm
3. **Material:** Engraved anodized aluminium. Face engraved rigid plastic laminate.
4. **Label size:** Contractor to provide a technical submittal showing proposed labels
5. **Colour**
 - 5.1. **Background:** White.
 - 5.2. **Lettering:** Black.
6. **Typography**
 - 6.1. **Font:** Arial
 - 6.2. **Size:** 5mm

4. Pr_65_70_11_12 Cable baskets

1. **Standard:** To BS EN 61537.
2. **Material:** 3 mm steel wire.
3. **Coating material:** None.
4. **Sizes**
 - 4.1. **Width:** 50 mm.
 - 4.2. **Side height:** 30 mm.
5. **Features**
 - 5.1. **Segregation:** Not required.
 - 5.2. **Protective cover:** Not required.
6. **Execution:** *Pr_65_70_11/630 Installing cable basket*

5. Pr_65_70_11_15 Cable ties

1. **Standard:** To BS EN IEC 62275.
2. **Format:** Wrap around self-locking non-releasable.
3. **Material:** Metal.
4. **Loop tensile strength (minimum):** 50 N.
5. **Temperatures for permanent installation**
 - 5.1. **Maximum:** 105°C.
 - 5.2. **Minimum:** -15°C.
6. **Contribution to fire :** Non-flame-propagating.

7. Environmental influences

7.1. Metallic and composite components: Resistant to corrosion.

6. Pr_65_70_48_58 Ordinary-duty heat-resistant PVC-insulated and sheathed flexible cables

1. **Standards:** To BS EN 50525-1 and BS EN 50525-2-11.
2. **Third-party certification:** British Approvals Service for Cables (BASEC)-certified.
3. **Cable type:** H05VV-F.
4. **Size:** To match final circuit cable size
5. **Sheath colour:** White.
6. **Execution:** *Pr_65_70_48/665 Installing flexible cables*

7. Pr_65_70_48_91 Thermosetting-insulated and thermoplastic-sheathed (LSHF) cables

1. **Standard:** To BS 7211.
2. **Third-party certification:** British Approvals Service for Cables (BASEC)-certified.
3. **Cable type:** 6241B. 6242B. 6243B.
4. **Size:** As denoted on cable schedules
5. **Execution:** *Pr_65_70_48/735 Cable installation on channel cable supports, cable tray, cable ladder and cable basket; Pr_65_70_48/660 Installing low-voltage cables in conduit and trunking; Pr_65_70_48/635 Installing low-voltage cables*

8. Pr_65_72_97_20 Cooker control units

1. **Description:** Forms part of kitchen control plate
2. **Standard:** To BS 4177.
3. **Current rating:** 32 A.
4. **Switched socket outlet:** Not required.
5. **Indicator lamp:** Not required.
6. **Mounting:** Flush.
7. **Ingress protection (minimum):** To BS EN 60529, IP 20.
8. **Cable termination:** Screwed.
9. **Plate**
 - 9.1. **Material:** Aluminium
 - 9.2. **Finish:** Brushed
10. **Insert colour:** White.
11. **Execution:** *Pr_65_72_97/610 Installing electrical accessories*

9. Pr_65_72_97_23 Double pole switches

1. **Description:** Generally forms part of kitchen control plate
2. **Standards:** To BS EN 60669-1 and BS EN 60669-2-4.
3. **Current rating:** 20 A.
4. **Indicator lamp:** Not required.
5. **Mounting:** Surface.
6. **Ingress protection (minimum):** To BS EN 60529, IP 20.
7. **Cable termination:** Screwed.

8. Plate

8.1. **Material:** Aluminium.

8.2. **Finish:** Brushed.

9. **Insert colour:** White.

10. **Execution:** *Pr_65_72_97/610 Installing electrical accessories*

10. Pr_65_72_97_29 Electric vehicle charging points

1. **Manufacturer:** Submit proposals

2. **Standards:** To BS EN IEC 61851-1.

3. **Mode:** 3.

4. **Input voltage:** 230 V a.c. single-phase.

5. **Input current:** 32 A.

6. **Rated frequency:** 50 Hz.

7. **Outlet type:** Single, type 2 socket, to BS EN 62196 series.

8. **Power output:** 7 kW.

9. **Mounting:** Ground-mounted.

10. **Impact protection (minimum):** To BS EN 62262, IK10.

11. **Ingress protection (minimum):** To BS EN 60529, IP 65.

12. **Circuit protection:** RCBO

13. **Accessories:** One no. 32 A charging cable, with BS EN 62196-2 type 2 male to female plug.

11. Pr_65_72_97_30 Fan isolators

1. **Standards:** To BS EN 60669-1 and BS EN 60669-2-4.

2. **Current rating:** 10 A.

3. **Poles:** Triple pole.

4. **Mounting:** Flush.

5. **Cable termination:** Screwed.

6. **Plate**

6.1. **Material:** Stainless steel.

6.2. **Finish:** Brushed.

7. **Insert colour:** White.

8. **Execution:** *Pr_65_72_97/610 Installing electrical accessories*

12. Pr_65_72_97_31 Fused connection units

1. **Description:** In cupboards, and forming part of the kitchen control plate.

2. **Standard:** To BS 1363-4.

3. **Control**

3.1. **Type:** Double pole, switched.

3.2. **Indicator lamp:** Not required.

4. **Mounting:** Surface.

5. **Flex outlet:** Base entry.

6. **Ingress protection (minimum):** To BS EN 60529, IP 20.

7. Cable termination: Screwed.
8. Fuse carrier access: Screw.
9. Plate
 - 9.1. Material: Aluminium.
 - 9.2. Finish: Brushed.
10. Insert colour: White.
11. Execution: *Pr_65_72_97/610 Installing electrical accessories*

13. Pr_65_72_97_31 Fused connection units Type A

1. Description: On view
2. Manufacturer: MK Electric
3. Standard: To BS 1363-4.
4. Control
 - 4.1. Type: Double pole, switched.
 - 4.2. Indicator lamp: Not required.
5. Mounting: Flush.
6. Cable termination: Screwed.
7. Fuse carrier access: Screw.
8. Plate
 - 8.1. Material: Stainless steel.
 - 8.2. Finish: Brushed.
9. Insert colour: White.
10. Execution: *Pr_65_72_97/610 Installing electrical accessories*

14. Pr_65_72_97_78 Shaver supply units

1. Description: On view
2. Manufacturer: MK Electric
3. Standards: To BS EN IEC 61558-1 and BS EN 61558-2-5.
4. Rating: 20 V·A.
5. Output voltage: 115 V and 230 V.
6. Isolating transformer: Integral.
7. Mounting: Flush.
8. Plate
 - 8.1. Material: Stainless steel.
 - 8.2. Finish: Brushed.
9. Insert colour: White.
10. Execution: *Pr_65_72_97/610 Installing electrical accessories*

15. Pr_65_72_97_83 Surface and concealed wiring enclosures

1. Standards
 - 1.1. Concealed enclosures: To BS 4662.
 - 1.2. Surface enclosures: To BS 5733.
2. Enclosure

- 2.1. **Material:** Cast iron (recessed). Pressed steel (Surface).
- 2.2. **Finish:** Galvanized.
3. **Enclosure depth (minimum):** 35 mm.
4. **Execution:** *Pr_65_72_97/610 Installing electrical accessories*

16. Pr_65_72_97_84 Standard socket outlets

1. **Description:** On view
2. **Manufacturer:** MK Electric
3. **Standard:** To BS 1363-2.
4. **Arrangement:** Twin gang.
5. **Control**
 - 5.1. **Type:** Double pole, switched.
 - 5.2. **Switch position:** Inboard. (Outboard where USB's are installed)
 - 5.3. **Indicator lamp:** Not required.
 - 5.4. **Interlock:** Three-pin equal pressure.
6. **Mounting:** Flush.
7. **Features:** Dual earth terminals. Two no. 5 V d.c. 2.2 A USB charger ports where denoted.
8. **Ingress protection (minimum):** To BS EN 60529, IP 20.
9. **Cable termination:** Screwed.
10. **Plate**
 - 10.1. **Material:** Stainless steel.
 - 10.2. **Finish:** Brushed.
11. **Insert colour:** White.
12. **Execution:** *Pr_65_72_97/610 Installing electrical accessories*

17. Pr_65_72_97_84 Standard socket outlets Type A

1. **Description:** In cupboards/risers
2. **Manufacturer:** MK Electric
3. **Standard:** To BS 1363-2.
4. **Arrangement:** Twin gang.
5. **Control**
 - 5.1. **Type:** Double pole, switched.
 - 5.2. **Switch position:** Inboard.
 - 5.3. **Indicator lamp:** Not required.
 - 5.4. **Interlock:** Three-pin equal pressure.
6. **Mounting:** Flush.
7. **Features:** Dual earth terminals.
8. **Ingress protection (minimum):** To BS EN 60529, IP 20.
9. **Cable termination:** Screwed.
10. **Plate**
 - 10.1. **Material:** Aluminium.
 - 10.2. **Finish:** Brushed.

11. **Insert colour:** White.

12. **Execution:** *Pr_65_72_97/610 Installing electrical accessories*

Execution

18. Pr_65_70_11/630 Installing cable basket

1. **Standards:** In accordance with BS 7671 and IET Guidance Note 1.
2. **Joints:** Cut adjacent cross basket wires. Make smooth any burrs or edges.
3. **Accessories:** Form on site and connect with basket manufacturer's coupling components.
4. **Fire barriers:** Provide where required to maintain fire performance of fabric.
5. **Support**
 - 5.1. **Fixing arrangement:** Independently fix and support from building structure using threaded rod fixed into expanding anchors.
 - 5.2. **Clearance from building fabric (minimum):** 20 mm.
6. **Components:** Avoid contact between dissimilar metals.
7. **Routing of cable basket:** Submit drawings showing the proposed routes.

19. Pr_65_70_48/635 Installing low-voltage cables

1. **Standard:** In accordance with BS 7671.
2. **Timing:** Do not start internal cabling until building enclosure provides permanently dry conditions.
3. **Preparation:** Store cables above 5°C for 24 hours before installation.

Clear cable path of debris.
4. **Installation temperature (minimum):** 5°C.
5. **Cables:** Install in one length. Dress cables flat, free from twists, kinks and strain.
6. **Cable pulling:** Do not overstress. Prevent kinks and twisting of the cable.
7. **Cable protection:** Cables passing through walls and floors to be sleeved with conduit or pipeduct to a minimum of 300 mm. Bush at both ends. Ensure that appropriate fire stopping materials are used to maintain the original fire integrity of the wall or floor around the penetration.
8. **Concealed cable runs to wall accessories:** Run vertically from the accessory.
9. **Distance from other services running parallel (minimum):** 150 mm. Position cables below heating pipes.
10. **Jointing and termination**
 - 10.1. **Final circuit cables:** At electrical accessories only.
 - 10.2. **Core connections:** Using compression lugs to equipment without integral clamping terminals.
 - 10.3. **Terminating cables when not using glands:** Take sheathing of cables into accessory boxes and equipment and protect against abrasion with grommets.

20. Pr_65_70_48/660 Installing low-voltage cables in conduit and trunking

1. **Cable installation:** Orderly and capable of being withdrawn.
2. **Single core wiring:** Arrange using the loop-in method.
3. **Cables within trunking:** Tie at 2 m intervals for cables of the same circuit reference. Label ties with circuit reference number at 10 m intervals.
4. **Cables in vertical conduit:** Provide cable clamps in accessible conduit boxes at 5 m intervals.
5. **Extra-low-voltage cables:** Install within a separate partition from low-voltage cables where installed in multi compartment trunking.

21. Pr_65_70_48/665 Installing flexible cables

1. **General requirements:** *Pr_65_70_48/635 Installing low-voltage cables*
2. **Cables:** Grip securely at connections. Where cord grips do not form an integral part of the accessory or equipment, provide separate proprietary cord grips.

22. Pr_65_70_48/735 Cable installation on channel cable supports, cable tray, cable ladder and cable basket

1. **Cabling:** Install when cable supports are complete.
2. **Position:** Place single and multicore cables side by side.
3. **Fastening**
 - 3.1. **Fastenings generally:** Secure cables, do not indent sheaths. Position to enable any submain cable to be individually removed.
 - 3.2. **Submain cables >95 mm²:** Cable bands at 1000 mm (maximum) horizontal spacing and 1200 mm (maximum) vertical spacing.
 - 3.3. **Final circuit cabling:** Cable ties at 250 mm (maximum) spacing.
 - 3.4. **Extra-low-voltage, communications and fibre-optic cabling:** Cable ties at 250 mm (maximum) spacing.

23. Pr_65_72_97/610 Installing electrical accessories

1. **Standard:** In accordance with BS 7671.
2. **Accessory faceplates:** Free from any traces of plaster, grout, paint or similar.
3. **Positioning:** Coordinate with other wall- or ceiling-mounted equipment.
4. **Alignment:** Align adjacent accessories on the same vertical or horizontal axis.
5. **Fixing:** Fix securely, plumb and level to vertical and horizontal axes.
6. **Mounting heights**
 - 6.1. **Generally:** Measure from finished floor level to centre line of accessory.
 - 6.2. **Light switches:** Refer to Interior Designers setting out drawings
 - 6.3. **Single voltage shaver outlets:** Refer to Interior Designers setting out drawings
 - 6.4. **Socket outlets:** Refer to Interior Designers setting out drawings
 - 6.5. **Fan isolators:** Refer to Interior Designers setting out drawings
 - 6.6. **Cooker control units:** Refer to Interior Designers setting out drawings
 - 6.7. **Cooker connection units:** Refer to Interior Designers setting out drawings
 - 6.8. **Telecommunications and data outlets:** Refer to Interior Designers setting out drawings
7. **Separation distance between adjacent accessories (minimum):** 20 mm.

24. Ss_70_30_80/620 Small power installation

1. **Standard:** In accordance with BS 7671.

25. Ss_70_30_80/630 Installing cabling to socket outlets

1. **General:** Wire socket outlets in ring final circuits without spurs where hard wiring is employed.

System completion**26. Ss_70_30_80/820** Documentation

1. Operating and maintenance instructions

- 1.1. **Scope:** Submit for the system giving optimum settings for controls.
- 1.2. **Product information:** Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
- 1.3. **Format:** Paper copy.
- 1.4. **Number of copies:** Two.

2. Record drawings

- 2.1. **Content:** For all low voltage final circuits, the cable origin, circuit designation, route, loading, conductor material and c.s.a, insulation type and colour, number of cores per cable, number of cables in trunking and conduit. Whether cables are run on surface, concealed in walls, floors, above suspended ceilings or within roof spaces. Location, route and depth of underground cables. Location of LV switchgear including distribution boards. Routes of trunking, conduit, cable tray and cable ladders. Location of all electrical outlets, including isolators, starters, control equipment and electrical accessories Schematic drawings showing all low voltage final circuits, the cable origin, circuit designation, cable type, size, number of cores, size and type of overcurrent protective device.
- 2.2. **Format:** Electronic drawing.
- 2.3. **Number of copies:** Two.

3. Submittal date: At handover.**27. Ss_70_30_80/830 Spares**

1. **Plugs:** Supply two for each socket outlet type.
2. **Fuse links:** Supply ten of each rating.

28. Ss_70_30_80/840 Maintenance

1. **Servicing and maintenance:** Undertake.
2. **Duration:** Until 12 months after Practical Completion.

Ω End of System

Ss_70_80_33_35**Hardwired general lighting systems****Systems****1. Ss_70_80_33_35 Hardwired general lighting systems****1. Generally**

The Contractor shall design, supply, deliver, store on site, distribute on site, erect, install, test and commission the general lighting as indicated on the lighting drawings and any architects drawings detailing the internal lighting installation and schedules.

All specifications are to be read in conjunction with preliminaries/general conditions, relevant drawings, and schedules of equipment.

All services shall be installed in accordance with the product manufacturer's guidelines.

The contractor shall design the installed lighting in accordance with Industry standards

Chartered Institute of Building Services Engineers (CIBSE)

- CIBSE Guide F: Energy Efficiency in Buildings
- CIBSE Guide K: Electricity in Buildings
- CIBSE Commissioning Code L: Lighting
- SLL Lighting Guides
- SLL Code for Lighting 2012
- Lighting Guide 09-2022-Lighting for communal residential buildings
- TM39 Building Energy Metering 2009

Generally Lighting shall be designed to the following illumination levels

Area	Lux Level	Working Plane	Control
Entrance	200	Floor	PIR
Corridors	100	Floor	PIR
Offices	300	Desk	Manual switch
Dining Room	150	Table top	Manual switch
Bed sitting room	100	Floor & bedhead	Manual switch
Bed sitting room ensuite/shower	150	Floor	Manual switch
Laundry	300	Vertical on washing machine/dryers	Manual switch
Kitchen	500	Kitchen work surfaces	Manual switch

2. Description:

The general lighting systems will be inclusive of all cable containment and support systems, cable wiring systems, luminaries, automatic and manual control devices and all associated distribution equipment.

The type of luminaire employed for each area of the building is depicted on the contract drawings by a letter reference (typically type A or type AE for an emergency version ('E' suffix denotes emergency version)).

The technical specification of each reference luminaire is indicated within the luminaire schedule accompanying this specification of works.

The lighting layouts are as indicated on the lighting drawings and as specified in the Luminaire schedule to which the Contractor is referred.

All lighting will be conventional switched circuits providing manual control to all luminaires.

3. Generally

Cabling for the conventional lighting circuits will typically be wired as a radial circuit using minimum size of 1.5mm² twin and earth (white sheath).

These shall be wired as a normal lighting circuit, and control by local recessed mounted switches as denoted on the drawings.

The contractor shall ensure that the installation is flush. Cables shall be installed at least 50mm from the surface of a wall, where this is not possible they shall be provided with mechanical protection sufficient to prevent the penetration of a nail or screw, installed in earthed steel conduit or metallic covering, protected by a 30 mA RCD.

Generally, switches etc shall be flush mounted as manufactured by MK Electric, of their Logic Plus range in white.

The contractor shall also note that the luminaires are to be subject to maintaining the fire, thermal and acoustic integrity of the structure for the walls, floors and ceilings.

Emergency Lighting

Emergency lighting shall be installed in the escape routes and stairs.

All emergency lighting shall be installed in accordance with BS5266 and all luminaires shall be of the self test type.

External Lighting

External luminaires shall be installed complete with integral microwave/PIR sensors and shall be installed in accordance with the Guidance Note GN01/21 The Reduction of Obtrusive Light as issued by the ILP. All external lighting shall be Bat Friendly and shall consist of downward orientated lighting.

Lighting Control

Generally, all internal lighting will be manually switched. In areas such as staff WCs presence detection will be via PIR sensors that will de-energised luminaires after 20 minutes of complete absence and energise after detecting new occupants.

1. System performance: *Ss_70_80_33/270 Lighting cables generally; Ss_70_80_33/270 Lighting Control cables*

2. **Final circuit cabling:** *Pr_65_70_48_91 Thermosetting-insulated and thermoplastic-sheathed (LSHF) cables*
3. **Containment:** *Pr_65_70_11_12 Cable baskets*
4. **Concealed installation:** Required.
5. **Luminaire types:** *Pr_70_70_48_71 Recessed luminaires; Pr_70_70_48_85 Surface luminaires*
6. **Lamp types:** *Pr_70_70_46_78 Self-ballasted LED lamps*
7. **Connections to luminaires:** *Pr_65_70_48_58 Ordinary-duty heat-resistant PVC-insulated and sheathed flexible cables*
8. **Lighting controls:** *Pr_65_72_97_63 Plate switches; Pr_75_50_76_58 Occupancy detectors*
9. **Accessories:** *Pr_70_70_48_48 Luminaire smoke hoods*
10. **Electrical identification:** *Pr_40_10_57_29 Equipment labels and warning notices*
11. **Execution:** *Ss_70_80_33/630 Installing general lighting systems; Ss_70_80_33/720 Labelling of lighting controls*
12. **System completion:** *Ss_70_80_33/810 Testing and commissioning of general lighting systems; Ss_70_80_33/820 Documentation relating to general lighting; Ss_70_80_33/830 Spares; Ss_70_80_33/840 Maintenance*

System performance

2. Ss_70_80_33/270 Lighting cables generally

1. **Standard:** In accordance with BS 7671.
2. **Conductor sizes (minimum)**
 - 2.1. **Lighting circuits:** 1.5 mm²
 - 2.2. **Final connection:** 0.75 mm²

3. Ss_70_80_33/270 Lighting Control cables

1. **Standard:** In accordance with BS 7671.
2. **Conductor sizes (minimum)**
 - 2.1. **Lighting circuits:** 1.5 mm².
 - 2.2. **Final connection:** 1.0 mm².

Products

4. Pr_40_10_57_29 Equipment labels and warning notices

1. **Description:** Distribution board references
2. **Manufacturer:** Contractor to confirm
3. **Material:** Engraved anodized aluminium. Face engraved rigid plastic laminate.
4. **Label size:** Contractor to provide a technical submittal showing proposed labels
5. **Colour**
 - 5.1. **Background:** White.
 - 5.2. **Lettering:** Black.
6. **Typography**
 - 6.1. **Font:** Arial
 - 6.2. **Size:** 5mm

5. Pr_65_70_11_12 Cable baskets

1. **Standard:** To BS EN 61537.
2. **Material:** 3 mm steel wire.
3. **Coating material:** None.
4. **Sizes**
 - 4.1. **Width:** 50 mm.
 - 4.2. **Side height:** 30 mm.
5. **Features**
 - 5.1. **Segregation:** Not required.
 - 5.2. **Protective cover:** Not required.
6. **Execution:** *Pr_65_70_11/630 Installing cable basket*

6. Pr_65_70_48_58 Ordinary-duty heat-resistant PVC-insulated and sheathed flexible cables

1. **Standards:** To BS EN 50525-1 and BS EN 50525-2-11.
2. **Third-party certification:** British Approvals Service for Cables (BASEC)-certified.
3. **Cable type:** H05VV-F.
4. **Size:** To match final circuit cable size
5. **Sheath colour:** White.
6. **Execution:** *Pr_65_70_48/665 Installing flexible cables*

7. Pr_65_70_48_91 Thermosetting-insulated and thermoplastic-sheathed (LSHF) cables

1. **Standard:** To BS 7211.
2. **Third-party certification:** British Approvals Service for Cables (BASEC)-certified.
3. **Cable type:** 6241B. 6242B. 6243B.
4. **Size:** As denoted on cable schedules
5. **Execution:** *Pr_65_70_48/735 Cable installation on channel cable supports, cable tray, cable ladder and cable basket; Pr_65_70_48/660 Installing low-voltage cables in conduit and trunking; Pr_65_70_48/635 Installing low-voltage cables*

8. Pr_65_72_97_63 Plate switches

1. **Description:** Lutron switches to be installed by AV contractor.
Switches to be installed in plant areas (denoted below)
2. **Manufacturer:** MK - metalclad range
3. **Standard:** To BS EN 60669-1.
4. **Current rating:** 10 A.
5. **Actuating method:** Rocker bar switch.
6. **Poles:** Single pole.
7. **Arrangement:** Single gang, one way. Single gang, two way.
8. **Mounting:** Surface Plantroom/roof void (099/10 & area adjacent to 103/02)
Flush - Store (099/10)
9. **Ingress protection (minimum):** To BS EN 60529, IP 20.
10. **Cable termination:** Screwed.

11. Plate

11.1. **Material:** Stainless steel.

11.2. **Finish:** Brushed.

12. **Insert colour:** White.

13. **Execution:** *Pr_65_72_97/640 Installing light switches*

9. Pr_70_70_46_78 Self-ballasted LED lamps

1. **Description:** Refer to luminaire schedule in Electrical volume 4.
2. **Manufacturer:** Refer to luminaire schedule
3. **Standards:** To BS EN 62560 and BS EN 62612.
4. **Third-party certification:** BSI Kitemark-approved.
5. **Wattage:** Refer to luminaire schedule
6. **Colour temperature:** 3000
7. **Colour rendering index (Ra):** >90.
8. **Rated life (minimum):** Manufacturer standard
9. **Initial lumens (minimum):** Manufacturer standard
10. **Rated lamp efficacy (minimum):** Manufacturer standard
11. **Energy efficiency label:** Manufacturer standard
12. **Dimmable:** Yes.

10. Pr_70_70_48_48 Luminaire smoke hoods

1. **Description:** Install hood to maintain fire rating where necessary
2. **Manufacturer:** Contractor to advise
3. **Standard:** To BS 476-21. To BS EN 1365-2.
4. **Smoke hoods and blankets:** Match fire performance of building fabric.
5. **Execution:** *Pr_70_70_48/695 Installing smoke hoods*

11. Pr_70_70_48_71 Recessed luminaires

1. **Description:** Refer to luminaire schedule in Electrical volume 4.
2. **Manufacturer:** Refer to luminaire schedule
3. **Standards:** To BS EN 60598-1 and BS EN 60598-2-2.
4. **Third-party certification:** ENEC mark.
5. **Luminaire description:** Refer to luminaire schedule
6. **Rated maximum ambient temperature:** Manufacturer standard
7. **Impact protection (minimum):** Manufacturer standard
8. **Luminaire performance:** To BS EN 62722-1 and BS EN 13032-1.
9. **Controlgear position:** Manufacturer standard
10. **Supply circuit conductor connections:** Manufacturer standard
11. **Internal fuse:** Manufacturer standard
12. **Nominal voltage:** Manufacturer standard
13. **Luminaire power factor:** Manufacturer standard
14. **LED luminaires**

14.1. Performance standards: To BS EN 62717 and BS EN 62722-2-1.

14.2. Safety standard: To BS EN IEC 62031.

14.3. Initial LED luminaire efficacy (minimum): Manufacturer standard

14.4. Wattage: Manufacturer standard

14.5. Colour temperature: Manufacturer standard

14.6. Colour rendering index (Ra): Manufacturer standard

14.7. Beam angle: Manufacturer standard

14.8. Useful life: Manufacturer standard

15. Emergency version

15.1. Standard: To BS EN 60598-2-22.

15.2. Classification

15.2.1. Type: X.

15.2.2. Mode of operation: 0.

15.2.3. Duration of emergency mode (minimum): 180.

16. Accessories: Manufacturer standard

17. Execution: *Pr_70_70_48/620 Installing luminaires and lamps generally; Pr_70_70_48/630 Luminaire cable connections; Pr_70_70_48/640 Luminaires mounted as part of a suspended ceiling; Pr_70_70_48/610 Luminaire samples*

12. Pr_70_70_48_85 Surface luminaires

1. Description: Refer to luminaire schedule in Electrical volume 4.

2. Manufacturer: Refer to luminaire schedule

3. Standard: To BS EN 60598-1 and BS 4533-102-1.

4. Third-party certification: ENEC mark.

5. Luminaire description: Refer to luminaire schedule

6. Rated maximum ambient temperature: Manufacturer standard

7. Impact protection (minimum): Manufacturer standard

8. Luminaire performance: To BS EN 62722-1 and BS EN 13032-1.

9. Controlgear position: Integral within luminaire.

10. Supply circuit conductor connections: Screw terminals.

11. Internal fuse: Not required.

12. Nominal voltage: 230 V a.c..

13. Luminaire power factor: Correct to minimum 0.9 lagging.

14. LED luminaires

14.1. Performance standards: To BS EN 62717 and BS EN 62722-2-1.

14.2. Safety standard: To BS EN IEC 62031.

14.3. Initial LED luminaire efficacy (minimum): Manufacturer standard

14.4. Wattage: Manufacturer standard

14.5. Colour temperature: 3500

14.6. Colour rendering index (Ra): >90.

14.7. Useful life: Manufacturer standard

15. Emergency version

15.1. **Standard:** To BS EN 60598-2-22.

15.2. **Classification**

15.2.1. **Type:** X.

15.2.2. **Mode of operation:** 0.

15.2.3. **Duration of emergency mode (minimum):** 180.

16. **Execution:** *Pr_70_70_48/620 Installing luminaires and lamps generally; Pr_70_70_48/630 Luminaire cable connections*

13. Pr_75_50_76_58 Occupancy detectors

1. **Standards:** To BS EN 60669-1 and BS EN 60669-2-1.
2. **Sensor type:** Passive infrared.
3. **Nominal voltage:** 230 V a.c.
4. **Rated current:** 10 A.
5. **Detection method:** Presence.
6. **Occupancy sensitivity:** Adjustable.
7. **Light level sensor:** User-adjustable between 10 and 1000 lux.
8. **Range:** 6 metres at 2.5m mounting height
9. **Field of view:** 360°.
10. **Switching delay:** Fixed.
11. **Set-up:** By infrared controller.
12. **Mounting:** Ceiling. Flush.
13. **Ingress protection (minimum):** To BS EN 60529, IP44.
14. **Equipment interconnectivity**
 - 14.1. **Wired:** Required.
15. **Execution:** *Pr_75_50_76/668 Installing occupancy detectors*

Execution

14. Pr_65_70_11/630 Installing cable basket

1. **Standards:** In accordance with BS 7671 and IET Guidance Note 1.
2. **Joints:** Cut adjacent cross basket wires. Make smooth any burrs or edges.
3. **Accessories:** Form on site and connect with basket manufacturer's coupling components.
4. **Fire barriers:** Provide where required to maintain fire performance of fabric.
5. **Support**
 - 5.1. **Fixing arrangement:** Independently fix and support from building structure using threaded rod fixed into expanding anchors.
 - 5.2. **Clearance from building fabric (minimum):** 20 mm.
6. **Components:** Avoid contact between dissimilar metals.
7. **Routing of cable basket:** Submit drawings showing the proposed routes.

15. Pr_65_70_48/635 Installing low-voltage cables

1. **Standard:** In accordance with BS 7671.

2. **Timing:** Do not start internal cabling until building enclosure provides permanently dry conditions.
3. **Preparation:** Store cables above 5°C for 24 hours before installation. Clear cable path of debris.
4. **Installation temperature (minimum):** 5°C.
5. **Cables:** Install in one length. Dress cables flat, free from twists, kinks and strain.
6. **Cable pulling:** Do not overstress. Prevent kinks and twisting of the cable.
7. **Cable protection:** Cables passing through walls and floors to be sleeved with conduit or pipeduct to a minimum of 300 mm. Bush at both ends. Ensure that appropriate fire stopping materials are used to maintain the original fire integrity of the wall or floor around the penetration.
8. **Concealed cable runs to wall accessories:** Run vertically from the accessory.
9. **Distance from other services running parallel (minimum):** 150 mm. Position cables below heating pipes.
10. **Jointing and termination**
 - 10.1. **Final circuit cables:** At electrical accessories only.
 - 10.2. **Core connections:** Using compression lugs to equipment without integral clamping terminals.
 - 10.3. **Terminating cables when not using glands:** Take sheathing of cables into accessory boxes and equipment and protect against abrasion with grommets.

16. Pr_65_70_48/660 Installing low-voltage cables in conduit and trunking

1. **Cable installation:** Orderly and capable of being withdrawn.
2. **Single core wiring:** Arrange using the loop-in method.
3. **Cables within trunking:** Tie at 2 m intervals for cables of the same circuit reference. Label ties with circuit reference number at 10 m intervals.
4. **Cables in vertical conduit:** Provide cable clamps in accessible conduit boxes at 5 m intervals.
5. **Extra-low-voltage cables:** Install within a separate partition from low-voltage cables where installed in multi compartment trunking.

17. Pr_65_70_48/665 Installing flexible cables

1. **General requirements:** *Pr_65_70_48/635 Installing low-voltage cables*
2. **Cables:** Grip securely at connections. Where cord grips do not form an integral part of the accessory or equipment, provide separate proprietary cord grips.

18. Pr_65_70_48/735 Cable installation on channel cable supports, cable tray, cable ladder and cable basket

1. **Cabling:** Install when cable supports are complete.
2. **Position:** Place single and multicore cables side by side.
3. **Fastening**
 - 3.1. **Fastenings generally:** Secure cables, do not indent sheaths. Position to enable any submain cable to be individually removed.
 - 3.2. **Submain cables >95 mm²:** Cable bands at 1000 mm (maximum) horizontal spacing and 1200 mm (maximum) vertical spacing.
 - 3.3. **Final circuit cabling:** Cable ties at 250 mm (maximum) spacing.
 - 3.4. **Extra-low-voltage, communications and fibre-optic cabling:** Cable ties at 250 mm (maximum) spacing.

19. Pr_65_72_97/640 Installing light switches

1. **Multigang switches:** Connect so that there is a logical relationship with luminaire positions.
2. **Unused switch spaces:** Fit with blanks.

3. **Segregation:** Internally segregate each phase with phase barriers. Include warning plates.

20. Pr_70_70_48/610 Luminaire samples

1. **Submittals:** Include manufacturer's technical information with each sample.
2. **Identification:** Label samples with the luminaire references.

21. Pr_70_70_48/620 Installing luminaires and lamps generally

1. **Lamps and accessories:** Provide.
2. **Supports:** Adequate for weight of luminaire.

22. Pr_70_70_48/630 Luminaire cable connections

1. **Cable connection size (minimum):** 1.5 mm².
2. **Cable entry:** Grommited.
3. **Class 1 earth connections:** Connect to luminaire circuit protective conductor.
4. **Wiring within luminaires:** Minimize. Clip at 300 mm intervals.

23. Pr_70_70_48/640 Luminaires mounted as part of a suspended ceiling

1. **Luminaire supports:** Support from ceiling.
2. **Luminaire final connection:** Luminaire supporting couplers.

24. Pr_70_70_48/695 Installing smoke hoods

1. **Support and fixing arrangement:** As required to maintain fire integrity of ceilings

25. Pr_75_50_20/606 Installing control components

1. **Standard:** In accordance with BS 7671.
2. **Equipment and sensor identification labels:** Provide.
3. **Insulation:** Submit details of proposed insulation method where control components are on insulated pipelines.
4. **Supports:** Do not strain components.
5. **Access:** Adequate for operation and maintenance.

26. Pr_75_50_76/668 Installing occupancy detectors

1. **General requirements:** *Pr_75_50_20/606 Installing control components*
2. **Position:** Ceiling-mounted, located to suit the occupancy pattern of the area under control and shielded from erroneous influences.
3. **Interconnection:** To luminaire.
4. **Cable type:** PVC-insulated and sheathed cables.
5. **Cable containment:** Flexible conduit.

27. Ss_70_80_33/630 Installing general lighting systems

1. **Standard:** In accordance with BS 7671 and CIBSE Commissioning Code L.
2. **Commissioning method statement:** Manually controlled
3. **Luminaire layout:** To suit Interior Designers RCP

28. Ss_70_80_33/720 Labelling of lighting controls

1. **Equipment and sensor identification labels:** Provide.
2. **Lighting controls:** Label each component describing its purpose.
3. **Output circuits:** Label each cable at point of connection to lighting distribution boxes, master distribution boxes and lighting control modules.

System completion

29. Ss_70_80_33/810 Testing and commissioning of general lighting systems

1. **Standards:** In accordance with BS 7671 and CIBSE Commissioning Code L.
2. **Test results:** Submit two copies of system commissioning completion certificate.
3. **Certificates of calibration for meters and instruments:** Submit.

30. Ss_70_80_33/820 Documentation relating to general lighting

1. **Operating and maintenance instructions**
 - 1.1. **Scope:** Submit for the system giving optimum settings for controls.
 - 1.2. **Product information:** Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
 - 1.3. **Format:** Paper copy.
 - 1.4. **Number of copies:** Two.
2. **Record drawings**
 - 2.1. **Content:** General arrangement drawings showing the location of luminaires, lighting circuit distribution boxes, master and slave distribution boxes, switch modules, manual and automatic switches and controls including timeswitches, passive infrared detectors, and daylight sensors .
 - 2.2. **Format:** Electronic drawing.
 - 2.3. **Number of copies:** Two.
3. **Submittal date:** At handover

31. Ss_70_80_33/830 Spares

1. **Test keys for secret keyswitches:** Three.
2. **Sensors:** One of each type.
3. **Lamps**
 - 3.1. **Quantity of each type to be supplied:** One.
 - 3.2. **Labelling:** Label the lamps with the corresponding luminaire reference.

32. Ss_70_80_33/840 Maintenance

1. **Servicing and maintenance:** Undertake.
2. **Duration:** Until 24 months after completion.

Ss_75_10_21_88**Telecommunications systems****Systems****1. Ss_75_10_21_88 Telecommunications systems****1. Generally**

The Contractor shall design, supply, deliver, store on site, distribute on site, erect, install, test and commission the telecoms / data as indicated on the drawings.

All specifications are to be read in conjunction with preliminaries/general conditions, relevant drawings, and schedules of equipment.

All services shall be installed in accordance with the product manufacturer's guidelines.

2. Description:

The Contractor shall allow for liaison with the Openreach to provide a new fibre broadband service to the building. An initial application has been made by the client.

The contractor shall allow to install any free issue internal optical fibre cable to be installed by from the Openreach network to the ONT location to be installed on the property.

The Contractor shall design, supply, deliver and install a copper cable (Cat6e or CW 1308) connection from the ONT location to the fire alarm panel to enable dial out.

System performance**2. Ss_75_10_21/211 Design of telecommunications systems**

- 1. Design:** Complete the design of the telecommunications system.
- 2. Standards:** To BS 6701 and BS EN 50174-1.
- 3. Cabling topology**
 - 3.1. Backbone cabling:** Fibre.
 - 3.2. Horizontal cabling:** Cat6e/CW 1308.
- 4. Requirement:** Submit proposals including cabinet general arrangement drawings, cabling topology schematics, distribution point layout drawing, equipment room layout drawings, interconnection diagrams and work area layout drawings, technical information, calculations and manufacturers' literature.

3. Ss_75_10_21/241 Telecommunications outlets

- 1. Telecommunications outlets:** Submit proposals

Products**4. Pr_65_70_11_12 Cable baskets**

- 1. Standard:** To BS EN 61537.
- 2. Material:** 3 mm steel wire.

3. **Coating material:** None.

4. **Sizes**

4.1. **Width:** 50 mm.

4.2. **Side height:** 30 mm.

5. **Features**

5.1. **Segregation:** Not required.

5.2. **Protective cover:** Not required.

6. **Execution:** *Pr_65_70_11/630 Installing cable basket*

5. **Pr_65_70_15_17** Copper voice cables

1. **Manufacturer:** Submit proposals

2. **Third-party certification:** British Approvals Service for Cables (BASEC)-certified.

3. **BT references:** CW 1308.

4. **Sizes:** 4 pair.

5. **Execution:** *Pr_65_70_48/635 Installing low-voltage cables; Pr_65_70_48/660 Installing low-voltage cables in conduit and trunking*

6. **Pr_65_70_15_58** Optical fibre cables

1. **Manufacturer:** Submit proposals

2. **Standard**

2.1. **Multimode:** To BS EN IEC 60793-2-10.

2.2. **Singlemode:** To BS EN IEC 60793-2-50.

3. **Third-party certification:** British Approvals Service for Cables (BASEC)-certified.

4. **Physical characteristics:** Multimode 62.5/ 125 µm. Singlemode.

5. **Category:** OM1. OS1a.

6. **Optical fibre strands:** 12.

7. **Sheath**

7.1. **Material:** LSHF.

7.2. **Colour:** Manufacturers standard

8. **Environment:** Indoors.

7. **Pr_70_75_04_88** Telecommunications outlet plates

1. **Manufacturer:** Submit proposals

2. **Standards:** To BS 6312-2-1 and BS 6312-2-2.

3. **Types:** RJ 45 socket.

4. **Mounting:** Flush.

5. **Cable termination:** Hyperoptic

6. **Plate**

6.1. **Material:** Stainless steel.

6.2. **Finish:** Brushed.

7. **Insert colour:** White.

8. **Execution:** *Pr_65_72_97/610 Installing electrical accessories*

8. Pr_70_75_88_21 Data and telecom transient overvoltage surge suppression devices

1. **Manufacturer:** Submit proposals
2. **Standard:** To BS EN 61643-21.
3. **Category:** B3.
4. **Maximum continuous operating voltage (Uc):** 50 V.
5. **Mode of protection:** Lines to earth, lines to lines.
6. **Rated current:** 150 mA.
7. **Voltage protection level (Up):** Manufacturers standard
8. **Bandwidth:** 20 MHz.
9. **Mounting method:** Manufacturers standard
10. **Execution:** *Pr_70_75_88/620 Installing surge protective devices for telecommunications and signalling networks*

9. Pr_70_75_88_86 Telephone distribution frames

1. **Manufacturer:** Manufacturers standard
2. **Sizes:** 15 way fibre panel
3. **Identification label:** Required.
4. **Execution:** *Pr_70_75_88/621 Installing distribution panels*

Execution**10. Pr_65_70_11/630** Installing cable basket

1. **Standards:** In accordance with BS 7671 and IET Guidance Note 1.
2. **Joints:** Cut adjacent cross basket wires. Make smooth any burrs or edges.
3. **Accessories:** Form on site and connect with basket manufacturer's coupling components.
4. **Fire barriers:** Provide where required to maintain fire performance of fabric.
5. **Support**
 - 5.1. **Fixing arrangement:** Independently fix and support from building structure using threaded rod fixed into expanding anchors.
 - 5.2. **Clearance from building fabric (minimum):** 20 mm.
6. **Components:** Avoid contact between dissimilar metals.
7. **Routing of cable basket:** Submit drawings showing the proposed routes.

11. Pr_65_70_48/635 Installing low-voltage cables

1. **Standard:** In accordance with BS 7671.
2. **Timing:** Do not start internal cabling until building enclosure provides permanently dry conditions.
3. **Preparation:** Store cables above 5°C for 24 hours before installation.

Clear cable path of debris.

4. **Installation temperature (minimum):** 5°C.
5. **Cables:** Install in one length. Dress cables flat, free from twists, kinks and strain.
6. **Cable pulling:** Do not overstress. Prevent kinks and twisting of the cable.
7. **Cable protection:** Cables passing through walls and floors to be sleeved with conduit or pipeduct to a minimum of 300 mm. Bush at both ends. Ensure that appropriate fire stopping materials are used to

maintain the original fire integrity of the wall or floor around the penetration.

8. **Concealed cable runs to wall accessories:** Run vertically from the accessory.

9. **Distance from other services running parallel (minimum):** 150 mm. Position cables below heating pipes.

10. Jointing and termination

10.1. **Final circuit cables:** At electrical accessories only.

10.2. **Core connections:** Using compression lugs to equipment without integral clamping terminals.

10.3. **Terminating cables when not using glands:** Take sheathing of cables into accessory boxes and equipment and protect against abrasion with grommets.

12. Pr_65_70_48/660 Installing low-voltage cables in conduit and trunking

1. **Cable installation:** Orderly and capable of being withdrawn.

2. **Single core wiring:** Arrange using the loop-in method.

3. **Cables within trunking:** Tie at 2 m intervals for cables of the same circuit reference. Label ties with circuit reference number at 10 m intervals.

4. **Cables in vertical conduit:** Provide cable clamps in accessible conduit boxes at 5 m intervals.

5. **Extra-low-voltage cables:** Install within a separate partition from low-voltage cables where installed in multi compartment trunking.

13. Pr_65_72_97/610 Installing electrical accessories

1. **Standard:** In accordance with BS 7671.

2. **Accessory faceplates:** Free from any traces of plaster, grout, paint or similar.

3. **Positioning:** Coordinate with other wall- or ceiling-mounted equipment.

4. **Alignment:** Align adjacent accessories on the same vertical or horizontal axis.

5. **Fixing:** Fix securely, plumb and level to vertical and horizontal axes.

6. Mounting heights

6.1. **Generally:** Measure from finished floor level to centre line of accessory.

6.2. **Light switches:** Refer to Interior Designers setting out drawings

6.3. **Single voltage shaver outlets:** Refer to Interior Designers setting out drawings

6.4. **Socket outlets:** Refer to Interior Designers setting out drawings

6.5. **Fan isolators:** Refer to Interior Designers setting out drawings

6.6. **Cooker control units:** Refer to Interior Designers setting out drawings

6.7. **Cooker connection units:** Refer to Interior Designers setting out drawings

6.8. **Telecommunications and data outlets:** Refer to Interior Designers setting out drawings

7. **Separation distance between adjacent accessories (minimum):** 20 mm.

14. Pr_70_75_88/620 Installing surge protective devices for telecommunications and signalling networks

1. **Standards:** In accordance with BS 7671 and PD CLC/TS 61643-22.

2. **Point of installation:** At main telephone distribution panel.

3. **Mounting arrangement:** Separate enclosure.

15. Pr_70_75_88/621 Installing distribution panels

1. **Position:** As denoted on drawings

2. Clear access (minimum)

2.1. **Front surface:** 1000 mm.

2.2. **Sides:** 600 mm.

3. **Earthing:** Provide functional earth connected to building main earth terminal.

4. **Cable size:** Submit proposals

16. Ss_75_10_21/616 Labelling**1. Labelling**

1.1. **Equipment:** Label with unique identifier on face engraved rigid plastic laminate.

1.2. **Cables:** Apply wrap-around machine-printed label with cable identifier within 100 mm of each termination.

1.3. **Outlets:** Apply machine printed adhesive label with extension identifier.

17. Ss_75_10_21/661 Installing telecommunications cabling**1. Standards**

1.1. **Generally:** To BS 6701 and BS EN 50174-1, and in accordance with BS 7671.

1.2. **Indoor installations:** To BS EN 50174-2.

1.3. **Outdoor installations:** To BS EN 50174-3.

2. **Timing:** Do not start internal cabling until building enclosure provides permanently dry conditions.

3. **Cables:** Install in one uninterrupted run.

4. **Arrangement:** Position vertically and horizontally in line with equipment served, and parallel with building lines.

5. **Orientation:** Dress cables flat, free from twists, kinks and strain. Optical fibre cables to be run parallel to, or on top of, copper cables.

6. **Cable pulling:** Do not overstress.

7. **Jointing:** At equipment and terminal fittings only.

8. **External cabling:** Terminate within 2 m of entrance to building.

9. Cables routes generally

9.1. **Concealed cable runs to wall accessories:** Run vertically from the accessory.

9.2. **Exposed cable runs:** Submit proposals.

10. Cable segregation

10.1. **Cables from other systems:** Segregate from other cabling and cross at right angles. Where installed in trunking, locate in a dedicated telecommunications compartment.

10.2. **Distance from other cables:** To BS 6701 and in accordance with BS EN 50174-2, clause 6.2.

11. **Distance from steam and low temperature hot water systems running parallel:** 500 mm minimum.

12. **Terminations:** Support cable within 150 mm of termination.

System completion**18. Ss_75_10_21/811** Testing and inspection of telecommunications systems

1. **Standard:** To BS EN 50346.

2. **Notice before commencing tests (minimum):** 72 h.

3. **Inspection of cabling:** Inspect cables for kinks, bends, snags and compression and deformation damage.

4. **Permanent link:** Measure length of each cabling segment (connector to connector).

5. **Pin assignment and continuity:** Verify and submit results.
6. **Cable temperature during testing:** Submit.
7. **Results:** Submit schedule of equipment and outlets, including total number of extensions, and a master directory (with a list of features available to each extension, and arrangement of hunt groups).
8. **Certificates of calibration for meters and instruments:** Submit.

19. Ss_75_10_21/821 Documentation

1. **Standard:** To BS EN 50174-1.
2. **Operating and maintenance instructions**
 - 2.1. **Scope:** Submit for the system giving optimum settings for controls.
 - 2.2. **Product information:** Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
 - 2.3. **Format:** Digital.
 - 2.4. **Number of copies:** Two.
3. **Record drawings**
 - 3.1. **Content:** For all telecommunications cabling, the cable origin, circuit designation, route, conductor material and c.s.a., insulation type and colour, number of cores per cable, number of cables in ducts, on tray or ladder.
 - 3.2. **Format:** Electronic drawing.
 - 3.3. **Number of copies:** Two.
4. **Submittal date:** At handover.

20. Ss_75_10_21/841 Maintenance

1. **Servicing and maintenance:** Undertake.
2. **Duration:** Until 12 months after Practical Completion.
3. **Level of maintenance:** Submit proposals with Tender return

Ω End of System

1.Ss_75_10_70_86**SURVEILLANCE SYSTEMS**

Description: The Contractor undertake the, design, supply, install, test, and commission a system of CCTV coverage to the building, to provide visual deterrent.

Industry Standards Statutory Acts		The Building Regulations The Electricity at Work Regulations 1989 SI 1989/635 The Electromagnetic Compatibility Regulations 2006/3418 Data Protection Act
Health and Safety Executive		The Electricity at Work Regulations 1989, HSR25 Construction Design and Management (CDM) Regulations, CDM2015
Building Control / Local Authority requirements		The Building Regulations Approved Documents • Part M 2015 Access to and use of buildings • Part L: 2023 (Conservation of fuel and power) - Volume 2: Buildings other than dwellings
		The Memorandum of guidance on the Electricity at Work Regulations 1989 (the Memorandum) IET Wiring Regulations 18th Edition, (BS7671:2018)
Industry standards		Chartered Institute of Building Services Engineers (CIBSE) CIBSE K Guide Building Services Research and Information Association (BSRIA) Guidance and Specification for Electronic Security Systems (FMS3/98) NIC/EIC Technical Guidance National Security Inspectorate (NSI – formally NACOSS & ISI) Code of Practice NCP 104 for the design, installation and maintenance of CCTV systems Other relevant codes of practice
Home Office		
		• Home Office CCTV Operational Requirements Manual 2009
BS 7958	2015	Closed circuit television (CCTV). Management and operation.
BS 8418	2021	Code of practice Installation and remote monitoring of detector-activated CCTV systems

- To provide visual surveillance for security monitoring of the external areas and carpark and internal areas as indicated on
- To provide permanent record of activity from all cameras in an efficient and manageable form.

DESIGN PARAMETERS

SYSTEM DESCRIPTION

CCTV System Strategy

The new cameras are to be connect to an IP based CCTV system.

The Specialist contractor shall visit site to inspect the existing system and ensure they have ALL necessary information to carry out the design of the new system.

The cameras shall only require a single data point and shall be powered by POE over the structured cabling network. Data points are to be provided by the Electrical Contractor.

All the cameras are to be IP addressed and link into web-based software. The entire system shall be assembled from equipment from a single manufacturer.

Images shall be stored on a NVR with a minimum image storage of 30days.

General

Appoint a specialist to design, supply, install, test and set to work a complete CCTV installation. Issue drawings, manuals, testing certificates, schedule of spares. Demonstrate. Provide 12-months defects period.

The CCTV specialist must be registered under the Approved Contractor Scheme (ACS) by the Security Industry Association (SIA) in accordance with the requirements of the Private Security Industry Act 2001, and regularly inspected by a certified body such as SSAIB www.SSAIB.org. The CCTV specialist must be an approved system designer and an approved installer by the system equipment manufacturer.

The requirements set out below are provisional for the purposes of the tender. The specialist shall allow for attending 2no. briefing meetings with the Employer, CA and Electrical Consultant prior to commencing their design, in order to finalise system requirements.

The CCTV installation is to comprise the following main items:

- New digital IP addressable Fixed dome cameras with a minimum resolution of 4MP, of discrete size and neat appearance, as shown on system drawings. Specialist to recommend most suitable camera type, based on performance requirements and environment. Cameras shall be power over IP type generally
- All necessary modifications to software and / or hardware of existing Hastings Commons CCTV system to integrate new cameras into system

Any other active network equipment required for the CCTV system to function

Include for all materials, fixings, fittings etc to form a complete installation. Include for all minor BWIC the CCTV installation requires

Provide any containment that may be necessary.

The systems and positioning of CCTV equipment shall be overt to announce the presence of CCTV and to act as a deterrent, but remain coordinated with, and not detract from, the architecture and aesthetic of the building. Positions of all equipment shall be drawn by the CCTV Contractor and agreed with the CA.

The selection and position of cameras shall be coordinated with the design for external lighting. Cameras to be provided with Infrared and low light level compensation.

The CCTV specialist shall advise the main contractor of the required signs and notices necessary, to comply with all statutory requirements. Style and materials of signage shall be coordinated with the other building signage and manifestations.

Installation

- Install all services in a professional manner in accordance with best practice.
- Do not install any services to routes other than those shown on the drawings without prior agreement of the CA. Any services installed unacceptably or without prior agreement shall be modified until acceptable to the CA without additional cost to the contract. Ensure all components that may require access are positioned where they can be accessed through doors to risers, cupboards etc. as shown on Architect's drawings. Do not install components that may require access in locations which would necessitate additional access hatches, without prior agreement of the CA.
- All visible electrical accessories shall be positioned according to the Architect's drawings. Specialists shall provide all information to allow Architect to determine final setting out of specialist elements.
- Obtain from the CA positive setting out dimensions for each and every outlet prior to first fix and second fix installation. Allow within tender for movement of final points of up to 5 metres on plan from the position indicated on the tender drawings.
- The CCTV specialist shall provide any active network equipment required for the CCTV system to function.

TESTING & COMMISSIONING

Carry out testing

Ss_75_50_28_29**Fire detection and alarm systems****Systems****1. Ss_75_50_28_29 Fire detection and alarm systems****1. Generally**

The Contractor shall design, supply, deliver, store on site, distribute on site, erect, install, test and commission the fire alarm system as indicated on the drawings.

All specifications are to be read in conjunction with preliminaries/general conditions, relevant drawings, and schedules of equipment.

All services shall be installed in accordance with the product manufacturer's guidelines

Description:

Provide a building regulation compliant fire alarm system in accordance with BS5839 Pt1. Allow to design and install automatic coverage in accordance with Category L1.

All devices shall be wired to a main fire alarm control panel to be installed at the entrance of the residences, with automatic detectors installed in all communal areas and the entrances to each flat.

Provide manual call points at all doors to external areas.

The main control panel shall be equipped complete with a communications device to allow communications with the Client's central monitoring station in the event of an alarm activation.

Cabling will be carried out using a soft skinned fire rated cable to BS7629-1 (similar to FP200 or equal approved). All fire alarm cable shall be installed complete with a red coloured outer sheath.

The contractor shall note that the fire alarm cabling is to be fully flush mounted, with fire alarm accessories subject to maintaining the fire, thermal and acoustic integrity of the structure for the walls, floors and ceilings.

Allow to complete all testing and commissioning in accordance with BS7671.

Allow to provide an interface connection to the AOV to be installed at the head of the stairs.

AOV:

The Contractor shall design, supply, install, test and commission the electrical services associated with the installation of the AOV at the head of the staircase. Allow to install all necessary electrical services supplies, all necessary yellow manual call points to operate the AOV and associated automatic detectors to operate the unit.

All electrical cabling to the AOV installation shall be completed using soft skinned fire rated cable to BS7629-1 (similar to FP200 or equal approved).

2. System performance: *Ss_75_50_28/210 Design of fire detection and alarm systems; Ss_75_50_28/260 Integration with other alarm and security systems***3. System manufacturer:** Open Protocol, Advanced Electronics panel, Apollo detectors.

4. **System type:** Addressable. Conventional.

5. **Detection devices**

5.1. **Atmosphere:** Normal.

5.2. **Types:** *Pr_75_80_30_65 Point smoke detectors*

6. **Equipment interconnectivity:** *Pr_65_70_48_29 Fire-resistant screened (LSHF) cables*

7. **Cable containment:** *Pr_65_70_11_12 Cable trays*

8. **Concealed installation:** Required.

9. **External alarms:** To alarm receiving centre (ARC).

10. **Controls:** *Pr_75_80_30_28 Fire alarm input and output modules; Pr_75_80_30_31 Fire detection and alarm power supply equipment*

11. **Execution:** *Ss_75_50_28/610 Installing fire detection and alarm systems; Ss_75_50_28/630 Installing cabling for fire detection and alarm systems; Ss_75_50_28/695 Installing interfaces to other equipment and systems*

12. **System completion:** *Ss_75_50_28/807 Standby battery testing; Ss_75_50_28/810 Testing and commissioning fire detection and alarm systems; Ss_75_50_28/819 Testing actuation, integration and interfacing with alarm and security systems; Ss_75_50_28/820 Documentation for fire detection and alarm systems; Ss_75_50_28/830 Spares and consumables; Ss_75_50_28/840 Maintenance; Ss_75_50_28/850 Verification certificate for fire detection and alarm systems; Ss_75_50_28/860 Acceptance certificate for fire detection and alarm systems*

System performance

2. **Ss_75_50_28/210** Design of fire detection and alarm systems

1. **System designer:** Contractor's design
2. **Standards:** Complete the design of the fire detection and alarm system in accordance with BS 5839-1.
3. **Category:** Refer Description
4. **Requirement:** Submit proposals including detailed design drawings, technical information, calculations and manufacturers' literature.
5. **System design certificate:** Submit with design proposals.

3. **Ss_75_50_28/260** Integration with other alarm and security systems

1. **Objectives:** Integrate following systems to ensure safety of all occupants.
2. **Systems to be integrated:** AOV.

Products

4. **Pr_65_70_11_12** Cable trays

1. **Standard:** To BS EN 61537.
2. **Material:** 3 mm steel.
3. **Coating material:** None.
4. **Sizes**
 - 4.1. **Width:** as detailed
 - 4.2. **Side height:** 30 mm.
5. **Features**
 - 5.1. **Segregation:** Not required.

5.2. **Protective cover:** Not required.

6. **Execution:** *Pr_65_70_11/630 Installing cable tray*

5. **Pr_65_70_48_29** Fire-resistant screened (LSHF) cables

1. **Manufacturer:** Pyrsman - FP200
2. **Standard:** To BS 7629-1.
3. **Third-party certification:** British Approvals Service for Cables (BASEC)-certified.
4. **Size:** Contractor to confirm
5. **Insulation:** EI 2, colour red.
6. **Fire resistance category:** STANDARD 30.
7. **Screen:** Aluminium tape.
8. **Execution:** *Pr_65_70_48/635 Installing low-voltage cables; Pr_65_70_48/735 Cable installation on channel cable supports, cable tray, cable ladder and cable tray*

6. **Pr_75_80_30_28** Fire alarm input and output modules

1. **Description:** AOV
2. **Standards:** To BS EN 54-18.
3. **Device type:** Single input module.
4. **Mounting arrangement:** DIN rail.
5. **Enclosure**
 - 5.1. **Ingress protection (minimum):** To BS EN 60529, IP 54.
 - 5.2. **Material:** ABS plastic.
 - 5.3. **Colour:** Grey.

7. **Pr_75_80_30_31** Fire detection and alarm power supply equipment

1. **Description:** Main panels in residences and Commercial Units each to have Advanced Electronics MX-Pro1 Panel
2. **Manufacturer:** Contractor to advise
3. **Standard:** To BS EN 54-4.
4. **Third party certification:** LPCB approved.
5. **Standby power supply:** Rechargeable battery sufficient to maintain the system in operation for a minimum of 24 hours and to provide an 'Evacuate' signal in all alarm zones for a further 30 minutes.
6. **Enclosure**
 - 6.1. **Ingress protection (minimum):** 31
 - 6.2. **Material:** Steel.
 - 6.3. **Finish:** Powder coated.
 - 6.4. **Mounting:** Surface.
7. **Monitoring of power supplies:** By the CIE.
8. **Execution:** *Pr_75_80_30/610 Installing main control and indicating equipment (CIE)*

8. **Pr_75_80_30_65** Point smoke detectors

1. **Manufacturer:** Apollo
2. **Standard:** To BS EN 54-7.

3. **Third party certification:** LPCB approved.
4. **Detector type:** Optical and ionization.
5. **Power source:** Manufacturers standard
6. **Execution:** *Pr_75_50_76/620 Installing point detectors*

Execution

9. Pr_65_70_11/630 Installing cable tray

1. **Standards:** In accordance with BS 7671 and IET Guidance Note 1.
2. **Joints:** Make smooth any burrs or edges.
3. **Accessories:** Manufactured accessories only.
4. **Fire barriers:** Provide where required to maintain fire performance of fabric.
5. **Support**
 - 5.1. **Fixing arrangement:** Independently fix and support from building structure using threaded rod fixed into expanding anchors.
 - 5.2. **Clearance from building fabric (minimum):** 20 mm.
6. **Components:** Avoid contact between dissimilar metals.
7. **Routing of cable tray:** Submit drawings showing the proposed routes.

10. Pr_65_70_48/635 Installing low-voltage cables

1. **Standard:** In accordance with BS 7671.
2. **Timing:** Do not start internal cabling until building enclosure provides permanently dry conditions.
3. **Preparation:** Store cables above 5°C for 24 hours before installation.

Clear cable path of debris.

4. **Installation temperature (minimum):** 5°C.
5. **Cables:** Install in one length. Dress cables flat, free from twists, kinks and strain.
6. **Cable pulling:** Do not overstress. Prevent kinks and twisting of the cable.
7. **Cable protection:** Cables passing through walls and floors to be sleeved with conduit or pipeduct to a minimum of 300 mm. Bush at both ends. Ensure that appropriate fire stopping materials are used to maintain the original fire integrity of the wall or floor around the penetration.
8. **Concealed cable runs to wall accessories:** Run vertically from the accessory.
9. **Distance from other services running parallel (minimum):** 150 mm. Position cables below heating pipes.
10. **Jointing and termination**
 - 10.1. **Final circuit cables:** At electrical accessories only.
 - 10.2. **Core connections:** Using compression lugs to equipment without integral clamping terminals.
 - 10.3. **Terminating cables when not using glands:** Take sheathing of cables into accessory boxes and equipment and protect against abrasion with grommets.

11. Pr_65_70_48/735 Cable installation on channel cable supports, cable tray, cable ladder and cable tray

1. **Cabling:** Install when cable supports are complete.
2. **Position:** Place single and multicore cables side by side.
3. **Fastening**
 - 3.1. **Fastenings generally:** Secure cables, do not indent sheaths. Position to enable any submain cable

- 3.2. **Submain cables >95 mm²:** Cable bands at 1000 mm (maximum) horizontal spacing and 1200 mm (maximum) vertical spacing.
- 3.3. **Final circuit cabling:** Cable ties at 250 mm (maximum) spacing.
- 3.4. **Extra-low-voltage, communications and fibre-optic cabling:** Cable ties at 250 mm (maximum) spacing.

12. Pr_75_50_76/620 Installing point detectors

1. **Protective cage:** Not required

13. Pr_75_80_30/610 Installing main control and indicating equipment (CIE)

1. **Position:** Lower Ground Entrance
2. **Power supply:** Derive from a dedicated circuit from the main distribution board and connect to CIE via fused key switches

14. Ss_75_50_28/610 Installing fire detection and alarm systems

1. **Standard:** In accordance with BS 5839-1.

15. Ss_75_50_28/630 Installing cabling for fire detection and alarm systems

1. **General requirements:** *Ss_75_50_28/610 Installing fire detection and alarm systems*
2. **Standard:** In accordance with BS 7671.
3. **Cable route:** Segregate from other cabling. Where installed in trunking, locate in a dedicated fire cabling compartment.
4. **Cable topology:** Loop circuits without spurs or tees.
5. **Cable pulling:** Submit proposals.
6. **Timing:** Do not start internal cabling until building enclosure provides permanently dry conditions.
7. **Mechanical protection:** Generally not required, but where any cable drops to serve equipment, this shall be mounted in galvanised conduit.
8. **Fastening cables**
 - 8.1. **To building fabric:** Metal P-clips with red plastic coating.
 - 8.2. **To cable supports:** Metal bands with red plastic coating.
9. **Cables passing through the building fabric:** Sleeve and seal to prevent transmission of gas and dust.
10. **Jointing:** At equipment and terminal fittings only.
11. **Maximum circuit resistance:** Measure before concealment. Submit results.

16. Ss_75_50_28/695 Installing interfaces to other equipment and systems

1. **General requirements:** *Ss_75_50_28/610 Installing fire detection and alarm systems*
2. **Connection to equipment:** Install interconnecting wiring between interface unit and equipment controlled.
3. **Interface units:** Label, describing their function.

System completion

17. Ss_75_50_28/807 Standby battery testing

1. **Mains power supply:** Isolate.
2. **Quiescent mode:** Measure current supplied by standby source when fire detection and alarm system is

3. **Alarm mode:** Measure current supplied by standby source when fire detection and alarm system is operating in the alarm mode. Submit results.

18. Ss_75_50_28/810 Testing and commissioning fire detection and alarm systems

1. **Standard:** In accordance with BS 5839-1.
2. **System commissioning agent:** Main contractor to advise
3. **Notice before commencing tests (minimum):** Two weeks.

19. Ss_75_50_28/819 Testing actuation, integration and interfacing with alarm and security systems

1. **Connections with other systems and equipment:** Verify and demonstrate operation of the systems and equipment under fire and fault conditions.

20. Ss_75_50_28/820 Documentation for fire detection and alarm systems

1. **Standard:** In accordance with BS 5839-1.
2. **Operating and maintenance instructions**
 - 2.1. **Scope:** Submit for the system giving optimum settings for controls.
 - 2.2. **Product information:** Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
 - 2.3. **Format:** Paper copy.
 - 2.4. **Number of copies:** Two.
3. **Logbook:** Submit one copy in accordance with BS 5839-1, Annex F.
4. **Record drawings**
 - 4.1. **Content:** General arrangement drawings showing the location of all control and indicating equipment, manual call points, detectors, radio transmitters and aerials, sounders, visual alarm signal devices, short circuit isolators, end of line devices, remote indicators, interface units connecting to other equipment, and automatic door hold open devices. Schematic diagram showing all control cabling, the cable origin, device addresses, route from control and indicating equipment to manual call points, detectors, radio transmitters and aerials, sounders, visual alarm signal devices, short circuit isolators, end of line devices, remote indicators, interface units connecting to other equipment, and automatic door hold open devices. Include conductor material and c.s.a, insulation type and colour, number of cores per cable, number of cables in ducts, on tray or ladder.
 - 4.2. **Drawing format:** Electronic drawing.
 - 4.3. **Number of copies:** Two.
 - 4.4. **Submittal date:** At handover.
5. **Fire evacuation plan:** Submit electronic colour CAD layout.
6. **Certification**
 - 6.1. **Design certificate:** Submit two copies in accordance with BS 5839-1, Annex G.1.
 - 6.2. **Installation certificate:** Submit two copies in accordance with BS 5839-1, Annex G.2.
 - 6.3. **Commissioning certificate:** Submit two copies in accordance with BS 5839-1, Annex G.3.

21. Ss_75_50_28/830 Spares and consumables

1. **Supply the following spares**
 - 1.1. **Detectors:** Two of each type.

2. **Printer ink and paper roll:** Replace immediately before handover (if required)

22. Ss_75_50_28/840 Maintenance

1. **Standard:** In accordance with BS 5839-1.
2. **Duration:** Until 12 months after Practical Completion.

23. Ss_75_50_28/850 Verification certificate for fire detection and alarm systems

1. **System verification agent:** Main contractor to advise
2. **Verification certificate:** Submit two copies in accordance with BS 5839-1, Annex G.5.

24. Ss_75_50_28/860 Acceptance certificate for fire detection and alarm systems

1. **Acceptance certificate:** Submit two copies in accordance with BS 5839-1, Annex G.4.

Ω End of System

APPENDIX A

Luminaire Schedule

Ref	Description	Image
A1	Compact 6W fire rated IP65 LED downlight with a COB LED module It is fitted with a polished reflector and a white twist and lock bezel as standard, Tested in the UK, it has been given a fire rating of FR90 and is IP65 compliant ad ALD Lighting Solutions Chilli Part No CHI/6/CCT/WH	
B1	Surface mounted LED Linear luminaire complete with wattage selectable with switchable CCT as ALD Lighting Solutions Stamford, Part No STM-WS-CCT-WH – Luminaires to be set to 31W, 4450lm unless directed by the Client. L1/E complete with integral 3Hr emergency – self test Part No Part No STM-WS-CCT-WH -M3-STE	
B2	Surface mounted spun steel housing epoxy powder coated white, with Lumaxx LED diffuser giving greater LOR, 20W, 1680lm and integral self test emergency as ALD Lighting Solutions Lancing, Part No LA-20-CCT-WH-M3-STE	
B3	Circular ceiling/Wall mounted IK10 bulkhead lumax opal diffuser & die-cast aluminium base powder coated black RAL9005 IP65, as ALD Lighting Solutions Equinox, Part No EQU-13-4K-BK-OP. A1/E complete with integral 3Hr emergency – self test Part No EQU-13-4K-BK-OP-M3-STE	
B4	Surface mounted LED Batten luminaire 1200mm switchable power 22-40W, 3430 – 6000lm, CCT 3000-6500K as A:D Lighting Solutions Defoe Part No DEO-SW-CCT-4F-WH	
B3	Circular surface mounted bulkhead TPa opal diffuser & polycarbonate base IP65, as ALD Lighting Solutions Comet, Part No COM/17/4K/OP/WH	

B6	Die-Cast aluminium base & cover bulkhead complete with polycarbonate diffuser, integral switchable PIR epoxy powder coated RAL9005, IP65, IK10, 13W as ALD Lighting Solutions Eaton, Part No ET-15-4K-BK	
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Note – All luminaires to be agreed with Architect and Client