ELECTRICAL SERVICES
PERFORMANCE SPECIFICATION
& CLIENT'S REQUIREMENTS

For

RECEPTION EXTENSION & ASSOCIATED WORK

at

PINNER PARK SCHOOL
MELBOURNE AVENUE, PINNER
MIDDLESEX HA5 5TL.

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2. SECTION 2

2.1 SCOPE

This Specification covers the type of materials, methods of use, fixing and location and is to be read in conjunction with the Conditions of Contract, the Specification of Work and the relevant drawings for each respective installation.

The clauses contained therein are considered to be in addition to the 18th Edition of BS 7671, with amendments, and do not supersede the standard in any way. The whole of the works shall be carried out in complete accordance with the 18th Edition of BS 7671 with amendments, the Supply Authority Regulations and the Electricity at Work Act 1989 and as currently amended.

The term “Engineer” shall mean the Facilities Manager for the School/Local Authority or his/her appointed representative.

The term “Contractor” or “Electrical Sub-Contractor” shall mean the company or firm engaged to carry out the electrical installation works.

The term “Tenderer” shall mean the company or firm tendering for the electrical installation works.

2.2 MATERIALS

Materials used in the works shall comply with the Specification, be new and unused and shall be manufactured, wherever possible, in Britain.

Materials shall comply with the latest British Standard Specification, where stated, and where materials are offered as alternatives for which there is no British Standard Specification, then the materials must comply with an equivalent known standard and samples shall be submitted for the approval of the Engineer before orders are placed.

When a trade name, firm or supplier is stated in the Specification, this shall be taken as being indicative of the required standard of design, quality, service and/or material. Alternatives will not be accepted.

Where materials and/or services are described as “approved”, “equal and approved” or “selected” it shall mean that the Engineer’s approval shall be obtained in writing before ordering the materials and/or services and before proceeding with the work.

At the time of obtaining quotations from a supplier named in the Contract Documents or when placing the order with a Nominated Supplier or Nominated Sub-Contractor (on the instruction of the Engineer) it shall be deemed that the Contractor has specifically stated that the firm concerned will be able to supply the goods or service at the required time to suite the general programme for the Contract. This clause shall not apply in cases when no alternative service is allowable.

Should a Supplier, Nominated Supplier or Nominated Sub Contractor not be able to comply with the general programme dates allocated for his goods or service, the Contractor must, before confirming any order, notify the Engineer immediately in writing and no claim for additional costs or extension of time will be allowed for the period of delay resulting from failure to check dates and notify the Engineer. It is, therefore in the Contractor’s interest to place orders as soon as it is practical, after the signing of the Contract for Suppliers and as soon as instructed by the engineer for Nominated Suppliers and Nominated Sub-Contractors.

Where any propriety brand of material is identified, it shall be used or supplied strictly in accordance with the manufacturer’s specification or instructions.

2.3 INSTALLATIONS - GENERAL

Every installation shall be installed with the utmost care and attention given to neatness – in particular neatness of surface installations shall be of paramount importance. All installations and work shall be to the satisfaction of the Engineer, only the very best workmanship shall be accepted.

The Contractor shall include in his tender for providing such standards.

The Contractor shall in all cases use figured dimensions on the drawings in preference to small scale. The Contractor will be responsible for taking and checking all site dimensions and for setting out prior to fixing.

Where the position of existing services is shown on the drawings, these are to be regarded as approximate only and the Contractor shall, before commencing any work, satisfy himself as to the positions of such cables, conduits, pipes or fittings, and as to whether their depths below the surface shall interfere with the works. In which case he shall provide such slings, struts and other supports as are adequate to support and protect the cables etc (see Excavation and Earthworks).

Care shall be taken not to disturb or damage any cables, conduits, pipes or fittings belonging to any Statutory Undertaking, Local Authority or private parties, which may be laid on the site either before the work commences or during the period of the contract or period of maintenance. Any damage to such cables etc, shall be made good at the Contractor's own expense.

The Tenderer shall include for supplying and installing all fixing brackets, standard or purpose made, necessary for the proper completion of the contract, including the supply and installation of any angle iron, framework, structures, or brackets necessary for fixing switchgear, bus bar chambers and tap off units etc. Brackets shall be steel - of dimensions to suit their purpose and loading, painted with a protective paint.

To avoid the possibility of inadvertently weakening load bearing structures, a schedule of holes through load bearing structures shall be prepared by the Contractor and approved by the engineer before commencement of work.

The drilling, welding to, or cutting of steel work (structural or otherwise) shall be avoided. If such drilling, welding or cutting appears essential the Electrical Contractor must first obtain the approval of the Engineer before any such work is undertaken. The general support for conduit, trunking, cable tray etc, shall be fixed by an approved clip or welded to steel work in a manner approved by the Engineer.

Where cable or conduits, trunking etc, pass through walls, floors, partitions or ceilings, the hole provided shall, after installation be made good with cement or similar incombustible material to the full thickness of the wall, floor, partition or ceiling. Instructions on priming and painting areas made good as part of this contract shall be given in the Specification of Work - where appropriate.

A competent site-based foreman/supervisor must be constantly in charge during the installation and have in his possession full copies of the specifications, schedule of requirements and drawings which must be overmarked daily with any alterations.

The Contractor shall bring to the attention of the engineer any corrosive or other deleterious conditions revealed in the course of the work.

2.4 SWITCHGEAR & DISTRIBUTION EQUIPMENT

All switchgear or distribution equipment used in main distribution systems or motive power installations shall be of the totally enclosed fully insulated interior metal clad (anti-rust finish) 500 volt pattern suitable for conduit or cable gland entry.

Switchgear shall have a fault rating compatible with the maximum prospective fault level attainable at each respective point of installation.

Switch panels shall be factory assembled and supplied complete with all necessary interconnection between bus bars and items of switchgear.

Before a switch panel is ordered, the Contractor shall submit a manufacturer's drawing fully dimensioned and detailed, and receive written approval from the engineer.

Bus-bar chambers shall be constructed of heavy gauge sheet metal and steel angle with solid copper bars on porcelain, acetate or other approved rigid supports and be marked in accordance with BS EN60439 with minimum current ratings in accordance with BS 159. The chamber shall be completely dust and vermin proof with gaskets between sections and the lids.

Bus bar chambers are to be constructed capable of being extended at both ends and the bars are to be ready to receive extension units.

Certain sub-main cables may be oversize in terms of current rating, being governed by voltage considerations, and attention is drawn to the necessity for ensuring the switchgear glands, terminals, etc, are of adequate size for the cable specified.

Switchgear shall be interlocked such that switches will not open whilst the switch handle is in the "ON" position.

It must not be possible for switch indicators to show an "OFF" position whilst switch contacts are closed.

Fuse carriers and bases shall be of the flameproof, high impact, moulded plastic type, incorporating HRC fuses.

Air circuit breakers shall be rated at not less than 600v, manufactured to BS EN60947-2 or BS 5311 as required, shall have a breaking capacity of not less than 25 MVA and be A.S.T.A. certified. Particular attention is drawn to the method of any remote safety or interlocking control.

Contactors are to be rated in accordance with "uninterrupted duty" and "utilisation category ACI" unless otherwise specified, manufactured to BS 5424, complete with D.C. or rectified A.C. operating coils wound for 230 volts protected by a cartridge fuse link, installed within contractors or externally in the form of a fused connection unit.

Residual current devices shall be current operated rated at 500 volts designed to trip at 30mA unless otherwise specifically directed, and supplied complete with a test button with suitable warning label.

For smaller installations and with the permission of the Engineer, switchgear may be mounted on a steel angle framework or timber backed of adequate strength and proportion. Cadmium plated or sheradised steel set bolts, nuts and washers shall be used. Frameworks shall be painted with a protective paint. Where a timber backboard is employed it shall be non-hygroscopic. Timber backboards shall be spaced off walls in an approved manner.

Generally, switchgear and fusegear shall be linked to other switch or fusegear via couplings and male brass bushes and steel trunking of adequate dimension.

MCCB panels shall be manufactured to EN 60947 as appropriate..

2.5 OVERHEAD & RISING BUS-BARS

Rising and overhead bus-bars shall be manufactured to BS 159 of the appropriate size and rating as detailed in the Specification of Work and shall have each conductor enclosed in insulating material supported on high quality porcelain or other approved insulation, the whole being supported in a rigid rust-proofed steel framework with heavy gauge sheet steel covers.

All junctions of steelwork shall be effectively bonded for earthing purposes. Bus-bars shall be best quality solid copper. Bus-bar trunking covers shall be removable only by the use of tools.

Plug in and/or clip on fuse boxes or enclosed fused tap off ways for conduit connection shall be arranged as detailed in the Specification of Work and shall be supplied complete with the necessary HRC fuses. A permanent label is to be pop-riveted or otherwise securely fixed to the lid of the tap off point.

Supports for rising or overhead bus-bars shall be as detailed on the drawings and the system is to be complete with all purpose made, manufacturer approved accessories i.e. Tees, bends, expansion joints, etc.,

Fire barriers are to be installed where the bus-bar passes through a floor or wall.

2.6 DISTRIBUTION BOARDS

All distribution boards shall be rated at 500V manufactured to BS EN 60439 to details in the Specification of Work.

Enclosure shall be constructed of heavy gauge sheet steel and be fitted with an isolator switch.

Distribution boards are to be mounted at a height of 2 metres to the top edge, above finished floor level or as otherwise directed.

Miniature circuit breaker distribution boards may be used complying with BS EN60439 and having a category of duty M6 minimum or as detailed in the Specification of Work. MCB types i.e. A,B,C or D shall be as detailed in the Specification of Work.

Spare ways for MCB boards are to be blanked off with factory made blank units and insulating bus-bar boots, and for fuse boards they are to be complete with fuse carriers to the maximum size of the spare way but no fuse cartridges are to be fitted.

All neutral and earth bars fitted in distribution boards shall include a way for each circuit contained in the board. Where TP & N fuse boards are utilised as SP & N the neutral bar is to include for a neutral way for each fuse way of the board (i.e. an 8 way TP & N distribution board used as a SP & N board is to have a 24 way neutral block).

All distribution boards shall have provision for padlocking off the complete front cover to prevent unauthorised access to MCBs or fuses i.e. a pillar to take 6mm shank padlock.

2.7 FUSES

All fuses in switchgear and distribution equipment are to be HRC manufactured in accordance with BS88 or BS1361. Cartridge fuses complying with BS88 shall have a category of duty A046 and a fusing factor as for Class Q1 fuses or as detailed in the Specification of Work.

2.8 LABELLING & MARKING

All switchgear and distribution equipment is to be complete with Traffolyt or similar approved labels, attached by small brass screw and nuts indicating in 10mm block lettering on white background, the duty, reference number, phase (1ph equipment), origin of supply, and also for isolators/fuse switches/switch fuses and fused tap-off boxes, their rating and fuse size installed.

All polyphase equipment is to be complete with Traffolyte or similar approved labels attached by small brass screws and nuts or otherwise securely fixed indicating in 12mm red lettering on white ground "**DANGER 415 VOLTS**".

All distribution boards and consumer service units are to be complete with a typed circuit schedule on thick white paper. The schedule shall clearly detail

- circuit designation,
- description,
- location,
- cable size,
- CPD rating and type

The schedule shall be enclosed in a heavy duty plastic envelope fixed to the inner face of the distribution board lid or door.

NOTE: It shall be possible to gain access to the “envelope” without removing fixing rivets, set screws, etc.

A further copy of the Schedule is to be issued to the Maintenance Department Engineer.

2.9 WIRING

The system of wiring shall be as indicated on the Specification of Work or on the working drawings and may be any of the following:

a. LSF cable in conduit or trunking (6491B)
b. MICC cable (LSF sheathed, unless otherwise specified)
c. Armoured, double PVC insulated cable
d. XLPE, SWA, PVCS or XLPE, SWA, LSF cables
e. Double LSF insulated cable (T+E), with stranded conductors and equal sized CPC!

All cables are to conform to the type and BS Specification quoted in Chapter 52 of the I.E.E. Wiring Regulations and shall be of an approved manufacture, copper cored. Each cable reel shall bear the manufacturer’s name and the date of manufacture. Cables shall not be more than 12 months old at the date of installation.

The “loop-in” system of wiring is to be used on final sub-circuits. No joints are to be made in the run of the cable and ringing of cable sheaths shall not be allowed. Generally, lighting feeds shall be taken to and from switches and not jointed through fitting etc.

The circuits are to be capable of carrying the connected load with a volt drop in accordance with The Wiring Regulations.

Identification of wiring shall be in accordance with Appendix 7 of BS7671, “Cable Harmonisation” as follows:

Colour codes

Single phase live conductors shall be	Brown
Live 1 of a 3 phase circuit shall be	Brown
Live 2 of a 3 phase circuit shall be	Black
Live 3 of a 3 phase circuit shall be	Grey
Neutral conductors shall be	Blue
Protective conductors shall be	Green/Yellow

Old" & "New" Circuits Mixed

Where old and new cables are present in the same circuit, i.e., an alteration or addition to a circuit, conductors shall be identified by proprietary cable markers at joint boxes and accessory joints;

Phase 1 (red or brown)	Identified as L1
Phase 2 (yellow or black)	Identified as L2
Phase 3 (blue or grey)	Identified as L3
Protective conductors shall be	Green/Yellow

Duplicate supplies shall not be run within the same cable, conduit, trunking or duct. Category 3 cables shall not be run within the same cable, conduit, trunking or duct as category 1 or 2 cables.

Category 2 cables shall not run within the same cable, conduit, trunking or duct as Category 1 cables.

Category 3 cables forming fire alarm or emergency lighting systems shall be self-contained for each function in respect of cables, trunking, conduit and ducts.

Note: In dado trunking applications, segregation of categories must be strictly adhered to all necessary barriers etc., to be installed.

2.10 UNDERGROUND CABLING & HANDLING

The Contractor shall provide all equipment required for installing the cable including cable jacks, cable rollers, cable stockings, hauling tackle, and the like and shall be responsible for ensuring that these are used and maintained in a safe and serviceable condition.

Cable drums shall be handled, moved and stored in a manner so as to prevent any likelihood of damage to the cable. The Contractor shall take all necessary precautions to ensure that no loss or damage occurs to the cable supplied by the School.

Where mechanical means are approved to pull cables, the pull shall be applied using a cable stocking or pulling eye sweated to the conductors and sheath, and measures shall be taken to avoid excessive strain on the cable.

The cable shall only be laid when the ambient temperature is above 0° C (zero degrees) and has been at this temperature for the previous 24 hours.

The Contractor shall bring to the immediate attention of the Director of Facilities Management any corrosive or other deleterious conditions revealed in the course of the work.

2.11 EXCAVATION & REINSTATEMENT

Before excavation is commenced, the marked out area on site shall be approved by the Engineer.

Trenches shall be kept as straight as possible, bottom of each trench shall be firm and of smooth contour.

In order to prevent damage to cables and accessories, the Contractor shall take adequate measures to ensure that water is not allowed to accumulate in cable trenches.

The depth of cable trenches shall in general be not less than 450m (18") and the distance between cables shall be 150mm (6") between centres.

When the course of excavation, obstructions are encountered which require deviation from the marked route, the new route shall be approved by the Engineer before further excavation commences.

Damage or suspected damage to other services found during or caused by the excavation and installation of cables, shall be reported by the Contractor to the Engineer.

Material excavated shall be so placed as to prevent unnecessary nuisance or damage. Top soil shall be placed separately and re-used to form the top layer when reinstatement is made. Large pieces of rock, concrete or metal etc. removed during excavation shall not be replaced when back filling, but shall be removed and disposed of by the Contractor.

Back filling shall be made in even layers, the earth of each layer being well consolidated by light ramming and sufficient allowance made in the final layer to allow for settlement.

Where back filling is carried out by a Sub-Contractor, the Contractor shall provide supervision to prevent damage to cable.

Each and every cable shall be protected by cable tiles centred 75mm above the top of the cable. All cable tiles whether for straight runs or bends shall be of the apex interlocking

pattern with the words – **DANGER ELECTRICITY**- impressed on every tile. Tiles shall conform to BS 2484 and shall be earthenware 225mm long by 150mm wide.

2.12 CABLES IN DUCTS

Cables shall be drawn through ducts when crossing under roads, buildings, structures, paved areas and where shown on drawings.

Earthenware ducts shall be used unless otherwise stated, they shall be of the Stamford type, and conforming to BS 65 in all respects. During laying, care shall be taken to remove all extraneous material from the sockets, and the ducts shall be laid on a base of 75mm concrete also a launching of 75mm concrete shall be provided around the ducts. Effective measures shall be taken to prevent concrete entering the bores of ducts.

Prior to the installation of cables, all ducts are to be cleared by drawing through a mandrel of suitable dimensions, this shall be followed by a pull through to clear any accumulated dirt, after which the ducts will be plugged until cables are laid. After cables are laid, the void formed between the cable and the duct shall be sealed using bituminous compound hessian to prevent ingress of dirt and water.

Ducts shall extend for a minimum distance of 300mm beyond the limits of the features being crossed.

All ducts shall be minimum 100mm internal diameter unless otherwise stated.

Not more than one cable shall occupy any one way in a duct unless otherwise approved.

2.13 TERMINATIONS & JOINTING

The filling of cable boxes with compound shall proceed without break, the box having been preheated to the pouring temperature of the compound. Compound shall be poured at a steady rate at the correct temperature to ensure that voids are not formed. Joint compounds shall be in accordance with the cable manufacturer’s recommendations.

The armouring of cables shall be securely terminated at glands by means of armour clamps in such a manner that the lay of the wires is undistorted and all wires are firmly gripped.

Through joints in cables will not be permitted unless approved by the Engineer.

The cores of all power cables shall be “test phased out” and the core ends identified in accordance with BS 7671.

2.14 CABLE MARKERS

On all cables of 11KV and above, identification labels shall be securely fixed by non-corroding ties to the ends of all cables. The cable labels shall give the cable size and destination. All labels shall be of brass construction.

2.15 SITE TESTING

All cables of 11KV and above shall be tested by an approved high voltage testing, Specialist Contractor.

2.16 CABLES

Where more than two circuits are run in one trunking the cables in each circuit are to be laced together with cable ties or cord and identified.

All cables shall be kept 150mm clear of steam and hot water pipes and other services.

Where unprotected cables are laid on the soffit of the ceiling, and only single battens are used for ceiling support, these battens are to be cut to allow the cables to pass through. The Electrical Contractor is to include in his tender for the supply and fixing protection for the cables from ceiling fixing nails/screws.

LSF cables shall not terminate in lamp-holders or lighting fittings or pass through lighting fittings where temperatures significantly above the ambient are present.

Final connections to such lighting fittings shall be made in heat resistant silicone rubber insulated flexible cable. Connections between flexible cables and sub-circuit wiring shall be made via cable connectors housed in the conduit boxes supporting respective fittings. Where this is impractical, an approved conduit box shall be sited adjacent to each respective fitting. Where this is impractical, an approved conduit box shall be sited adjacent to each respective fitting and connector shall be housed within the conduit box.

2.17 MICC – (MINERAL INSULATED COPPER CLAD) CABLES.

Mineral insulated cables shall be sheathed with copper, incorporating high conducting copper conductors embedded in compressed magnetism oxide, heavy duty grade for all systems as manufactured to B.A.S.E.C approvals, and delivered to site bearing the manufacturer's identification labels.

Mineral insulated cables shall be fitted with screw-on pot scale, filled with plastic compound, and incorporating protective conductors on pots, or an approved heat shrink seal incorporating protective conductor with green/yellow sheath. Phase conductors shall be identified using coloured tapes.

Where possible, unless directed to the contrary, MICC cable shall terminate at equipment, fittings or accessories via a gland, conduit coupling and male brass bush.

MICC cable shall be LSF sheathed installed using LSF boots and shrouds (unless otherwise specified).

MICC cable shall be installed in accordance with the manufacturer's instructions by tradesmen who are expert in the handling and jointing of the cable. Bending, stripping and sealing tools shall be employed as recommended by the manufacturers. MICC cable shall be installed in horizontal and vertical runs-diagonal runs will not be permitted.

Minimum bending radii of MICC cable shall be in accordance with the Wiring Regulations BS7671. Where MICC cables are surface routed, they shall be run in a neat and workmanlike manner to conform with the architectural features of a room-even if this entails longer routes of cables. Where MICS cables are buried in wall fabric or floor screeds, they are to be adequately protected from mechanical damage- particularly before floor screeding.

Where MICC cables pass through floors they shall be protected by steel conduit to a minimum height of 300mm. Protective conduits shall be fitted at each end with a female brass bush. Where MICC cables are routed through other areas where mechanical damage is likely to occur, they shall be protected by steel troughs/ducts. Protective conduits or troughs/ducts shall be sealed against the ingress of dust or litter using quick setting mastic after the installation of MICC cables.

Where it is proposed to use MICC wiring units on an installation, these will only be acceptable when obtained from the manufacturers direct.

Each circuit wired in MICC cable shall leave switchgear or distribution boards as separate.

Special scale (135°C) are to used on mineral insulated cable for all boiler plant wiring, where run within heating ducts, final connections to electric fires, fan convectors, unit heaters, enclosed close to ceiling lighting fittings or where high ambient temperatures can be anticipated.

Where mineral insulated cables are used on fire alarm system, the cables are to be LSF sheathed and the sheathing is to be coloured red to identify its duty.

MICC cables shall be fixed by means of LSF sheathed copper clips (one cable) and saddles (more than one cable) where cables are buried in the building fabric. Clips and saddles shall not be secured to the joints of surface brickwork or blockwork. Where three or more MICC cables are run together in plantrooms, roof and floor spaces, ducts, etc., they shall be run on galvanised tray.

Fixings on galvanised tray shall be made with round head brass set screws, nuts and washers.

Fixings for MICC cables recessed into floor screeds or walls shall be made with galvanised nails secured into purpose made plugs.

Fixings for MICC cables surface routed shall be by roundhead brass wood screws into purpose made plastic plugs.

Plastic cable straps shall not be used.

MICC cables shall be tested as soon as possible after receipt on site, before and after installation within the building fabric (i.e. Walls and floor screeds) at handover and during the guarantee period. MICC cables shall be tested with a 500 volt Insulation Tester. Should any test not produce an infinity reading the Contractor shall investigate and make good the fault at their own expense.

2.18 STEEL CONDUIT

All steel conduits and conduit accessories used in the execution of the Contract shall comply with the following requirements:

Solid conduits shall be of heavy gauge steel, welded, with screw threads for jointing length to length and for the attachment of accessories.

Generally, conduits shall be galvanised inside and outside. They shall be manufactured to the requirements of BS No. 4568 for Class B materials and none of size less than 20mm external diameter shall be used unless specially requested elsewhere in this specification.

Flexible conduits shall be of heavy WATERTIGHT pattern finished galvanised and none of size less than 20mm external diameter shall be used unless specially called for to the contrary in this specification. Flexible conduits to be used for fixed wire installation work within building fabric shall be manufactured from low-smoke halogen free materials throughout.

Conduit accessories shall be of malleable grey cast iron BS 4568 and shall generally be galvanised inside and outside. They shall be of BESA pattern with long spouts threaded for the reception of conduits except in the case of such loop-in and adaptable type boxes. Covers for draw-in junction etc. boxes shall be of heavy malleable grey cast iron, generally without gaskets but, when requested, in external situations or in damp atmospheres or locations, suitable approved gaskets shall be fitted. Special waterproof or watertight pattern accessories shall only be used if so specified.

Bushes, glands, plugs, etc., used in conjunction with conduits and conduit accessories shall be of brass. All male bushes shall be of long thread pattern.

Saddles used for fixing conduits, which are to be buried in floor or roof screeds, shall be of clip type finished galvanised. Those used in fixing conduits to surface walls, ceilings, steelwork, etc., shall be of spacer bar type, galvanised. Crampets used for fixing conduits which are to be buried in wall plaster, shall be of steel, finished galvanised.

All conduits and conduit accessories used in the execution of the Contract shall be installed to comply with the following requirements.

Conduit and accessories damaged by weather or other hazards shall not be installed. Previously used conduit shall not be installed.

Cutting, screwing and setting shall be carefully carried out, and all ends shall be cut square.

After cutting and screwing, ends shall be reamered to remove all sharp edges and burrs.

Setting shall be effected without distortion of diameter and by means of an efficient setting machine. Screwing shall be by means of good quality dies in good condition and poor or damaged threads shall be rejected.

After jointing either length to length or to accessories, the exterior of the conduits, couplings or accessories in the vicinity of the joint shall be protected particularly observed in the case of work to be buried or concealed and the Contractor shall take care to see that all joints are protected against rusting i.e. painted before being buried or concealed.

2.19 CONDUIT INSTALLATIONS

Draw-in boxes or through boxes shall be inserted at intervals of not more than 10m in straight runs of conduit and, a draw-in box or through box shall be inserted after not more than two such bends or changes in direction.

Conduits shall be surface installed or buried in building structures in accordance with definitive requirements of the other sections of this specification.

Surface installed conduits shall, in all cases, be run parallel to the building lines and shall be fixed in position at intervals of not more than 1200mm (4') by means of spacer bar type saddles and these saddles shall be fixed by the following methods as appropriate:

a) To brickwork, concrete or the like, by 25mm (1") x no. 8 brass woodscrews and plastic raw plugs.

b) To woodwork by means of 25mm (1") x no. 8 brass woodscrews.

c) To steel structure by means of cadmium plated 2 B.A. mild steel machine bolts/screws and nuts or by means of similar mild steel self-tapping screws.

Conduits run in roof spaces, accessible trenches and such like shall be considered to be surface installed.

Draw-in inspection and junction boxes, and troughs, other than "adaptable" type boxes installed in conduit runs whether on the surface or buried, need not be separately fixed to building structures, but shall rely on the efficient saddling of conduits for their support. Saddles shall be fixed to the conduit runs immediately adjacent to the boxes or troughs.

“Adaptable” type boxes of whatever size shall always be fixed separately to building structures by means of at least two fixings of nature similar to the fixings specified for saddles in sub-clause above.

Conduit attachment to sheet steel cable trunking and fluorescent fittings channelling and such like and to all sheet steel or cast equipment boxes with untapped conduit entries, whether surface installed or concealed, with the exception only of loop-in type conduit boxes and other instances where space limitation prohibits shall be effected by means of flanged coupling, a long thread male brass bush and heavy pattern brass compression washer. The coupling shall be fitted outside the equipment and the male bush and compression washer inside the equipment with the flanged part of the washer bearing against the head of the bush.

Conduit attachment to loop-in type conduit boxes and to sheet steel or cast cases of other equipment where space installed or concealed, shall be effected by means of a standard conduit coupling, a long thread male brass bush and a heavy pattern brass compression washer. The coupling shall be fitted outside the equipment and the male bush and compression washer inside the equipment with the flanged part of the washer bearing against the box or case.

Attachments other than as detailed in the foregoing sub-clauses 10 and 11 will not be accepted unless the prior approval of the Engineer has been obtained.

Where attachment is to equipment such as cable trunking, florescent fittings, channelling, etc., which is painted or enamelled, the paint or enamel shall be carefully removed from the area of coupling, bush or washer contact and after attachment any exposed area from which paint or enamel has been removed shall be carefully touched up to match the original.

Attachment of flexible conduits to solid conduit, conduit accessories, equipment cases or motor terminal chambers shall be effected without exception by means of brass adapters to which the flexible conduit shall be effectively brazed or soldered. The brass adapters shall then be fixed to solid conduit, conduit accessories, equipment cases or motor terminal chambers in a sound manner, bearing in mind the need for the maintenance of efficient earth continuity. Earth continuity across all flexible conduits shall be affected by the installation within the conduit of a 2.5mm green/yellow sheathed earth wire, which shall be efficiently connected to the brass adapters by soldering or other approved method.

The Contractor shall ensure that conduits are free from dampness and moisture before any wiring is installed therein and shall swab them dry if there is any doubt or if such should prove necessary.

Throughout the course of the Contract, all conduits and accessories shall be effectively

protected against the ingress of plaster and other building materials.

Wiring shall not be drawn into any conduit system until the system is complete.

In the case of buried or concealed conduit work, draw-in, inspection and similar boxes, the covers of which must be flush with the finished surface of walls or ceilings, shall have covers of a special overlapping type or shall have fitted between a standard cover, and the box a white Bakelite break joint ring.

The use of running couplings shall not be allowed within the works carried out under this contract. Conduit union will be used instead.

All conduit systems shall be complete before the installation of cables.

All surface conduits shall be in vertical and horizontal routes. Conduits in loft areas and ceiling spaces shall be installed in vertical horizontal routes. Conduit routes shall be determined on site where not clearly defined on the contract drawings. All main or conduit routes shall be approved by the Engineer before installation.

Conduits recessed into or installed within walls shall be installed in vertical and horizontal routes. Horizontal routes shall be restricted to high level positions wherever possible.

Conduits cast into floors may be routed in diagonal routes.

All conduits must be installed in a neat and symmetrical pattern and should, where possible, follow the same route even if this entails using longer conduit runs and if during the course of construction it is found this is not being carried out in the manner specified, then the Contractor will be instructed to dismantle and re-install the conduits in the manner specified and the cost of any additional conduit and labour required will be borne by the Contractor.

All conduit routes shall incorporate an adequate number of draw-in boxes in agreed positions. Draw-in boxes shall be of correct type to suit purpose of use i.e. correct number and position of outlet points. Draw-in boxes shall be securely fixed in position using steel wood screws or toggle bolts, as appropriate, and shall be provided at each outlet position. All conduits to be “cast” into building fabrics shall be positioned clear of and above first reinforcement material. No more than two right angle bends shall be incorporated in any conduit run.

Generally, conduit fixings shall be installed at spacings within manufacturer’s recommendations. Fixing saddles shall be positioned at a maximum of 1.2m apart or 0.3m from conduit outlet boxes or changes in direction.

Surface conduits including conduits routed through loft areas shall be secured using distance saddles to give not less than 2mm clearance between conduit and wall.

Flush conduits shall be secured using crampets or spring saddles as directed by the Engineer.

Where conduits are run adjacent to steam or hot water pipes, they are to be placed below these wherever possible and in any case are to be not less than 150mm there from.

The conduit and accessories are to be electrically and mechanically continuous throughout.

Conduits shall be protected by Denso tape wrapping where passing through floor slabs.

Where conduits are to be installed externally or in other potentially damp situations, spout outlet boxes or internally threaded cast boxes shall be used. Special measures to ensure water tightness shall be taken including provision of rubber gaskets.

2.20 PVC CONDUIT & CONDUIT ACCESSORIES

Plastic conduits shall be rigid PVC heavy gauge, white, black high impact, or LSF flexible conduit as specified. Conduits shall generally be installed in accordance with manufacturer’s instructions, with particular reference to expansion joints.

All changes in direction of conduit shall be carried out via purpose made accessories.

Conduits shall terminate at accessory boxes using a plastic flange coupling and plastic male bush. Conduits shall butt solidly into all conduit fittings.

All plastic “slip on” connections shall be cemented using manufacturer’s approved cement.

Plastic conduits SHALL NOT be installed in locations suffering temperatures (high or low) likely to cause damage to the same.

All plastic conduits shall incorporate protective conductors.

Plastic conduits boxes shall be made of high impact material supplied complete with box lid and where installed at lighting point positions, shall be the type with external fixing feet.

Plastic conduits shall be fixed rigidly to the building fabric in accordance with Clause above. Plastic conduit boxes used to support light fittings shall be either reinforced pattern to carry

10KG load or be substituted with Galvanised boxes.

2.21 TRUNKING CONTAINMENT STEEL

All cable trunking and accessories used in the execution of the Contract shall comply with the following requirements.

Trunking shall be constructed of sheet steel of not less than 1.5mm thickness for sizes up to 100mm x 100mm or equivalent and not less than 1.75mm for sizes above 100mm x 100mm or equivalent and standard sections shall not be less than 2m in length and shall be manufactured to BS EN10142.

It shall be free from all rough edges, burrs and rust, and shall be thoroughly rust-proofed and finished inside and out in a galvanised finish.

Sizes and types of trunking shall be as called for in the various sections of this Specification or on the drawings, or shall in any case by sufficient size to accommodate the wiring required whilst still ensuring the appropriate space factor.

All standard rectangular section trunking shall be of the lipped type i.e. the sides shall be flanged over or lipped along the opening over which the cover or lid shall fit. Any skirting, trunking, multi-section trunking or trunking of special nature for installation in floors shall, if called for in any of the various sections of this Specification, be as definitely specified therein.

Lids or cover plates for standard rectangular section trunking shall be of similar gauge and finished as the trunking, shall have their edges flanged over to overlap the sides of the trunking and shall be provided with substantial means of attachment to the trunking. Fixing by means of self-tapping screws will not be acceptable. Lids or cover plates for skirting or other special trunking, shall if such trunking is called for in any of the various sections of this Specification, be as definitely specified therein.

Bend, tees, jointing pieces and plates, flanges and other accessories shall, unless special permission is otherwise given by the Engineer, be ex-works by the manufacturers of the trunking and suitable in all respects for use in conjunction with the trunking. All shall be of gauge of steel not less than that of the trunking and preferably at least one gauge heavier. All shall be rust proofed and finished similar to the trunking.

Trunking of greater length than 3m, installed vertically, shall be fitted with stout metal pegs at 1000mm intervals so that cables can be laced in and out between them and thus be held firmly in position, and the trunking size shall be increased to maintain the same space factor present for the horizontal.

Where trunking is required to pass through floors from one floor of the building to another, it shall be fitted with suitable and approved flame proof fire barriers.

All trunking and trunking accessories used in the execution of the Contract shall, unless called for otherwise in any of the various sections of this Specification, be installed to comply with the following requirements.

Trunking shall be fitted with lid or cover plate facing outwards or uppermost.

Trunking may be fixed direct to brickwork, plasterwork, steelwork, etc., as may be necessary or indirectly to such structures by means of brackets. The Contractor, however, shall be guided in this matter by the requirements of any of the various sections of this Specification or where no definite requirements are given, but consultation with the engineer. Where steelwork etc., is permissible, the methods of fixing shall be as for surface installed conduit saddles. Where fixing shall be by means of brackets, the trunking shall be secured to brackets by means of cadmium plated mild steel bolts, nuts and lock washers. Bolts shall be round head pattern and heads shall be fitted within trunking.

Brackets for supporting trunking from roof or other steelwork shall preferably be arranged to hook or clip onto the steelwork in order that drilling of steelwork may be avoided. In such cases, use may be made of such patent fixings as “lindapter” or similar. In the event of hook or clip or similar type bracket proving unsuitable or unfeasible, the permission of the Engineer shall be sought to drill steelwork, but such drilling shall not be carried out prior to the engineer’s approval being given in writing.

Brackets for fixing trunking to walls shall be arranged by fixing to the walls by means of woodscrews and plastic plugs.

All trunking shall be of standard finish and size, as called for on drawings.

Trunking systems shall be re-wirable and shall be complete before the installation of cables.

Trunkings shall be run in vertical and horizontal routes, in a neat and symmetrical pattern. Routes shall be determined on site unless detailed on the contract drawings. All main routes of trunkings shall be approved by the engineer before installation.

Trunkings shall be sized to provide at least 50% spare capacity after the installation of all cables provided at original installation stage.

Trunkings shall be kept 300mm minimum clear of steam or hot water pipes.

Expansion couplings shall be provided where trunkings cross an expansion joint within the building fabric. Floor routed trunkings shall not be employed without prior approval of the Engineer.

Trunking covers through walls, floors or ceilings shall be solidly fixed. The solidly fixed portions shall project 50mm on either side of walls and 150mm on either side of floors or ceilings. No trunking apart from ceiling trunking shall be installed with the cover on the underside. Where trunking is secured to switchgear, fuseboards, etc., flanged type couplings shall be used. Particular attention is to be given to corners at tees and bends and to the fitting of screws to avoid possible damage to cables.

Trunkings shall be wrapped with “Denso” tape where passing through concrete floors.

Flush ceiling trunking shall not be less than 2.0mm gauge galvanised flo-coat after manufacture and free from distortion. Lids are to be flush with ceiling, secured to the body by means of mushroom headed steel screws at intervals not exceeding 400mm and suitably reinforced to prevent sagging. Fire barriers shall be fixed to the lid.

Where lighting fittings or pull cord switches are fixed to trunkings, trunking lids shall be cut and arranged to allow lids in the vicinity of fittings or switches to remain secured after the removal of other sections of lid.

2.22 TRUNKING CONTAINMENT PVC

Plastic trunking shall be rigid PVC heavy gauge, white, high impact complete with lid, full length back tray and manufactured fittings.

Plastic trunking shall be installed in accordance with manufacturer’s recommendations.

Plastic trunkings shall be secured rigidly to building fabrics using round headed steel wood screws in manufactured plugs with oversize washers to prevent screw heads pulling through holes in trunking.

All plastic trunkings shall incorporate protective conductors.

All changes in direction of plastic trunking shall be carried out via purpose made accessories.

Plastic trunking shall be cut to length and access holes for conduit entry etc. shall be cut using only the manufacturer’s special tools.

Surface fixed plastic trunking shall be routed as unobtrusively as possible following the architectural features of the room even if this entails longer runs of trunking. Trunking shall be run along full wall lengths and must not terminate part way along a wall, unless specified to the contrary.

Plastic trunking shall not be routed through areas suffering high or low temperatures.

2.23 CABLE TRAY & BASKET SYSTEMS

All cable tray and accessories used in the execution of the Contract shall comply with the

following requirements.

It shall be constructed of perforated sheet steel as particularly called for in any section of the Specification, shall be of the particular widths and depths specified or, when not specified, of dimensions sufficient to accommodate all the cables to be routed on it without bunching, unless specifically approved by the Engineer. It shall be provided in standard sections of not less than 2m in length.

All cable trays shall be heavily galvanised throughout and shall be free from all rough edges and burrs. The quality and type, unless otherwise specified, shall be heavy duty galvanised medium return flange. All bends, sets, tees, jointing pieces and other accessories shall, unless special permission is otherwise given by the Engineer, be ex-works by the manufacturer of the cable tray and suitable in all respects for use in conjunction with the tray. All fittings shall be of gauge of steel not less than that of the tray and of the appropriate dimensions and shall be of galvanised finish. Fixings to tray sections shall be as specified for cable trunking.

All cable tray and accessories used in the execution of the contract shall, unless called for otherwise in any of the various sections of this Specification, be installed to comply with the following requirements.

Where intended to carry heavy power cables, it shall be installed, when horizontal, to enable the cables to be laid inside and not suspended below, unless particularly called for.

It shall always be installed whether horizontal or vertical, to allow space behind for securing cable straps.

Cable tray shall generally be carried on suitable steel brackets, securely fixed to the building structure work, as particularly called for in the various sections of this Specification and generally specified for the cable trunking above.

2.24 CABLES, FLEXIBLE CORDS & WIRING

All wires and cables installed under this contract shall conform with the relevant and applicable requirements appropriate up-to-date British Standards as follows:

PVC LSF XLPE sheathed and armoured cables and insulated to BS 6346; BS 6724; BS 5467 and BS 7211 as appropriate, all holding BASEC approval.

Polyvinyl-chloride-insulated (PVC insulated) cables and flexible cords.

Mineral-insulated metal-sheathed cables BS 6207.

Mineral-insulated metal-sheathed cables must be the product of an approved manufacturer and compliant with the relevant British Standard.

Polyvinyl-chloride-insulated (PVC insulated) cables and flexible cords, vulcanised-rubber insulated cables and flexible cords, paper-insulted cables, butyl-rubber insulated cables and all others shall be the product of an approved manufacturer compliant with the relevant B.S. 6004.

In so far as identification of single core cables, wire and flexible cords and the cores of multi-core cables, wires and flexible cords is concerned, the requirements of I.E.E. Regulations must be rigidly adhered to.

All wires, cables and flexible cords shall be delivered to site with the maker's labels, seals and other proofs of origin, intact.

The sizes of all LSF and similar wiring, shall be strictly in accordance with the requirements of the various sections of the Specification and with the details shown on the drawings.

LSF and similar wiring, shall only be installed within conduit or trunking systems within enclosed equipment or apparatus, unless specific direction is given otherwise.

Wiring shall not be installed within any conduit or trunking system until that system is complete.

Jointing of wiring shall not be permitted other than at equipment terminals or within suitable and approved joint boxes containing suitable terminals.

In so far as termination, bonding, protection against damage by heat, fire, explosion or by corrosion is concerned, special attention shall be paid to the applicable requirements of I.E.E. regulations.

The number of cables which shall be installed in any one conduit shall not exceed the number permitted by I.E.E. Regulations.

All wiring installed in cable trunking, ducting, channelling, and such like, shall be bound together in single or three phase circuit groups at 2m intervals and shall, at intervals by typed label marked in permanent fashion to indicate the circuit.

Where installed within switches, distribution boards, control panels and such like, wiring shall be neatly and carefully bunched, secured together by means of whipcord binding and adequately supported and held in position by means of supports or brackets of insulating material.

Wiring of not more than one phase shall be installed in an outlet box, switch box etc., other than one designed for multi-phase use.

The sized of all M.I.C.C. wiring shall be strictly in accordance with the requirements of the various sections of this specification and with the details as shown on the drawings.

All accessories used in conjunction with the termination, sealing, jointing, etc., of the cable, shall be the product of the cable manufacturers and of the correct size of the product of the cable manufacturers and of the correct size and type for the purpose. Where LSF sheathed cable is used, LSF shrouds shall be fitted over the final few inches of cable and over cable gland at all terminations. Also all jointing, sealing and termination work shall be carried out strictly in accordance with the manufacturer's recommendations and only by tradesmen qualified to do so.

In so far as termination, jointing, bending, protection against mechanical damage, damage by fire, explosion or corrosion is concerned, special attention shall be paid to the applicable requirements of the I.E.E. Regulations in addition to any requirements of this clause.

Except in cases of runs not exceeding 2m in length, M.I.C.C. wiring shall not be buried in building structure in such a way that it is accessible only by breaking in to the structure, unless prior permission is obtained from the Engineer in writing.

In the case of wiring or cabling by means of other than LSF or mineral insulated cables being called for in the Specification, methods of installation shall be as called for in the section of the Specification under which the work is to be carried out.

Where the use of flexible cords is called for, no cord of size less than 0.75mm2 shall be used and, unless specified to the contrary, they shall be of PVC coloured white, to BS6500 and be

rated at 85°C. In all usage of flexible cords, arrangements must be made to ensure that cords are so clamped or fixed that weight of fittings or such like is not taken by terminals.

Where LSF/LSF double insulated cables are used within the building structure, the following conditions shall apply:

The cable shall be run at a minimum depth of 75mm below the underside of all floor boards, joists shall be drilled, not slotted, to accommodate transverse runs. Where cable is run parallel with the joists, it shall be affixed to the joist at intervals not exceeding 300mm using moulded PVC clips of appropriate size to the cable.

Where LSF, LSF double insulated cable is run within walls, it shall be enclosed in steel conduit in accordance with the Specification, or be RCD protected. The foregoing conduit shall extend from the accessories being wired to 50mm beyond the point of entry of the cable into the floor or ceiling void.

Where new cabling is to be installed on existing cable tray, the cabling shall be independently fixed to the cable tray and not tie wrapped to existing cables.

Where traditional telephone wiring is installed, all telephone cabling from floor distribution points to line jack units shall be carried out in CW 1308 B white coloured sheathed cabling.

All data and structured cabling from data cabinets to data outlet positions shall be carried out in U.T.P. Cat 5E or Cat 6 sheathed cabling according to the specification.

2.25 LIGHTING SWITCHES

Lighting switch assemblies shall comply with BS 3676 either surface or flush and are to be 10A rated grids with rocker type in metal boxes and complete with cover plates detailed in the Specification.

Insulated plate switches may be used where detailed in the Specification. These are to comply with BS EN60669 rocker type screwed to a metal box where flush or to moulded PVC boxes where surface.

Where more than one phase of the supply is brought to a single switching position, purpose made switch units with fixed phase barriers shall be employed incorporating danger notices below the switch plate.

All grid type switches are to incorporate a protective conductor terminal on the grid plate into which the circuit protective conductor shall terminate. In the case of a steel conduit system a protective conductor shall be provided between each grid switch plate and its respective metal housing i.e. switch box.

2.26 SWITCHED SOCKET OUTLETS

All socket outlets shall comply with BS 1363 either surface or flush and are to be 13A shockproof three pin shuttered and switched type complete with metal plates mounted in a metal box or as detailed in the Specification of Work.

Insulated plate socket outlets may be used where detailed in the Specification of Work. These are to comply with BS 1363 to match the insulated plate switches and screwed to metal boxes where flush or to moulded PVC boxes where surface.

Surface mounted metal socket boxes are to have no unused knockouts left when the installation is complete, all socket boxes must accept only the installed conduit.

A protective conductor shall be provided between the protective conductor terminal on each socket outlet and its respective metal housing i.e. Socket box.

2.27 LIGHTING FITTINGS

All lighting fittings detailed in the Specification of Work or on the drawings are to be supplied complete with lamps as the detailed wattage and colour.

Where hook and chain suspension is specified a protective conductor terminal shall be fitted in the conduit box and three core flexible cable is to be cable tied to, not threaded, down the chain.

Where the conduit suspension is specified, a ball and socket type dome lid with flexible copper bend between the fixed and moving part is to be mounted on the conduit box with a conduit drop and oversize double lock nuts and bush are to be installed on the fitting.

Unless directed to the contrary, where a lighting fitting is recessed into a ceiling, the wiring system is to terminate in a plug-in ceiling rose or three pin plug and socket sited on the soffit and a short length of 3 core white circular silicone rubber flexible cable is to be taken into the fitting via a suitability protected opening (e.g. use of grommets etc.).

All diffusers shall be manufactured in light stabilised plastic such as polycarbonate.

All control gear for luminaries shall be either electronic ballast or high frequency unless otherwise specified.

Any existing luminaries to be re-utilised within an installation shall be cleaned, overhauled and re-lamped.

2.28 MOUNTING HEIGHTS OF EQUIPMENT

Mounting heights of all equipment are important and the Contractor shall take considerable care in this respect. The following schedule of heights shall normally apply, but where it is desired shall differ from these, special instructions will be as contained in the various sections of the specification or on the drawings.

In the following schedule, the heights given are from finished floor level to bottom of the equipment :-

a) Wall mounted switch and distribution equipment and the like – 1600mm to 1900mm.

b) Wall mounted control equipment – 1300mm to 1900mm.

c) Lighting switches, control switches, indicator switches and the like – 1400mm.

d) Socket outlets in labs and offices – 850mm or 200mm above bench height.

e) Socket outlets in corridors – 450mm.

f) Clock points at 2500mm.

2.29 CIRCUIT PROTECTIVE DEVICES

Fusing shall be of the cartridge type of size called for in the various sections of the Specification and on the drawings. No departure from Specification or drawing requirements shall be made without the approval of the engineer.

All circuits of 32A or less shall be controlled by miniature circuit breakers and the Contractor attention is drawn to the necessity of maintaining correct discrimination with the fuse feeding the M.C.B.'s.

R.C.D.s and R.C.B.O.s shall be used in accordance to BS 7671 and in accordance with the specification.

All cartridge fuses shall be of H.B.C., A.S.T.A. tested indicating pattern of approved manufacture.

On completion of the works, spares for all switch and distribution equipment, including switchboards, shall be handed to the engineer.

2.30 EARTHING

Main earth electrodes shall be supplied in the form of copper, steel tipped earth rod (s) of Messrs Furse manufacture or equal and approved, where supply authority earthing points are not provided. Where a point of distribution external to the main switchroom is serviced by conduit and/or trunking, a protective conductor shall be supplied and installed within the conduit and/or trunking and shall serve as the main protective conductor for the said point of external distribution, and the conduit or trunking serving the point of external distribution shall not be relied upon as part of the conductive path.

An equipotential bonding cable shall be provided between the main earthing connection point and the incoming water supply pipe, generally at its point of entry into the building.

An equipotential bonding cable shall be provided between the main earthing connection point and the incoming gas supply pipe, generally at its point of entry into the building.

An equipotential bonding cable shall be provided between the earthing connection point and accessible structural steelwork and lightening conductor system.

Maker tiles and earth rod chambers shall be supplied and installed indicating the position of earth main electrode.

Supply authority earthing blocks fitted as part of this contract shall be bonded to main earthing connection points.

On all sites where Protective Multiple Earthing (PME) is provided by the supply authority, the earthing conductor shall be connected to the consumer's earthing terminal together with the neutral conductor of the consumer's installation.

All items of electrical distribution equipment within switch rooms shall be bonded to the main earthing connection point.

Where MICC cables are used as sub-mains i.e., feeding a point of distribution external to main switch rooms, the outer copper sheath may be employed as an earthing conductor but shall be bonded direct to the main earthing connection point (switch room) and the main earth connection on the distribution equipment and cable glands.

2.31 LABELS AND CIRCUIT LISTS

Labels – labels engraved to indicate the function or usage of equipment shall be supplied and fitted as called for in the various sections of the Specification.

Labels shall be polished brass, brass finished matt chromium plated, Traffolyte or plastic as definitely specified. Lettering shall be coloured black unless specially called for the contrary, although all labels bearing wording of a warning or “Beware of Danger” nature, shall be coloured red.

Circuit lists shall be fitted in all distribution boards or equipment from which more than one circuit emanates.

Generally, circuit lists shall take the form of a sheet with circuit details typed or printed thereon in a clearly legible manner, the sheet enclosed within a cellophane envelope and the envelope attached to the inside of lid, door or cover of the distribution equipment. The size of each list shall be commensurate with the size of lid, door or cover and with the information which it must contain.

A further copy of the distribution board schedule is to be handed to the Engineer.

2.32 PAINTING

Generally, any necessary painting of work carried out under this Contract will be the responsibility of the building Contractor, but the following are exceptions where painting shall be carried out by the Electrical Contractor.

Of any work or items where particularly called for in other sections of this Specification.

Of any manufacturer's paint finish of equipment which has been marked or damaged, in which case painting required shall be in the nature of touching up and shall match the original in every respect.

Of all brackets, fixings, supports etc., in which case anti-rust painting and undercoating is required by means of zinc chromate or other anti-corrosive paint and an undercoating of light grey colour and all to be carried out before erection.

Of any externally installed metal equipment, in which case treatment after installation, shall be aluminium primer or other anti-corrosive paint, one undercoat shall be agreed on site during the course of the Contract.

2.33 TESTS ON SITE

During and on completion, the installation shall be tested by the Contractor. Tests shall be carried out in accordance with the I.E.E. Wiring Regulations. In addition, the Engineer or his representative may carry out or request to be carried out further tests to satisfy himself or any special aspect of the installation.

Tests shall include resistance of earth electrodes to the general mass of earth, earth continuity of the complete installation, and insulation resistance of all circuits. In addition, tests of protective conductors shall be carried out on all enclosed work before being closed.

The Contractor shall provide a sufficient type and quantity of all measuring equipment and labour for tests which may be required to be carried out concurrently at various points on the site. Contractor shall take every precaution to ensure the safety of his own, other contractor's personnel during periods of testing.

On completion of the test, an Inspection Certificate based upon the current I.E.E. Wiring Regulations, shall be completed by the Contractor and handed to the Engineer with two copies for the test results upon which the completion is based.

The Engineer may, at his discretion, instruct his representative to duplicate any tests and/or completion inspection with a reasonable period after the receipt of the Contractor's Inspection Certificate, in order to assess, independently, the results declared thereon.

All costs incurred because of the necessity to conduct a second test and/or inspection of incorporated or deficient work (and, if required, any and all further tests and/or inspections as may prove necessary in this respect) shall be carried by the contractor.

2.34 FINAL INSPECTION, TESTING & COMMISSIONING

Introduction.

Normal inspection and testing shall be carried out during the course of the work by the contractor's craftsmen to ensure:

- Those defacements to the paint finish of conduits are made good before being buried in plaster.
- That effective continuity is achieved between sections of conduit and/or switchgear.
- That MICC cables are effectively sealed at their terminations.
- That good workmanship prevails in all matters.
- That work does not need to be condemned after it is considered to be complete.

Any such intermediate tests that may be required during the course of the work shall be demonstrated to the Site Engineer.

Final inspection, testing and commissioning shall be carried out by the Contractor's representative after the installation is 100% complete and before it is handed over to the Client.

Format

Final inspection shall be carried out in the manner prescribed in BS 7671 - Requirements for Electrical Installations (Part 7 - Inspection and Testing) and Appendix 6.

To ensure that the conductors in an installation have been installed and connected correctly, the sequence of tests in the "Sequence of Tests Schedule" should be completed (where applicable) and witnessed by the Commissioning Engineer before the installation is energised. Some of the testing methods are described therein, but other methods may be used (with the Commissioning Engineers approval) provided they are capable of producing reliable test results.

Responsibility

The schedule listing in this section is only intended as a minimum requirement guide and it remains the responsibility of the Contractor to ensure that the full requirement of the Regulations are met in every case and circumstance.

Costs

The tenderer shall allow for the full costs of inspection, testing and commissioning within his Tender Sum.

Witness by Site Engineer.

The Contractor shall give the Site Engineer at least seven days notice, in writing of his intention to carry out the final inspection, testing and commissioning. In the event of any test indicating failure to comply, that test and those preceding, the results of which may be influenced by the fault indicated, shall be repeated and witnessed after the fault has been rectified. The Contractor will be required to measure and quote the prospective fault current at all distribution centres and distribution boards.

Test Instruments.

It shall be the Contractors responsibility to provide all test instruments and equipment necessary to carry out the inspection and testing procedures. The most recent certificate of calibration for any such test equipment shall be produced on demand, the decision to declare any instrument unfit for use will be made by the Commissioning Engineer - his decision will be final.

Factory Built Modules.

The Engineer may, if he so wishes, inspect large items of plant at works prior to delivery to site. A test and inspection certificate shall be provided for each such unit and attached to the main test and inspection manual.

Handover of Works.

The Client reserves the right to refuse the handover of any works which are not 100% complete to their satisfaction and covered by an Inspection and Test Certificate.

Manuals.

The contractor shall allow for a full test and inspection report to be included in each set of the manuals, which are to be produced at handover.

SEQUENCE OF TEST SCHEDULE.

Sequence	Test	Objective
1	Continuity of protective conductors including bonding conductors.	Verify that all protective conductors are correctly connected and electrically sound.
2	Continuity of ring final circuit	Verify continuity of phase neutral and protective conductors.
3	Insulation resistance (Minimum 1 Megohm)	Test voltage 500 volt dc (maximum) with fuses in, sockets and circuit breakers closed, appliances disconnected, lamps removed and electronics devices disconnected.
4	Insulation of site-built assemblies protection against direct contact. Insulation of site-built assemblies protection against indirect contact.	Verify insulation capable of withstanding test voltage of between 1000v to 1500v according to BS5486. Verify insulated enclosure protected to IP2X (minimum) and capable of withstanding test voltage of 1500v to 5200v according to BS5486.
5	Protection by electrical separation	Verify and test that live parts of SELV equipment is electrically separate from live parts of other circuits. The separation should not be less than that between input and output windings of safety isolating transformers.
6	Protection by barriers or enclosures during erection.	Verify by test that enclosure or barriers have IP2X or IP4X degree of protection where required.
7	Insulation of non-conducting floors and walls	Resistance of floors and walls to main protective conductor to be measured at three points to between 1-1.2m from any extraneous conductive part
8	Polarity	Test to ensure • Fuses and single pole control devices only in phase conductor. • ES lamp holder centre contact connected to phase conductor and threaded outer metal to neutral. • Correct connection of socket outlet phase conductors.
9	Earth fault loop impedance	Test earth loop impedance with proprietary test instrument. Verify protective conductor conductivity including conduits etc.
10	Earth electrode resistance.	Verify resistance of electrodes with proprietary test instrument.
11	Operation of residual current operated devices (and any fault - voltage operated devices incorporated in existing installations).	Verify by using test instrument that simulates fault conditions.

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Reception Extension & Associated Works
Employer's Requirements

Electrical Services

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Pinner Park School
Reception Extension & Associated Works
Employer's Requirements

Electrical Services

SECTION 3 – GENERAL ELECTRICAL SPECIFICATION

3 SECTION 3 – ELECTRICAL TECHNICAL SPECIFICATION 2007E/DJG

3.1 ELECTRICAL SERVICES DESIGN PARAMETERS

This contract comprises the complete Electrical Services supply, installation, design and commissioning comprising new; Lighting & Power, Emergency Lighting, Fire Alarms, Security Systems, Access Control Systems, Data Systems, rationalisation of overhead cables and Mechanical Services wiring.

The works are located on the site of the Pinner Park School, Melbourne Avenue, Pinner, Middlesex, HA5 5TL.

The Electrical Sub-Contractor shall be responsible for the **design**, supply, delivery, offloading, storage, handling, crane-age, transportation, installation, connection, testing and setting to work of all equipment, materials and fittings together with all access, lifting and safety equipment, and all labour and materials necessary to provide a complete installation as generally detailed on the Drawings and as described in this Specification – all of which comprise the Employers Requirements.

The Electrical Sub-Contractor shall be fully responsible for the design of the installation. The information provided in this specification and on the drawings are the employer's requirements. The Electrical Sub-Contractor shall satisfy himself as to the extent and as to the adequacy of the design of the electrical installation/works to meet the employer's requirements.

3.2 DESIGN.

The Contractor shall carry out a full site survey and appraisal of the existing services present, and the main plant and electrical equipment.

The Contractor shall assess the capacity of the existing services, and install new equipment where the existing is inadequate or unsuitable.

Calculations shall be carried out to assess cable sizes, lighting levels, fire detection equipment positions, security system positions, IT equipment, door access control equipment and network provisions etc. All such services calculations and proposal drawings shall be submitted for comment and approval along with the Main Contractor's design proposals prior to the commencement of the works.

The Contractor shall prepare a designer's risk assessment to support their proposals and specifically in respect to the safe operation, ongoing maintenance and future replacement, in full accordance with current Health and Safety Legislation.

3.3 SCOPE OF THE WORKS

The objective of this project is to undertake the extension to the existing main building in order to create an improved and more formal waiting area, reception desk and alternative school office access.

All existing redundant electrical services within the proposed works area, and all other associated & affected areas shall be carefully isolated, decommissioned, stripped back and removed from site.

The new installations shall be carefully planned and coordinated with the new proposed fixed furniture, loose furniture, door openings and windows, appliances, existing and proposed new M&E services, building elements and structure.

All works are to be undertaken whilst the area of the works is generally vacated by students, staff and visitors during summer holiday period initially, however the project will extend into term time when the school will/may be occupied (Covid 19 permitting).

However any work that may give rise to interruption of existing services and facilities shall be programmed in advance, and carefully planned with full liaison via the project team to ensure any out of term activities can be organised to suit.

The Electrical Sub-Contractor shall generally include for the complete supply, installation, connection, testing, commissioning and setting to work of the electrical services installation to the warehouse as detailed within this specification and on the contract drawings.

These works shall include:

- Survey of existing site electrics to determine capacities etc.
- All calculations.
- Rationalisation of over-head cabling.
- Sub-mains final circuits and ancillary circuit containment systems.
- Small power installation.
- Lighting and emergency lighting installation.
- Additions to the fire alarm and automatic detection system.
- Telephone & Data installations
- Additions to security system.
- Modifications to the allow for the enabling works to form a temporary Reception in Room 11 and subsequent re-instatement.
- Fob/card operated Access Control Systems.
- Intruder Alarms
- CCTV.
- Mechanical services power wiring.
- Earthing & bonding.
- Provision of design drawings for “approval”.
- Provision of “as fitted” drawings, maintenance manuals and test records.

3.4 CONTRACTUAL CONDITIONS

The Electrical Sub-Contractor shall act as Sub-Contractor to a Building Main Contractor. The Electrical Sub-Contractor shall refer to the Main Contractor for all Preliminary Items, programme details and shall be responsible to the Main Contractor for CDM issues.

3.5 CONTRACTOR’S DESIGN

The Electrical Sub-Contractor shall carry out a full site survey and appraisal of the existing services present, and the main plant, equipment, associated systems - and all relevant conditions which will be required and upon which the Contractor will formulate his design.

The Electrical Sub-Contractor shall meet the requirements of applicable documentation e.g. IET Wiring Regulations (BS7671), SLL Lighting Guides, CIBSE design guides, and UK Gov. Department of Education - Schools Design Guidance.

In Particular,

DoE – Technical Annex 2E “Daylight & Electric Lighting”
DoE – Technical Annex 2G “Electrical Services, Communications, Fire & Security Systems”.

The Electrical Sub-Contractor shall assess the capacity of the existing services, and install new (or modifications to existing) plant & distribution systems where the existing capacity, arrangement or location is inadequate or unsuitable, and/or as required by this specification.

The Electrical Sub-Contractor shall carry out detailed calculations to cables sizes, services loadings and plant capacity, etc, which shall be submitted in full for comment along with the Contractor’s design proposals.

The Electrical Sub-Contractor shall submit his design in the form of scaled, detailed technical CAD drawings in sufficient detail to enable his design to be adequately appraised by the Engineer, to his satisfaction.

The Electrical Sub-Contractor shall prepare a designer's risk assessment to support their designs and proposals, and specifically in respect to the safe operation, ongoing maintenance and future replacement, in full accordance with current Health and Safety Legislation.

The Electrical Sub-Contractor's design shall adhere to the requirements under the building regulations for the conservation of energy.

Additionally, the Electrical Sub-Contractor shall prepare and submit all necessary documentation required by the local planning authority in order to substantiate and demonstrate his design in respect to all applicable building regulations requirements for electrical services.

This information shall be submitted along with the abovementioned design proposal information ie drawings & supporting calculations.

The Principal Contractor shall take the lead in determining project programming & coordination for himself and all other parties.

Name of Party	Work Element	Employed by	Managed by	Programmed & Coordinated by
Principal (Building) Contractor	All Minor & Major Specified Builder's Works	Principal Contractor	Themselves	Themselves
Mechanical Services Sub-Contractor	All works within this specification & associated drawings	Principal Contractor	Principal Contractor	Principal Contractor
Electrical Services Sub-Contractor (others)	All electrical services power supplies works	Principal Contractor	Principal Contractor	Principal Contractor

3.6 TENDER DRAWINGS & DOCUMENTATION.

Architectural Information

Reference	Title	Size
19-187-PSRE-01	Extg Location Plan	A1
19-187-PSRE-02	Extg Site Plan	A1
19-187-PSRE-03	Proposed Site Setup	A1
19-187-PSRE-04	Enabling Plan	A1
19-187-PSRE-05	Demolition Plan	A1
19-187-PSRE-06	Proposed Site Plan	A1
19-187-PSRE-07	Proposed Reception	A1
19-187-PSRE-08	Proposed Administration Office	A1
19-187-PSRE-09	Proposed Link Corridors	A1
19-187-PSRE-10	Proposed Kitchen Access Corridor	A1
19-187-PSRE-11	Proposed Furniture Layout	A1
19-187-PSRE-12	Existing Elevations	A1
19-187-PSRE-13	Proposed Elevations	A1
19-187-PSRE-14	Proposed Roof Layout	A1
19-187-PSRE-15	Proposed Flooring Layout	A1

DGA Documentation

Reference	Title	Size
2007E/DJG	Electrical Services Performance Specification & Client's Requirements	A4
2007 -E01	Electrical Services – Strip out Areas & Works	A0
2007 -E02	Electrical Services – Proposed Electrical Works – Small Power, IT Etc.	A0
2007 -E03	Electrical Services – Proposed Electrical Works – Lighting.	A0
J-E300	Ambitemp "as built drawing" – Upper School Ground Floor	A3
J-E301	Ambitemp "as built drawing" – Upper School Ground Floor	A3

All drawings included within this tender invitation are intended to show the design intent for the electrical services works. The Electrical Sub-Contractor shall utilise and develop this information to provide their own 'installation' drawings as they so require in order to compose their own final design solution.

Any specific dimensions or locations of existing equipment shown should not be used for critical setting -out of the plant or equipment, but shall utilised as the outline basis to be further verified and developed by the Electrical Sub-Contractor within his coordination and installation works as required.

The Electrical Sub-Contractor shall produce his own design, fabrication and working construction drawings, which shall be presented via the Principal Contractor to the Contract Administrator (CA), and all critical comments be resolved to the CAs satisfaction prior to ordering any materials or undertaking any installation works.

The Electrical Sub-Contractor's Design Proposals shall be issued along with all supporting technical supporting calculations, included any collected third-party information and any assumptions (which shall be suitably identified as such).

3.7 ROOM DATA SHEETS

The Electrical Sub-Contractor shall include all Mechanical Engineering Services provisions required in order to meet the client's requirements as indicated on the following documents:-

Title	Reference	Location
DGA – Employer's Requirements – Electrical Services : Small Power & Fixed Equipment	RDS-E01	Section 5
DGA – Employer's Requirements – Electrical Services : General & Emergency Lighting	RDS-E02	Section 5

Should any conflict occur between the above documents then the higher quantity and/or the higher specification shall apply.

The scale shown on the drawings shall be deemed for guidance only, and shall not be relied upon for accuracy.

3.8 STANDARD SPECIFICATION - ELECTRICAL INSTALLATION STANDARDS.

The Electrical Sub-Contractor shall carry out the works in accordance with the attached Standard Specification clauses in Section 2 of this document

3.9 BUILDING CONSTRUCTION.

The Electrical Sub-Contractor shall determine all material information from site inspection, and/or architectural design drawings, as required.

3.10 THE CLIENT

The client is: -

Mick Wynne
Head of Service, Corporate Landlord Capital Programme
Commissioning & Commercial Services|Community Directorate
Internal: 7692
External: 020 8424 7692
BUILDING A BETTER
HARROW
www.harrow.gov.uk

3.11 THE SITE

The site address for the works: -

Pinner Park Primary School,
Melbourne Avenue,
Pinner,
Middlesex,
HA5 %TL

3.12 CONTACTS

All enquiries, either of a general or technical nature in respect of this tender shall be addressed to:-

Aaron Crown **EDGE Property Solutions** **Birmingham**	Tel 07484 080480	Email: aaron.crown@edgeps.co.uk
Joseph Matthews **EDGE Property Solutions** **Sheffield**	Tel 07990 039294	Email:joseph.matthews@edgeps.co.uk
David Guzzetta, **Electrical Engineer:** **DGA Consultants**	Tel 07976 808323	Email: dguzzetta@dgace.co.uk

3.13 VISITING THE SITE.

The Tenderer shall visit site before submitting his tender in order to satisfy himself as to the nature and extent of the works to be carried out, and as to all details relating to labour carriage, cartage, crane-age, storage, unloading and getting into position on site and to obtain any information on any other matters incidental to the performance of the work in the best possible manner as no allowance will be made under claims arising from expressed lack of information on any points.

Permission to visit site must be obtained from:

Aaron Crown Mob: 07484 080480
Building Surveyor
Edge Property Solutions

Queries regarding technical elements of the project should be addressed to:

David Guzzetta Tel: 01530 264166
DGA Consulting Engineers
The Croft,
1 Mill Lane,
Coalville
Leicestershire
LE67 2QH

3.14 WORKMANSHIP.

All materials supplied or work carried out shall be to the best standards available of their respective kind to ensure a first class installation to the entire satisfaction of the Engineer who shall have the authority to order the removal and replacement or reinstatement of any faulty or inferior materials supplied, or work carried out, which is not in accordance with this specification or the drawings, without additional charge to the client.

The Engineer's interpretation as to compliance with the Specification shall be final.

Unless specified other wise all work carried out or materials specified shall comply with the following codes, acts, byelaws and regulations: -

Relevant British and European Standards.

Relevant British Standard Codes of Practice.

In particular,

DfE Technical Annex 2G: Electrical Services, Communications, Fire & Security Systems (May 2020)

DfE Technical Annex 2E: Daylight & Electric Lighting (May 2020)

The Electricity Supply Regulations 1988 (as amended 1990)

The Electricity at Work Regulations.

The Low Voltage Electrical (Safety) Regulations 1988.

British Standard Code of Practice BS7671 – 18th Edition

CIBSE Guides.

CIBSE Recommendations for Lighting

Building regulations.

Fire officer Committee and Local Fire Officer Requirements.

Health & Safety at Work Act 1974.

3.15 DAMAGE TO OTHER SERVICES.

The Electrical Sub-Contractor shall take care not to damage any services not covered by this contract. Should the contractor damage any service then the Site Engineer should be informed immediately. The Electrical Sub-Contractor may be required to make good any damage at his own expense.

It is highly recommended that the Electrical Sub-Contractor carries out his own Dilapidation Survey with sufficient photographs or similar records to illustrate any existing deficiencies or damage that could be construed as arising from this project, at a later date (this shall also include a functionality test where deemed applicable).

3.16 CARE OF BUILDING FABRIC/FLOOR .

All precautions must be taken to avoid damage to floor surfaces. Conduit threading must be carried out on a ply or hardboard base and care taken that the swarf from the conduit threading is not trodden into the floor surfaces. The Electrical Sub-Contractor shall be held responsible for any floor damage caused by not observing these precautions.

3.17 CRANEAGE & DELIVERIES

The Electrical Sub-Contractor shall schedule all work requiring lifting of plant and equipment (including any site cabins, skips, stores, welfare facilities, etc) requiring the use of a permanent or mobile crane / lift / hoist for an agreed weekend or other 'out of normal hours' period, and at a time of day, and day of week to suit the client.

This is applicable for both deliveries and removals / carting away.

The Electrical Sub-Contractor shall schedule all major deliveries for a day and time during a weekend, which shall not disrupt the normal use of roadways and parking areas within the School site, or Public Roadways.

Any abnormal size deliveries shall be planned with full method statements and risk assessments plus a mini-programme for submission and agreement with the Contract Administrator.

The Electrical Sub-Contractor shall make a formal application in writing for these major deliveries and any crane'age, through the Contract Administrator, giving at least 14 calendar days notice.

Failure to plan, agree, and abide by pre-arranged deliveries and crane'age will result in cancellation of these operations, entirely at the Electrical Sub-Contractor's expense.

3.18 BUILDER'S WORK.

The Building Contractor (others) will be responsible for the carrying out of all major builder's-work.

This shall be deemed to include all work to the building's fabric, necessary in order to carry out the installation in accordance with the tender drawings and this specification, excluding; - small holes through the building fabric up to 28mm diameter (clearance) which shall be the responsibility of the Electrical Sub-Contractor.

Where holes are made in fire compartment structures, the Electrical Contractor shall ensure the final installation maintains the rating of fire resistance by means described in the relevant sub-section, or making good all holes and sections of trunking passing through fire walls with suitable materials, and caulking around services with intumescent mastic or tape, all to the satisfaction of the Contract Administrator.

The Electrical Sub-Contractor shall allow for the removal and replacement of any ceiling tiles. Any damage shall caused by the Electrical Sub-Contractor shall be rectified at the Electrical Sub-Contractor's expense.

Where any specific building works are described, the Electrical Sub-Contractor shall carry out the works and allow all required materials, attendance, labour and equipment to ensure the work is carried out in accordance with good practice and 'standard' building details, and where appropriate, in accordance with manufacturer's requirements and guidance.

Where any kind of contradiction exists, this shall be clarified before works commence, at no extra cost to the contract.

Holes required through masonry walls and concrete floor slabs shall be carried out by the method of diamond-tipped core drilling, which shall be carried out by suitably experienced specialists.

The Electrical Sub-Contractor shall make all allowance to protect the existing plant and building fabric from the resultant slurry created by this process, as appropriate.

All building details shown on drawings shall be deemed for guidance only, and are to indicate general intent, not actual arrangement or dimension, unless specifically shown as such.

The Electrical Sub-Contractor shall agree all building work details with the Contract Administrator prior to commencement of the works.

3.19 ASBESTOS

The client will have organised an Asbestos R&D Survey prior to commencement of the works on site, and will issue this as part of the project documents, to the Contractor.

Notwithstanding this, due to the vintage of the building, it is a possibility that ACM remain present within the construction materials originally used, including parts of the M&E services & sanitary installations.

The information contained in any Asbestos Survey should not be treated as definitive or exhaustive, and hence the Electrical Sub-Contractor must proceed with caution and due diligence at all times.

If the Electrical Sub-Contractor is suspicious (in advance) of Asbestos being uncovered then he shall raise his concerns with the CA in good time, and under these circumstances the testing of any suspect materials will be arranged, or be uncovered under controlled conditions by others.

If the Electrical Sub-Contractor suspects that Asbestos has been uncovered / discovered or disturbed then he shall cease all works and vacate the area immediately – The CA shall be alerted to the incident as a matter of urgency.

All materials, outer clothing and tools shall be left in position / on site until any contamination is removed & a clearance certificate is issued.

Records of personnel involved, dates and times shall be issued to the CA and must be kept for future reference.

3.20 FIRE & SMOKE INTEGRITY

The Electrical Sub-Contractor shall carry out the work necessary (including time allowance, supply and installation of all materials including employing of a specialist sub-contractor where applicable) to maintain & preserve the integrity of all fire compartment demarcation elements where his installations cross these points.

Any specialist sub-contractors engaged by the Electrical Sub-Contractor shall be suitably trained, experienced and accredited through specific license(s) for the type of work being undertaken: the specialist shall hold FIRAS certification and ASFP membership.

Where appropriate – major service route penetrations shall be given a unique reference (recorded on site via suitable label) and all information then scheduled and recorded in the Operating and Maintenance manuals & Record Drawings.

All works of this nature shall be carried out to the satisfaction of the CA

3.21 CONSTRUCTION (DESIGN & MANAGEMENT) REGULATIONS 2015

A Health & Safety Consultant has been appointed to undertake the Principle Designer (PD) role, and will be a key point of contact for all Health and Safety related matters.

The PD has provided a Pre-Construction Information Document relating to this project, which is provided separately, along with this tender information package.

The PD will pass authoritative comment upon all Risk Assessments presented by the Mechanical Sub-Contractor (via the Principle Contractor ie Builder) – who will manage and be responsible for this process.

3.22 SPECIAL WORKING CONDITIONS

A Health & Safety Consultant has been appointed to undertake the Principle Designer (PD) role, and will be a key point of contact for all Health and Safety related matters.

The PD has provided a Pre-Construction Information Document relating to this project, which is provided separately, along with this tender information package.

The PD will pass authoritative comment upon all Risk Assessments presented by the Electrical Sub-Contractor (via the Principle Contractor ie Builder) – who will manage and be responsible for this process.

3.23 RISK ASSESSMENT & METHOD STATEMENTS

The Electrical Sub-Contractor shall prepare and present a series of risk assessments and method statements (RAMS) pertinent to each aspect of his works, in each location – and present them in good time to the CA for comment.

The RAMS shall be written specifically around the works being undertaken within this project to ensure the Electrical Sub-Contractor has considered his works and operations carefully and in a considered manner.

Works shall not proceed until all comments on the RAMS from the project team have been satisfactorily resolved.

The RAMS shall form part of the documentation which the Electrical Sub-Contractor shall use to brief and instruct his operatives on site

3.24 CONNECTIONS TO EXISTING SERVICES

Prior to isolating services for the disconnection of existing electrical services or plant, or to make new connections, the Electrical Sub-Contractor shall make a formal application in writing through the Contract Administrator, giving at least 14 calendar days notice.

3.25 PROGRAMMING OF THE WORKS

The Electrical Sub-Contractor shall carry out the installation work generally in accordance with the programme and progress of the Building Contractor, in line with the key construction programme and dates.

The Electrical Sub-Contractor shall produce a detailed programme for the works and for any “shut-downs” etc. for agreement by the Engineer and Contract Administrator, before work commences on site.

3.26 CO-ORDINATION

The Electrical Sub-Contractor shall make all due allowance in his tender submission for the co-ordination of the entire electrical services installation and shall always make due allowance for appropriate maintenance accessibility with regard to the new and existing services.

The Electrical Sub-Contractor shall determine the final location and routing of all services and shall provide any relevant information to others in the construction team in good time.

The Electrical Sub-Contractor shall ensure that the installation is co-ordinated to the best possible standard and to the satisfaction of the Engineer and Contract Administrator.

Demonstration of this is required by the production of working installation drawings by the Electrical Sub-Contractor.

Additional information from other trades or from site shall be obtained directly by the Contractor.

3.27 SUB CIRCUIT WIRING

LSF served single cables shall be **installed flush** throughout the installation routed in new containment systems to the standards detailed in Section 2 of this document.

LSF served single cables shall be installed flush throughout the installation routed horizontally in new containment systems. Lighting cables shall be 1.5 mm^2 generally protected at 10A. General small power cables shall be 2.5 mm^2 protected at 32A. Circuits

shall be wired as indicated on the drawings and shall be from the a new Distribution Board system.

All socket outlets shall be wired to the high integrity earth standard (dual earths). All circuits shall be protected by RCBo's.

The installation shall be wired flush throughout and shall generally be LSF served cables routed in a conduit/trunking containment system. The cable shall be delivered to site on reels, with seals and labels intact and shall be of one manufacture throughout the installation.

The wiring of the installation shall be carried out on the loop-in system, i.e., wiring shall terminate at definite points and no intermediate connections will be permitted. Cables shall not pass through or terminate in lighting fittings.

All recessed lighting shall be connected to a Klix type connection system, maximum length of tails shall be 1.5 metres.

Unless otherwise directed by the Engineer, lighting switches shall be located adjacent to the closing side on single doors (not shown on DGA drawings). Cables shall be segregated according to I.E.E. Regulations (18th Edition).

3.28 MOUNTING HEIGHTS

The mounting heights, colour coordination etc of electrical equipment and accessories shall be fully compliant with Building Regulations and the DDA requirements.

3.29 EARTHING AND BONDING.

The Electrical Sub-Contractor shall allow for earthing and bonding as required by BS7671 to the whole installation. The Electrical Sub-Contractor shall allow for high integrity earthing to all socket outlets (dual earths).

3.30 LABELLING.

At the distribution board a typed PVC sealed circuit list shall be supplied and fixed on the wall adjacent the existing distribution boards. The list shall state clearly the details of the circuits including room numbers and accessories/equipment supplied.

On the cover of the distribution board, fuse switch or switch-fuse a Traffolyte label (or similar) shall be fixed and engraved in 8mm characters, giving details of the point of supply, supply cable size, service designation, circuit reference and phase etc.

Also all socket outlets, fused switched connection units etc. shall be labelled with a circuit reference indicating outlet identification number and source of supply/connection.

All switched fused connection units shall be fully labelled to indicate their use (e.g. "Water Boiler", "Heating Pump" etc.).

NOTE!

The present Distribution Charts in the Infant School are incomplete and require to be updated. The Electrical Sub-Contractor shall allow for full site investigations regarding the 2nr Distribution Boards (18way TPN and SPN Board) in the Infant School and shall fully test and update the distribution charts) to periodic test standard.

3.31 TESTING & COMMISSIONING.

The contractor shall carry out and successfully complete all electrical service tests and commissioning procedures as detailed in Section 3 of this specification for both installations once the installation works are complete.

It is intended that a period of time will be allocated towards the end of the Main Contract programme for the final commissioning and witnessing of the engineering services tests by the Trust's Site Engineer.

3.32 AS BUILT DRAWINGS AND MANUALS.

The Electrical Sub-Contractor shall record the exact installation detail of all electrical engineering services on all floors affected and shall produce record drawings at 1:50 scale of the general layout within the building, detailing the following information: -

Location of all electrical equipment and accessories including full circuit references.

Schematics and wiring diagrams.

Service manuals as detailed in Section 1.

Record drawings and manuals shall be submitted to the Site Engineer for final approval **prior** to the handover of the works.

The Electrical Sub-Contractor shall provide four full sets of documentation (3 sets for the Client and one for the Planner Supervisor). The four manuals, one full set of record drawings produced on Auto-Cad DWG file, one set printed on transparent polyester film and four on paper, shall be issued to the Engineer by the Electrical Sub-Contractor at handover of the works.

The requirements for the CAD layering convention are listed below and shall be strictly followed;

Layer Number	Layer Title	Colour	Comments
1	Original Base	Black/White	Identifying existing walls, windows, doors, sanitary ware, external surfaces
2	Revisions	Red	Identifying where existing walls, windows, doors, sanitary ware, have been modified, dotted if removed.
3	Base layer	Black	Original Base layer modified to new layout of walls, windows, doors, sanitary ware, external surfaces
4	Furniture	Brown	Identifying proposed positioning of loaded equipment.
5	Lighting	Amber	Identifying all new light positions and switching together with schedule of types and circuits
6	Power	Green	Identifying all new outlets and switching together with schedule of types and circuits.
7	Ventilation	Magenta	Identify any supply and extract, duct work and plant
8	Hot Water	Cyan	Position and run of all new hot water services, including valves, pipe sizes, connection to existing main.
9	Cold Water	Blue	Position and run of all new cold water services, including valves, pipe sizes, connection to existing main.
10	Medical Gases	Magenta	Position and run of all new services, including valves, pipe sizes, connection to existing main etc.
11	Fire Alarm	Red	Identifying all new detectors, call points, sounders and panel etc. Reference schedule for installation and identification of monitoring point. All fire compartment walls to be over marked in solid red, sub compartment walls to be over marked in dashed red, including doors.
12	Security	Red	Identifying all new security locks, intercoms, cameras etc. Reference schedule for installation and identification of monitoring point.
13	Text	Black/White	All text and page layouts / boundaries

The issue of the above documentation is part of the "work to be done". The hand-over of the installation will not be accepted without the all of the above documentation in place.

3.33 VARIATIONS.

The Electrical Sub-Contractor tendering the lowest price for the works shall be required to return a schedule showing all quantities, labour and material costs, within fourteen days from the date of request. The complete schedule of rates shall equate to the Tender Sum. The priced schedule shall form the Schedule of Rates upon which the cost of any variations or extras shall be based.

SECTION 4

Pinner Park School

Reception Extension & Associated Works

Employer's Requirements

Electrical Services Work to be Done

4 ELECTRICAL SERVICES – WORK TO BE DONE

4.1 GENERAL

The Electrical Sub-Contractor (ESC) shall allow in his tender submission for the design and installation of the whole of the works described in this specification including the supply of all materials and fixings necessary to complete the installation to the Contract Administrator's satisfaction and as described on the drawings and in this document.

The Electrical Sub-Contractor shall allow for a complete and fully tested electrical installation and shall include for all items described in this specification and as indicated in the Electrical Room Data Sheets in Section 6 as follows:

RDS-E01 Electrical Services – Small Power.- Ground Floor
RDS-E02 Electrical Services – Small Power – 1st Floor

The items indicated in Section 6 are the minimum requirements and only detail small power and lighting, the Electrical Sub-Contractor shall allow for any other items required to complete the installation. The Electrical Sub-Contractor shall allow for any additional power supplies to PSU's, fire alarm, door access and security interfaces as required by the data network, Access Controls, security and fire alarm sub-contractors.

4.2 STRIPPING OUT

The Electrical Sub-Contractor shall allow for the complete stripping out of all items rendered redundant by the new works described in this specification and as indicated on the Architect's drawings. An indication of the required strip out is indicated on the drawings.

The Electrical Sub-Contractor shall make all necessary disconnections to the general electrical and fire alarm system etc. to ensure that the areas identified on the drawings can be demolished safely. The Electrical Sub-Contractor shall take particular care in the areas of the existing Main Infant & Junior School buildings where the structure is to be demolished to allow for the new installation.

The Electrical Contractor shall satisfy himself as to the extent of the works and allow for all necessary works, labour and materials to complete the strip out works within the tender submission. The Electrical Sub Contractor shall fully maintain electrical supplies to all adjacent occupied areas whilst the installation works are in progress.

As indicated on the drawings the Computer Room (Room 11) is to reconfigured as a temporary entrance while the works are being carried out. The Electrical Sub-Contractor shall allow for the removal of the temporarily redundant electrical services to allow for the installation of the new entrance and internal access doors. When the main works are complete the Electrical Sub-Contractor shall allow for the complete re-instatement of the temporarily stripped out electrical services to return the Computer Room to its original condition. The Electrical Sub-Contractor shall ensure that a minimum of 3x data and 2x telephone points are available for the temporary Reception Desk. It is envisaged that the original electrical services will be utilised for this purpose.

4.3 CABLE ROUTES & TRUNKING

Cables shall generally be routed horizontally in new trunking/tray containment system which is generally to be installed in the ceiling voids. Drops to accessories shall be buried in the fabric of the building protected by PVC conduit throughout of Marshal Trufflex or MK manufacture. Unsupported cabling will not be permitted.

The Electrical Sub-Contractor shall allow for containment for any mechanical controls installation including back-boxes for sensors etc. The Electrical Sub-Contractor shall liaise

with the Mechanical Contractor to determine all requirements and shall include for all items in the Tender Submission.

4.4 OVERHEAD CABLES

Part of the area between the two buildings appears to be served by over head cables which are routed into the works area, passing over the proposed roofing from an existing “telegraph pole”. The Electrical Sub-Contractor shall allow in the Tender for rerouting the cables over the proposed new roofed areas and also shall allow for stripping out of any redundant cabling and for refixing and making good of any cables to remain, to the new roof structures.

The cables currently appear to be routed into the Infant School at various points along the route where the new construction is to take place (see drawing). The Electrical Sub-Contractor shall consult with the IT Network Cabling, Fire Alarm and the Security Systems Contractors (in Sections 4.9, 4.10, 4.11 & 4.12) to determine the nature of the cabling (i.e. redundant or in use) and develop a practical solution.

The Electrical Sub-Contractor shall ensure that the services served by the cabling are maintained fully operational at all times and shall notify the Contract Administrator to arranged for any necessary shut-downs/interruptions of service etc.

4.5 GENERAL POWER INSTALLATION.

Accessories shall be of MK manufacture in white plastic finish unless stated otherwise.

Distribution equipment shall be of the following manufacture:

- Interior Switch-Fuses/Switch Disconnectors – Square D Twin break.
- Exterior Switch-Fuses/Switch Disconnectors – Telemechanique Vario
- Distribution Boards – MEM or Merlin Gerin Isobar range.

4.6 LIGHTING INSTALLATION.

The Electrical Sub-Contractor shall allow for the design, supply and installation of a complete lighting installation as detailed in this specification and on the drawings. The design of the lighting installation shall be fully compliant with the Building Regulations (Part L) and with the CIBSE lighting recommendations and Lighting Guides.

All luminaires on suspended ceilings shall be wired utilising the retained plug & socket systems (Rock-Ashley Klik); tails shall be a maximum of 1.5 metres long.

Lighting switches shall be of the “grid switch” type and shall be of white plastic finish and shall be DDA compliant.

All luminaires shall be low energy, efficient LED types throughout.

The lighting requirements are indicated on the drawing 2007-E03. The Electrical Sub-Contractor shall carry out the necessary calculations to achieve the lighting levels required with luminaires as described. The lighting calculations shall be issued to the CA and the types of luminaires agreed as part of the drawing and documentation approval process.

The Electrical Sub-Contractor shall allow for new lighting switches of the MK grid pattern generally switches shall be two way/intermediate where appropriate.

4.7 EXTERNAL LIGHTING

The Electrical Sub-Contractor shall allow the design and installation of external lighting as indicated on the drawings. The external luminaires shall be controlled by a local over-ride switch complete with Photo-Cell and 24/7 Timer Unit.

4.8 EMERGENCY LIGHTING INSTALLATION.

The Electrical Sub-Contractor shall allow for a complete emergency lighting installation designed and installed fully compliant with BS 5266 and the Building Control, local Fire Officer and Statutory Requirements.

Luminaires shall be of miniature LED type flushed into the ceilings where appropriate. The luminaries shall be of Thorn, Thorlux, Dextra or of approved equivalent.

The system shall be wired to the manufacturer's requirements with individual luminaries monitoring the local lighting circuit. Testing shall be by test key switches

The Electrical Sub-Contractor shall allow for full commissioning by the emergency lighting system manufacturer's Engineers in the tender.

4.9 FIRE ALARM INSTALLATION.

The Electrical Sub-Contractor shall allow for a complete Fire Alarm System designed and installed fully compliant with BS 5839 and the Building Control, local Fire Officer and Statutory Requirements. The Fire Alarm System shall be designed by a BAFE qualified Operative who shall commission the full system and provide, at handover, a completed compliant fire alarm certificate. Note that the Fire Alarm Panel is located in the corridor adjacent lobby to the Main Reception Area (not shown on drawings)..

The wiring shall be in either Firetuf or Pirelli FP200.

The ESC shall allow for the following:-

- ensure that the Fire Alarm System to the remainder of the School is maintained 100% operational at all times.
- initial strip out of the Fire Alarm Services to allow for demolitions.
- works to facilitate the temporary Reception in Computer Room 11.
- The fire alarm system shall be fully operational in the site area after the Contractors have left site.
- All interfaces required for the door access systems and auto door to Main Reception.
- The fire bell system shall also be integrated with the Lesson Change Annunciator System if required

The Electrical Sub-Contractor shall liaise with all other parties to ensure that all items requiring interface units etc are included.

The Electrical Sub-Contractor shall allow for all necessary wiring and modifications to fully integrate the new elements of the fire alarm system into the existing site system.

The existing fire alarm systems serving the adjacent areas shall be maintained operational at all times.

The fire alarm components and site specific wiring information shall be obtained from the Harrow Council and Pinner Park School's current Fire Alarm System Maintenance Contractor, name and address as follows:

RGE Services Ltd,
The Nurseries,
Gravel Lane.
Chigwell,
IG7 6BZ

Contact: Jamie Bell
Tel. : 020 8559 8686
Email : Jamie@rgeservices.co.uk

The Electrical Sub-Contractor shall allow in his tender for commissioning by RGE Services' Engineers. The Electrical Sub-Contractor shall allow in his tender for attendance during commissioning of the Fire Alarm System.

4.10 DATA & TELEPHONE INSTALLATION

The Electrical Sub-Contractor shall allow for the complete design & installation of Category 6 cabling and outlet plates to all data points required by the new installation. The cables shall be routed along a new containment system through to the existing IT Patch Cabinet which is to be located as indicated on the drawings. The Electrical Sub-Contractor shall also allow for the necessary strip out and reinstatement works for the temporary Reception and for all new telephone requirements.

The Electrical Sub-Contractor shall include for all necessary data installation links to integrate the Access Control System into the Main School System (to include fire alarm interfaces).

The Electrical Sub-Contractor shall ensure that all cables are adequately labelled at both ends and fully tested.

The Electrical Sub-Contractor shall allow in the Tender for the wiring and installation to be carried out by Beebug Ltd.

In order to complete the installation the Electrical Sub-Contractor shall allow for the following

- All necessary 230v power supplies.
- Any containment through the building and for any back boxes required etc.
- Attendance during commissioning.

Contact details as below:-

Beebug Ltd
Unit B1,
The Courtyard,
Alban Park,
St. Albans,
Hertfordshire,
AL4 0LA

Contact: Jimmy Varnadviees
Tel. : 01727 840 303
Email : jimmy@beebug.co.uk

4.11 ACCESS CONTROL.

The Electrical Sub-Contractor shall allow for the design, installation, setting to work and commissioning of the access control system including the supply and installation of any additional local control panels, power supplies etc. to the doors as indicated on the drawings. The system shall fully integrate with the Fire Alarm and Intruder Alarm Systems and be suitable for actuation by fobs/card readers. The Electrical Sub-Contractor shall supply a pack of 100 fobs or cards to be handed to the school at handover.

The Intercom system shall be provided by Beebug Ltd.

The Electrical Sub-Contractor shall allow in the Tender for the Access Control System to be provided by the following Supplier:-

Beebug Ltd
Unit B1,
The Courtyard,
Alban Park,
St. Albans,
Hertfordshire,
AL4 0LA

Contact: James Varnadviees
Tel. : 01727 840 303
Email : support@beebug.co.uk

The Electrical Sub-Contractor shall allow for all necessary attendance as required and for commissioning by the “Beebug Ltd” engineers.

4.12 CCTV & SECURITY SYSTEM

The Electrical Sub-Contractor shall allow for the design, installation, setting to work and commissioning of the additions to the CCTV & Intruder Alarm system including the supply and installation of any additional local control panels, power supplies etc., the devices indicated on the drawings are indicative. The Electrical Sub-Contractor shall include for all necessary security system links to integrate into the Main School System. A new secondary keypad is required at the new Infant School Entrance.

The security alarm & CCTV components and site specific wiring information shall be obtained from the Pinner Park School's current Security Alarm System Maintenance Contractor, name and contact details as follows:

Ambush Security,
Copthall Farm,
Breakspear Road South,
Uxbridge,
Middlesex,
UB10 8HB

Tel. : 01895 632 688
Email : ambush-security.co.uk

The Electrical Sub-Contractor shall allow in his tender for commissioning by Ambush Security's engineers. The Electrical Sub-Contractor shall allow in his tender for attendance during commissioning of the Security Alarm System.

4.13 MECHANICAL WIRING

General

The Electrical Sub-Contractor shall include for the supply and installation of the wiring, containment, accessories and final connections to mechanical plant etc. required to complete the installation. The general accessories, switchgear etc. and wiring shall generally be by the Electrical Sub-Contractor.

The drawings indicate the wiring and accessories required and the responsibilities of each of the Contractors for most of the works envisaged.

The final connections shall be by the Electrical Sub-Contractor.

The Electrical Sub-Contractor shall liaise with the Mechanical Sub-Contractor to ensure that the following electrical installation works for mechanical services are included in the tender submission such that all systems are complete including; containment, for mechanical controls, power supplies, etc. are included. The Electrical Sub-Contractor shall ensure that all items are allowed for in the tender submission. Any additional payments requested due items of equipment or labour not included due to the lack of effective liaison between the Electrical and Mechanical Sub-Contractors at the tender stage will not be accepted.

The mechanical systems include but are not limited to, the following:

Strip out electrical wiring and make safe for removal:

- Overdoor heater (all electric)
- Extract fan (Store 2)
- Water heater (Store 2)

Allow for new electrical supplies for the following,:-

- Overdoor heater (LTHW)
- Comfort Cooling (004 Admin)
- Extract Fan (002 WC)
- Extract Fan (Existing WC)
- Radiant Electric Heating & Controls (006 Circulation)
- Radiant Electric Heating & Controls (009 Circulation)

- MVHR Unit c/w Electric Heater (004 Admin / 013 Private Office)
- LTHW CT Pump in Boiler house

The Electrical Sub-Contractor shall liaise with the Mechanical Contractors Designer's to determine the electrical loads, containment requirements etc.

Electrical Services

5 TENDER SUMMARIES

TENDER SUMMARY- 2007E/DJG

Stripping Out/Make Safe for Demolition	£…….....
Rationalisation of Overhead Cables	£…….....
Small Power Installation	£…….....
Temporary Reception Works	£…….....
Lighting & Emergency Lighting Installation	£…….....
Emergency Lighting Installation	£…….....
Fire Alarm System	£…….....
Access Control Installation	£…….....
Security & CCTV Systems	£…….....
Telephone & Data Installation	£…….....
Testing, As-Built Drawings & Manuals	£…….....
Mechanical Services Wiring	£…….....
Sub-Total	**£**
Main Contractor's Discount 1/39	£…….....
TOTAL TENDER SUM	**£**

Signed ……..……. Company ……..……

Position ……..……..…… Address ……

……..…… ……

Date …… ……

6 SCHEDULE OF ELECTRICAL SERVICES REQUIRED

Pinner Park School
Reception Extension & Associated Works
Employer's Requirements

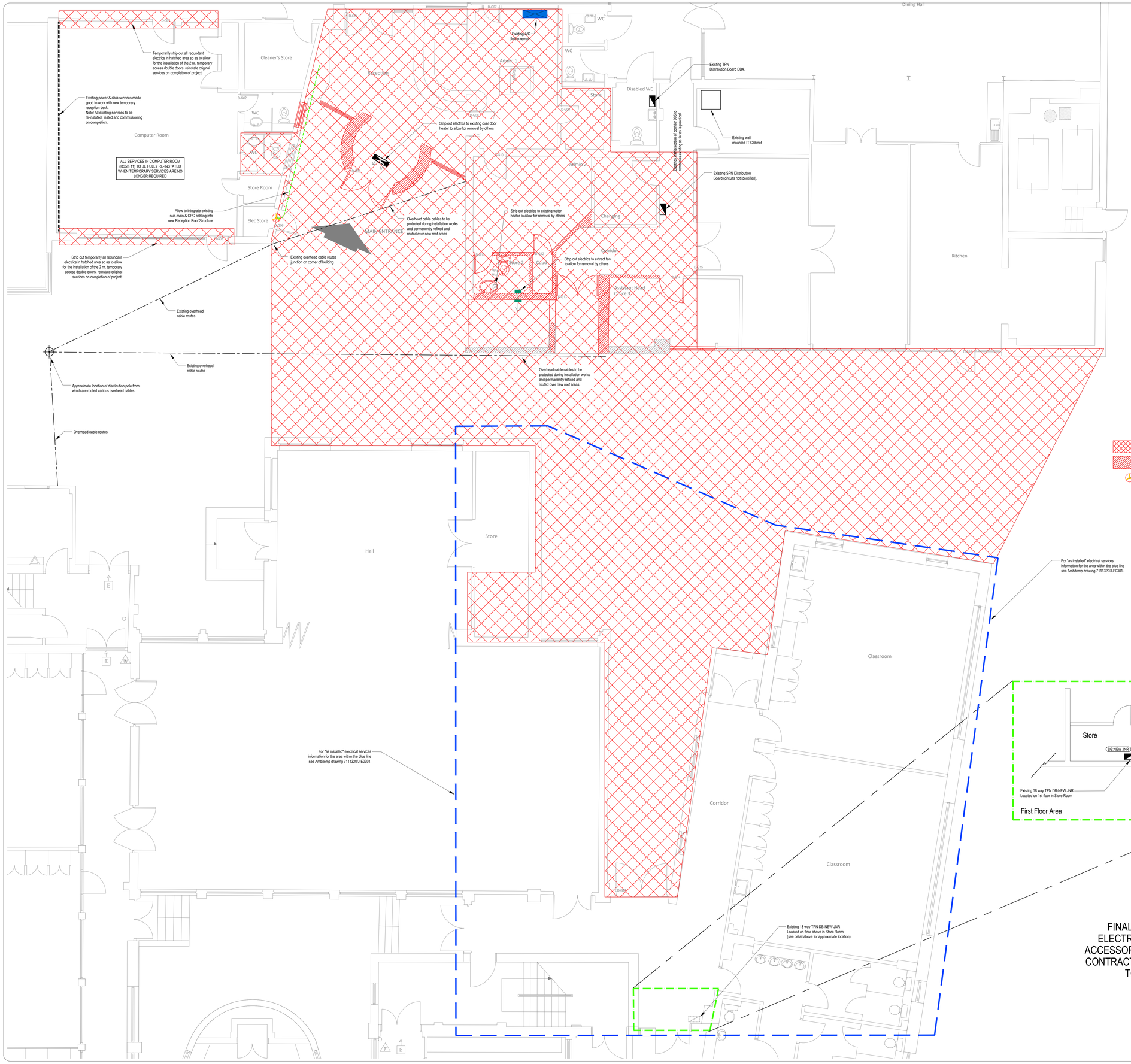
RDS-E01	Electrical Services – Small Power.
RDS-E02	Electrical Services – Lighting

Pinner Park - Reception Extension
RDS - E01
Small Power & Fixed Equipment

Room No	Room Name	Cleaner's Socket (adj doorway)	Twin Switched Socket Outlet	Twin Switched Socket Outlet & High Integrity Earth	Fused Spur Connection Unit	RJ45 Data Points	Telephone Point	High level W/Fi Unit	Door Access Control System	Dado Trunking	Intruder Alarm System	CCTV System	Fire Alarm System	Provision for Video Screen	Containment for Mech Controls (Stats,Sensors etc.)	Disabled WC Alarm System	Vandal Restsant Hand Dyer	Distribution/Containment for Power & Data	Comments
1	Reception	2		12	10	12	2	✓	2	✓	✓	✓	✓	✓	✓			✓	Power access control, FAI PSU's. Auto Doors etc.
2	Visitor WC	2											✓				✓	✓	Supply & Fix Dyson Blade Hand Dryer
3	Reception Admin Office	1		6		4	3	✓		✓			✓					✓	Existing a/c unit to remain
4	Administration Office	3		11	3	7	6		1	✓			✓	✓				✓	Power for new a/c unit & MVHR Unit
5	Photocopying Area	1		1		1							✓					✓	
6	Circulation	2				2			2		✓	✓	✓	✓				✓	Power for ceiling Heating
7	Covered Circulation	2			6				1		✓		✓					✓	
8	Office	1		2		1		✓					✓					✓	
9	Circulation - Infant School Corridor	5			2				✓			✓	✓					✓	Power for ceiling Heating
10	Hall/Lobby	1											✓					✓	
11	Computer Room/ Temporary Reception			3				✓	2		✓		✓					✓	Existing services to be re-used & reinstated at end of Project
12	Reception Admin Office Store	1											✓					✓	
13	Private Office			4		2		✓		✓			✓						
14	External											✓							Power to a/c unit on roof. CCTV Camera

Pinner Park - Reception Extension
RDS-E02
General and Emergency Lighting

Room No	Room Name	Maintained Illumination - Lux	Display Lighting	Height of Working Plane (M)	Glare Index	Colour Rendering (Ra)	VDU Compatible	Flush (F) or Surface (S)	Emergency Lighting to BS5266	Em. Ltg Test Key Switch	Comments
1	Reception	300	✓	0.70	25	80		F	✓	✓	2 way & Inermediate switching, Colour of luminaares to be agreed (black or white)..
2	Visitor WC	200		0.70	19	80	✓	F	✓	✓	PIR Control
3	Reception Admin Office	400		0.70	19	80	✓	F	✓	✓	2 way switching c/w em ltg test switch as required
4	Administration Office	400		0.70	25	80		F	✓	✓	2 way switching c/w em ltg test switch as required
5	Photocopying Area	200		0.70	19	80	✓	F	✓	✓	2 way switching c/w em ltg test switch as required
6	Circulation	200		0.70	19	80	✓	F	✓	✓	2 way switching c/w em ltg test switch as required
7	Covered Circulation	200		0.70	19	80	✓	F	✓	✓	2 way switching c/w em ltg test switch as required
8	Office	400		0.70	25	80		F	✓	✓	2 way switching c/w em ltg test switch as required
9	Circulation - Infant School Corridor	200		0.70	25	80		F	✓	✓	2 way switching c/w em ltg test switch as required
10	Hall/Lobby	200		0.70	25	80		F	✓	✓	Emergency task ltg.
11	Computer Room/ Temporary Reception	300		0.70	25	80		S	✓	✓	Improve emergency lighting for temporary Reception
12	Reception Admin Office Store	100		0.70	19	80		F			1 way switch
13	Private Office	400		0.70	19	80	✓	F	✓	✓	1 way switch
14	External										Decorative circular HF luminaire e.g. Dextra Amenity Decorative c/w silver finish



NOTE!
As built information is not available for the Infants Schools Site and the information for the Junior school is indicative.
The Electrical Contractor shall allow for a complete survey of the whole areas to determine site conditions to formulate the Electrical Contractor's final design.

FINAL LOCATIONS OF ALL ELECTRICAL EQUIPMENT AND ACCESSORIES TO BE AGREED WITH CONTRACT ADMINISTRATOR PRIOR TO INSTALLATION

NOTES

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-	-	-

TENDER ISSUE

PROJECT
PINNER SCHOOL
RECEPTION EXTENSION
EDGE

DRAWING TITLE
Electrical Services
Extent of Electrical Strip Out

DGA Consulting Engineers Project Managers
The Croft, 1 Mill Lane, Coalville, Leicestershire. LE67 2QF
Telephone :- 01530 264166
Email :- office@dgace.co.uk

SCALE	DATE
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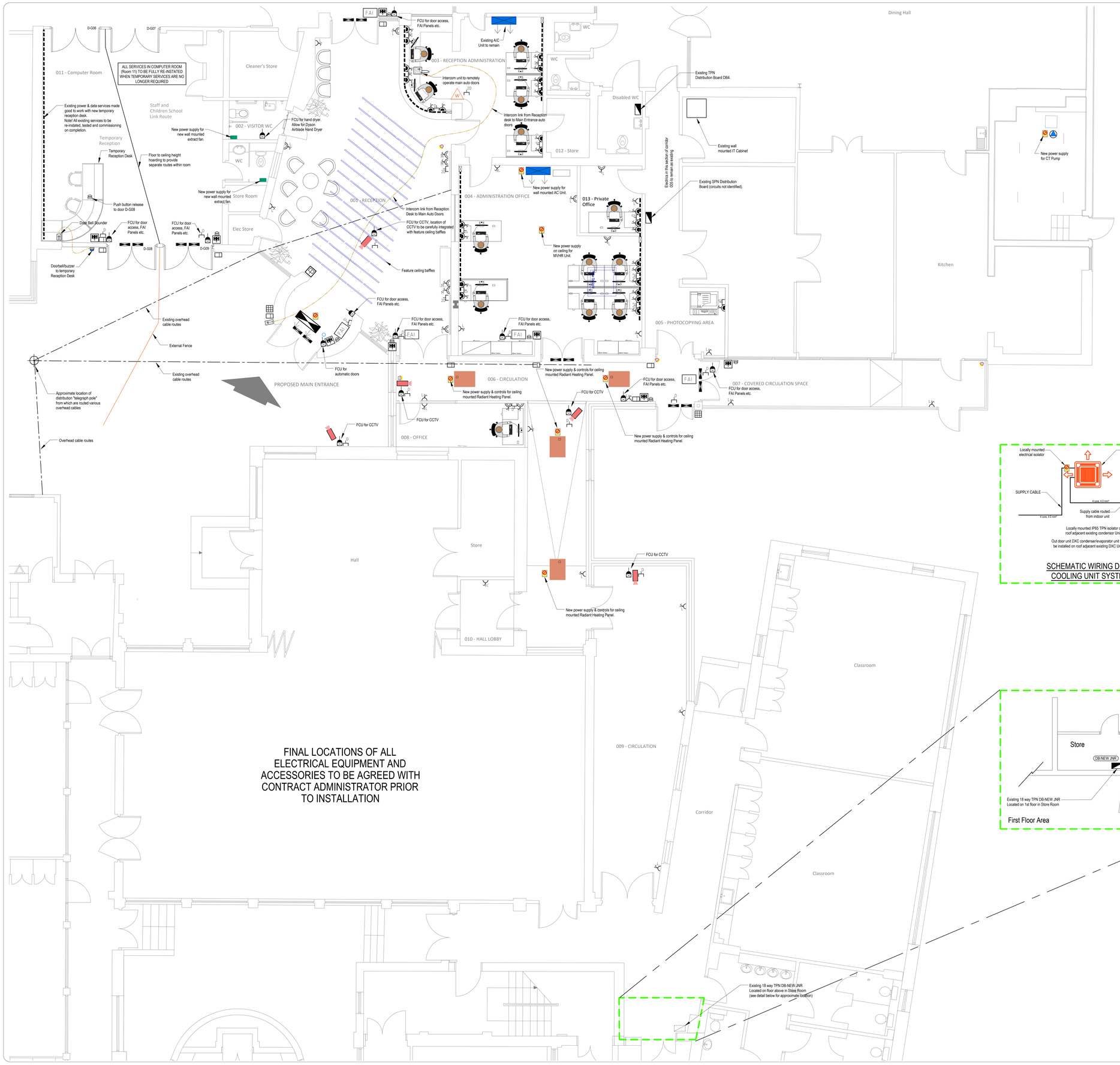
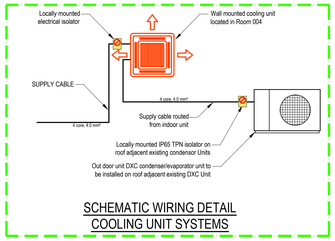
DRAWN BY: DJG	CHECKED BY:
DRAWING No: 2007-E01	Rev:A

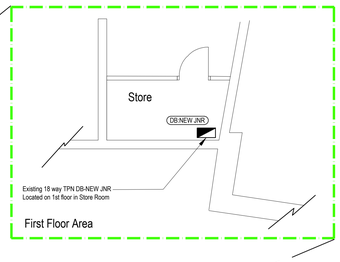


LEGEND

- Twin 13amp SSO (high integrity earth) on dado trunking or 1000mm AFFL
- Twin switched 13amp (high integrity earth) SSO @ 450mm AFFL
- Single 13amp (Cleaner's SSO) @ 450mm AFFL
- 13amp Fused Connection Unit (FCU) - Spur
- 3 Compartment Trunking Riser
- Dado Trunking
- Single Data Point for Fob Access Control
- Twin Data Point
- Door Access System Emergency Break Glass Unit
- Magnetic Door Locks
- Door Release Push Button
- Electronic Fob/Card Reader
- Secondary Electronic Keypad for Intruder Alarm
- S-Quad Optical Heat S4-710
- Fire Alarm Manual Call Point
- Fire Alarm Interface
- Intercom/Video handset for Main Entrance
- Video/Intercom Call Unit Wall Mounted
- Intruder Alarm PIR Detector
- Wall/ceiling mounted network camera c/w data point connected to School Main System
- Wi-Fi point at high level c/w twin data point connected to School Network



SCHEMATIC WIRING DETAIL
COOLING UNIT SYSTEMS



FINAL LOCATIONS OF ALL ELECTRICAL EQUIPMENT AND ACCESSORIES TO BE AGREED WITH CONTRACT ADMINISTRATOR PRIOR TO INSTALLATION

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B	05-06-20	Alterations to Room 11

TENDER ISSUE

PROJECT
PINNER SCHOOL
RECEPTION EXTENSION
EDGE

DRAWING TITLE
Electrical Services
Extent of Electrical Strip Out

DGA Consulting Engineers Project Managers
The Croft, 1 Mill Lane, Coalville, Leicestershire. LE67 2QF
Telephone :- 01530 264166
Email :- office@dgace.co.uk

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DJG	

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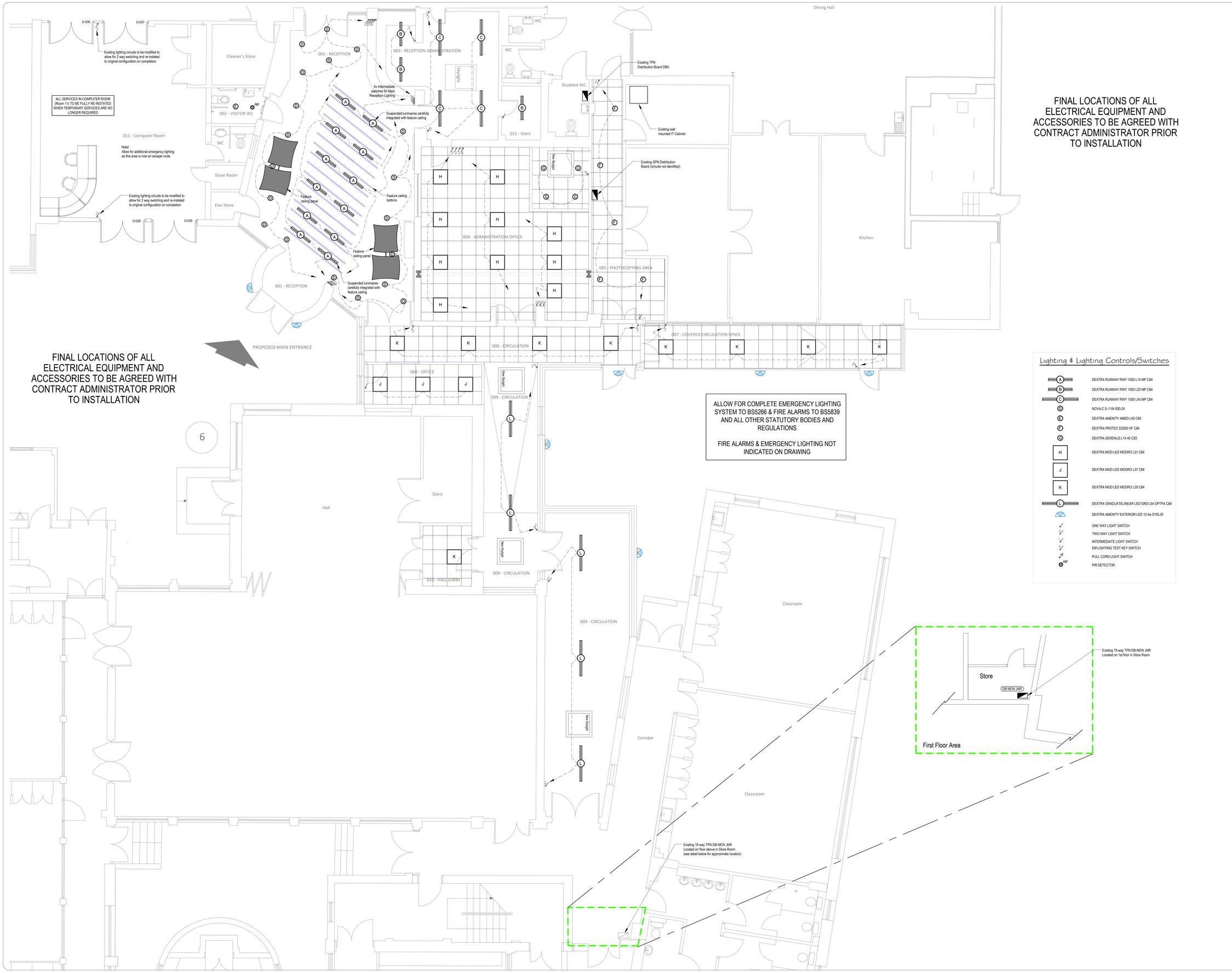
2007-E02 Rev:B



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TENDER ISSUE

PROJECT
PINNER SCHOOL
RECEPTION EXTENSION
EDGE

DRAWING TITLE
Electrical Services
Extent of Electrical Strip Out

DGA Consulting Engineers Project Managers
The Croft, 1 Mill Lane, Coalville, Leicestershire, LE67 2QF
Telephone :- 01530 264166
Email :- office@dgace.co.uk

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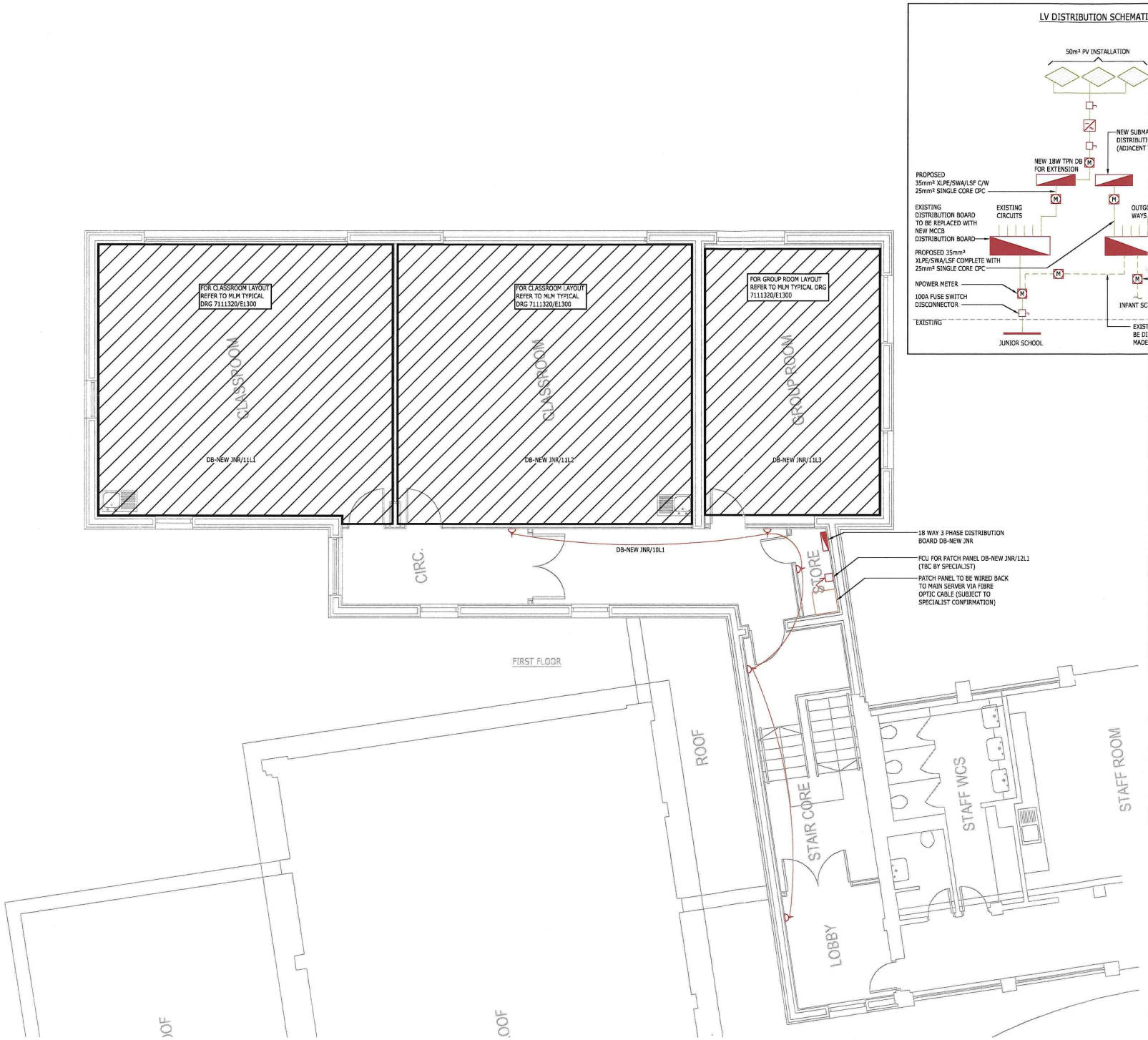
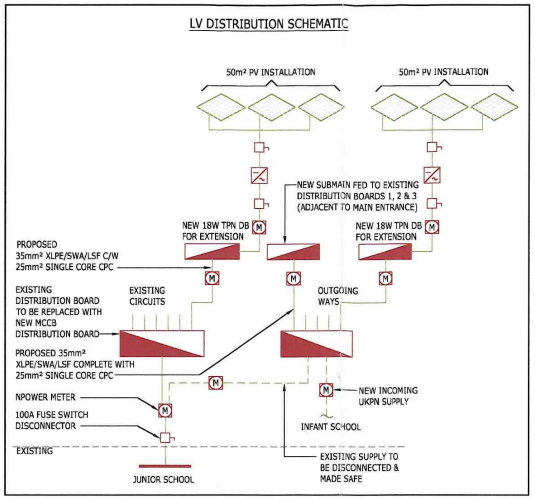
DRAWING No: 2007-E01 Rev:A





REV	DATE	BY	DESCRIPTION

DRAWING STATUS: AS INSTALLED

ambitemp
Mechanical & Electrical Building services
HERITAGE EXCHANGE, WELLINGTON MILLS, WELLINGTON STREET, HUDDERSFIELD, HD3 3HR.
TEL: 01484 485330, FAX: 01484 485331.
EMail: info@ambitemp.com, WEB: www.ambitemp.com

PROJECT: PINNER PARK JUNIOR SCHOOL

DRAWING TITLE: FIRST FLOOR CLASSROOM BLOCK SMALL POWER & DATA SERVICES LAYOUT

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PROJECT No:	DRAWING No:	REV:
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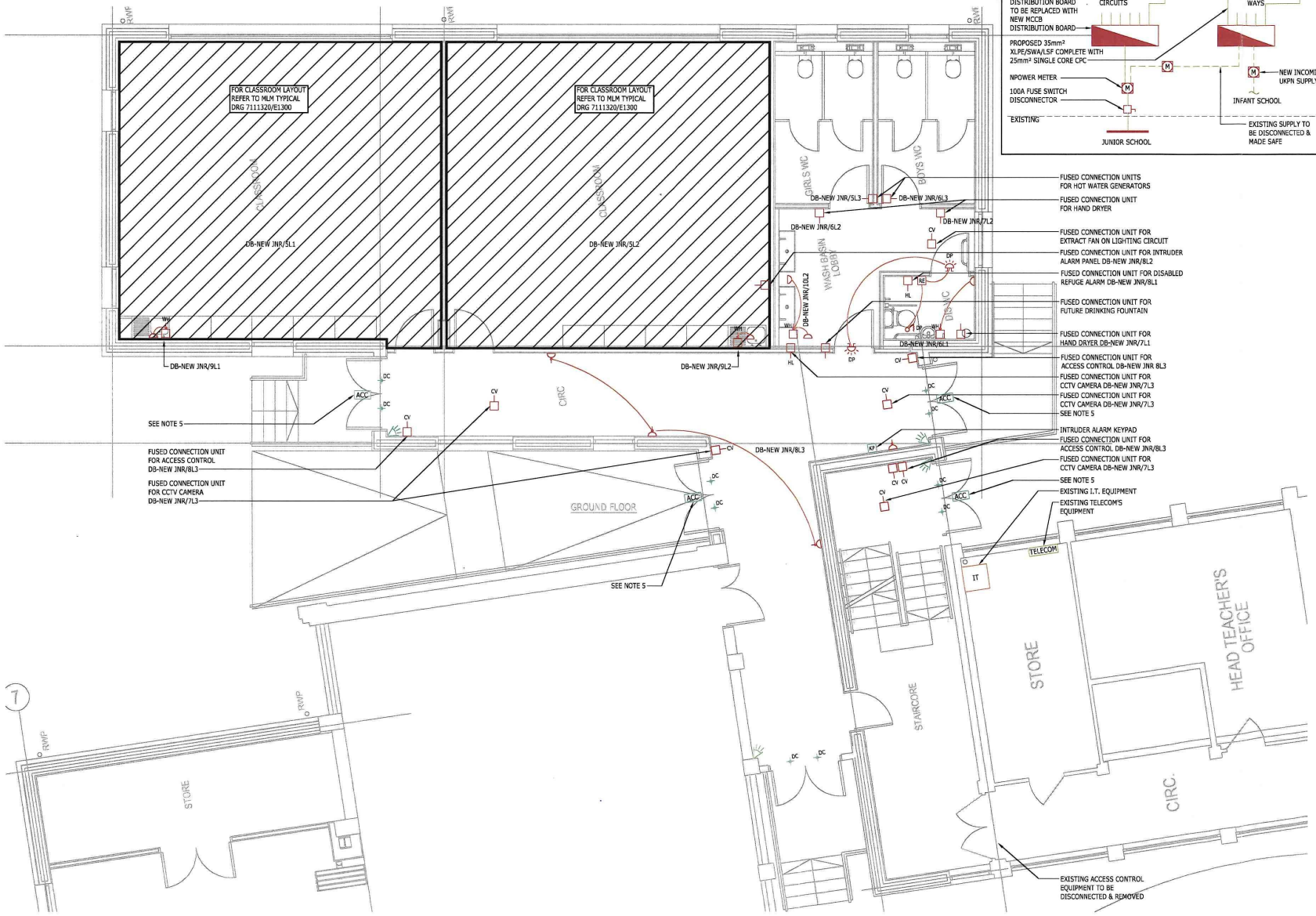

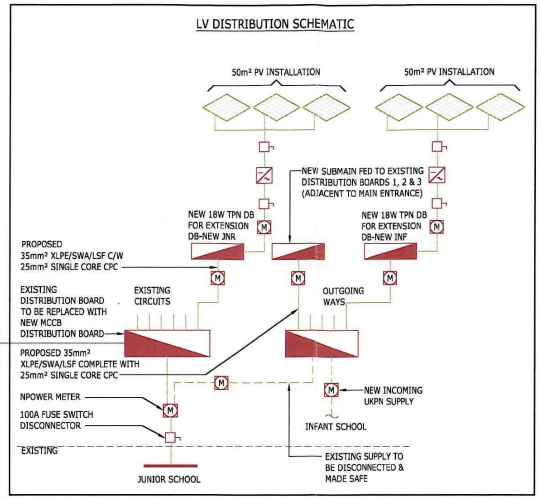

REV	DATE	BY	DESCRIPTION

DRAWING STATUS: AS INSTALLED

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HERITAGE EXCHANGE, WELLINGTON MILLS, WELLINGTON STREET, HUDDERSFIELD, HD3 3HR.
TEL: 01484 485330, FAX: 01484 485331.
EMail: info@ambitemp.com, WEB: www.ambitemp.com

PROJECT: PINNER PARK JUNIOR SCHOOL

DRAWING TITLE: GROUND FLOOR CLASSROOM BLOCK SMALL POWER & DATA SERVICES LAYOUT

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1:50 @ A1	MR		OCT'15

PROJECT No:	DRAWING No:	REV:
C2015-0428	7111320/J-E0300	-