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Revision

P03

Title

UPPER & LOWER CAMPFIELD MARKET HALL
STAGE 3 REPORT

DOCUMENT HISTORY

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1 INTRODUCTION

This report proposes the mechanical, electrical, and public health (MEP) building services engineering design strategy to RIBA Stage 3 (Spatial Coordination), including statutory utility loadings, for the refurbishment of the Upper & Lower Campfield Market Hall on behalf of Allied London.

The markets halls are historic buildings built in the late 19th century. The buildings are large open buildings with a complex roof structure with various pitches and high ceiling heights.

This document provides information on the MEP developed designs which are to be developed further as part of the RIBA Stage 4 (Technical Design) design stage.

Both market halls are large open plan building, with a large, pitched roof. The projects convert the historic market halls into office and creative space with welfare facilities, break out amenity spaces.

The site address is:

- Lower Campfield Market Hall, Liverpool Road, Manchester, M3 4FP.
- Upper Campfield Market Hall, Barton Street, Manchester, M3 4NN.

The existing mechanical, electrical and public health building services installations are dated back to the hall opening date, with sections replaced or added to over the course of the lease to the Museum of Science and Industry. The proposal is for all the existing services to be stripped back and all brand-new services installed.

2 DESIGN CRITERIA

The mechanical, electrical, and public health (MEP) building services will be designed in accordance with CIBSE Guidelines, Codes of Practice, Building Regulations and all appropriate other legislation and regulations, but will be specifically designed using the following criteria:

- British and European Standards (BSI)
- Chartered Institution of Building Services Engineers (CIBSE)
- Building Services Research and Information Association (BSRIA)
- Building Research Establishment (BRE)
- British Council for Offices (BCO)
- Heating & Ventilating Contractors Association (HVCA)
- Guidance on the Control of Odour and Noise from Kitchen Exhaust Systems (DEFRA)

MEP systems design will also be based on the following statutory requirements:

- The Building Regulations.
- Clean Air Act 1993.
- The Control of Pollution Act 1974 and Amendment Acts.
- The Construction (Design and Management) Regulations 2015.
- British Standards and Codes of Practice.
- Non-Domestic Building Services Compliance Guide.
- Domestic Building Services Compliance Guide.
- Salford Council Planning Conditions and Requirements.
- Gas Safety (Installation and Use) Regulations 1998.
- Public Health Acts.
- The Clean Air (Arrestment Plant) (Exemption) Regulations 1969.

- The Control of Substances Hazardous to Health (COSHH) Regulations.
- The Construction (General Provisions) Regulations 1961.
- The Lifting Operations and Lifting Equipment Regulations 1998.
- Public Utility Company and/or Statutory Authority regulations, specifications, and requirements.
- The Institution of Gas Engineers and Managers (IGEM).
- Best Practice Design to Minimise Legionella Risk.
- Electricity at Work Regulations.

2.1 TEMPERATURES

The following schedule states the average internal summer and winter design conditions for the spaces indicated based upon the design ambient temperature stated below.

Since there is no humidity control provided, the internal humidity will vary depending on external conditions and internal latent gains.

For the design of all thermal loads and selection of room terminal systems and equipment the following internal conditions will apply:

Lower	Summer	Winter
External	30°C db	-1°C, 90%
Ground Floor Offices	23°C ± 2°C	21°C ± 2°C
Mezzanine Offices	25°C ± 2°C	21°C ± 2°C
Public and Staff Toilets	N/A	21°C Min
Stairs / Circulation	N/A	N/A
ICT Comms Rooms	22°C ± 2°C	22°C ± 2°C
Refuse Stores	N/A	N/A
Plant Rooms	N/A	N/A

Upper	Summer	Winter
External	30°C db	-1°C, 90%
Studios & Offices	25°C ± 2°C	21°C ± 2°C
Public and Staff Toilets	N/A	20°C Min
Stairs / Circulation	N/A	N/A
ICT Comms Rooms	22°C ± 2°C	22°C ± 2°C
Refuse Stores	N/A	N/A
Plant Rooms	N/A	N/A

The following shall also be considered at part of the design process:

Item	Rate
Solar Gain	As calculated via software
Lighting Heat Gain	As dictated by lighting design or 10W/m ² whichever is the lesser
Small Power Heat Gain	25W/m ²
Metabolic Rate	CIBSE recommendations
Occupancy Density	10m ² / person

2.2 VENTILATION

Ventilation services for all other areas shall be provided in accordance with the below:

Area	Rate
Office	Natural ventilation in line with CIBSE AM10
Toilets	6 air changes/hour
Cleaners' stores	4 air changes/hour
Communal Lounges	Natural ventilation in line with CIBSE AM10
Refuse Store	Natural ventilation in line with approved document B
Plant Rooms	Natural ventilation in accordance with manufacturers recommendations

All ventilation must comply with Building Regulations Approved Document Part F where applicable.

The following shall also be considered as part of the design process:

Item	Rate
Main riser duct velocity	7.5 m/s & NR38
Main branch duct velocity	5.0 m/s & NR38
Ductwork pressure drop	1 pa/m

Ductwork classifications shall be as defined in HVCA DW/144 for General Ventilation and HVCA DW/172 for Kitchen Ventilation Systems.

Occupancy has been based on counting seats number from Sheila Birds initial interior layout designs.

2.3 NOISE

Noise levels emanating externally from plant located within or on the building will not exceed those levels set down by the by Sandy Brown, the projects acoustic consultant.

Typically, all plant is located internally, and the noise levels can be treated by attenuation and building fabric to minimise noise breakout.

Noise criterion listed within the Acoustic report takes precedence over the values listed above.

Area	Rate
External	As dictated in acoustic report by Sandy Brown

Area	Rate
Meeting Rooms Studios Individual cellular offices Zoom pods	NR35
Open-plan office space Workspaces Garden Studio Event Space	NR40
Toilets Corridor Circulation Stairs	NR45
Plant Rooms	Varies – dependent on egress limit for mechanical plant – See Sandy Brown Acoustic report
Electrical Equipment Room	NR55

Extract from Sandy Brown Acoustic report, table 11.

2.4 DOMESTIC COLD WATER

2.4.1 GENERAL

The complete domestic water services systems shall be designed in accordance with BS8558:2015 and BS EN 806-3:2006.

Item	Rate
Loading Units	BSEN 806
Up to 54mm pipework velocity	1.5 m/s
54mm and over pipework velocity	1.5 m/s

An incoming water main with a utility meter and an incoming point of isolation will be provided.

The water shall then distribute to the various appliances.

2.4.2 RETAIL UNITS

Retail units shall be provided with a dedicated metered domestic water supply.

The new account and meter installation shall be applied for by the tenant direct to United Utilities. The meter will be in a meter manifold, local to the main building incoming water meter.

The domestic water services supplies to Retail Units shall be sized based on the units being type A1. A1 units shall have staff sanitary appliances provided only.

Each retail unit supply shall be sized to deliver a minimum pressure of 2 bar at the water meter.

It shall be the tenant's responsibility to provide a domestic water storage tank within their own demise if required.

There are not retail units in Upper Campfield.

2.5 LIGHTING LEVELS

The recommended maintained illuminance levels are as follows and shall be used as general guidance, in conjunction with the illuminance levels listed within BS EN 12464:

Area	Average Maintained Illuminance	Measuring Plane Height AFFL	Limiting Glare Index
General Areas			
Comms Rooms	300/150	Floor/cabinet face	19
Plant Rooms	200	Floor	25
Risers	100	Wall at 1000	25
Staircases	100	Tread	25
Corridors	100	Floor	25
Lift Lobbies	200	Floor	25
Offices	500	Desk	19
Meeting / Board Rooms	500	Table	19
Co-Working	300	Desk	19
Store Rooms	100	Floor	25
Concierge	300	Counter	22
Refuse Store	100	Floor	22
Seating / Lounge	200	Floor	22
Kitchen / Kitchenette	500	Worktop	22
WCs	200	Floor	25

Area	Average Maintained Illuminance	Measuring Plane Height AFFL	Limiting Glare Index
Emergency Lighting			
Open Plan-anti-panic	0.5	Floor	22
Corridors-escape path	1	floor	22

2.6 MOUNTING HEIGHTS

All electrical switches and controls intended to be operated by persons working or visiting within these premises will be installed at heights in accordance with Building Regulations Approved Document Part M.

Item	Mounting Height (mm) AFFL
Sockets/Data Points/TV Outlets etc	between 400mm and 1000mm AFFL; 1400mm AFFL behind TVs.
Switches for permanently wired Appliances	between 400mm and 1200mm AFFL
Light Switches	between 900mm and 1100mm AFFL
All Controls which require precise Hand movement	between 750mm and 1200mm AFFL
Simple push button controls	not more than 1200mm AFFL
Controls which require close vision	between 1200mm and 1400mm; 1400mm to u/s for Intercoms.

Unless otherwise indicated all the following mounting heights are taken from the finished floor level to the underside of the equipment/accessory.

Item		Mounting Height (mm) AFFL
Distribution Boards		1000
Consumer Units	Switches	1350-1450
Socket Outlets	General	450
	High Level	1800
	Above Work Surfaces	150
	External	1350
Fused Connection Units	General	450
	High Level	1800
	Above Work Surfaces	150
	Other	To suit equipment served
Data/Telephone Outlets	General	450
	High Level	1800
	Above Work Surfaces	150
Light Switches		1100
Fire Alarm Call Point		1100
Fire Alarm Sounder or Beacon	Ceilings less than 2400	150 below ceiling
	Ceilings greater than 2400	2200
Security Keypad		1100

Item		Mounting Height (mm) AFFL
Security Sounder	Ceilings less than 2400	150 below ceiling
	Ceilings greater than 2400	2200
Intercom		1100
Access Control Reader	General	1100
Request to Exit Button		1100
Emergency Break Glass		1100
Refuge Call Point		900
Toilet Alarm Reset		900

3 UTILITY SUPPLIES

3.1 WATER

The existing water mains to both buildings has been stripped out back to the incoming stop cock in an earlier phase of works.

From the existing point of isolation, a meter manifold shall be installed capable of providing two meters, one meter to the main building and one to the retail unit.

From this point the domestic services, be installed and distributed throughout the properties as detailed inset and on the contract drawings.

The retail unit pipework will be installed as part of this contract, to avoid the fitout contractor having to complete disruptive works in the main building once it is occupied. However, no meter will be installed to the retail unit under this scope of work, that is the responsibility of the future occupant.

The utility aspects of the project are expected to be carried out by a utility provider and are not the responsibility of the mechanical services contractor.

3.2 GAS

There is no natural gas service proposed on this project.

The existing gas supply is to be stripped back and capped off.

The utility aspects of the project are expected to be carried out by a utility provider and are not the responsibility of the mechanical services contractor.

The existing gas mains to both buildings shall be retained. The existing gas services shall be stripped back to the stop valve.

3.3 ELECTRIC

3.3.1 UPPER CAMPFIELD

The existing ENWL supply (20kVA) to the building will require upgrading to 226kVA to cover increased power requirements of the redeveloped building.

The supply will emanate from a MOD156 unit with fuse cut-out located in a proposed electrical switchroom.

3.3.2 LOWER CAMPFIELD

The existing ENWL supply (60kVA) to the building will require upgrading to 544kVA to cover increased power requirements of the redeveloped building.

The supply will emanate from a MOD156 unit with fuse cut-out located in the electrical switchroom.

A sub-metered connections off landlords' system will be provided for each retail unit.

3.4 UTILITY LOADING ESTIMATES

ENWL provides new LV supplies only up to 300kVA. Based on load estimates for each building this requirement will be exceeded if electric radiant heating is used as the primary heating source. A new dedicated electrical substation will be required for each building to satisfy increased power requirements.

Estimated electrical power requirements based on different building heating sources:

Building	Electrical Supply	Water Flow Rates	Drainage Discharge Units
Upper	226 kVA	1.16 l/s	70DU 4.2l/s
Lower	544 kVA	0.72 l/s	30DU 2.8l/s

Lower Campfield – Radiant Panel System running cost analysis:

3.5 TELECOMS

Telecoms infrastructure provision will be via fibre and multi-pair copper cabling and will be provided to the building by Allied London's preferred telecommunications provider.

Retail units will not have dedicated telecom connections. They will share buildings broadband connection.

4 METERING STRATEGY

4.1 PART L & TM39 REQUIREMENTS

TM39 is a technical memorandum produced by The Chartered Institute of Building Services Engineers (CIBSE) aimed at promoting the best practice energy metering and sub-metering strategy and is quoted in Building Regulations Approved Document Part L 2021 as the correct metering methodology to ensure compliance with Building Regulations requirements.

The guidelines set out within Building Regulations Approved Document Part L2A are as follows:

- at least 90% of the estimated annual energy consumption of each fuel to be assigned to the various end-user categories (heating, lighting etc.) Detailed guidance on how this can be achieved is given in CIBSE TM39 Building Energy Metering.
- The output of any renewable system is to be separately monitored.
- In buildings with a total useful floor area greater than 1000m², automatic meter reading and data collection.

4.2 MAINS COLD WATER

United Utilities are providing an incoming metered mains cold water supply (MCWS) to the development as described in section 1.4.

Landlords submeters shall be provided to meter the following areas individually:

- Retail Units
- Kitchen
- Shower block
- Bar Area

Sub-metering will be in accordance with BREEAM requirements.

4.3 NATURAL GAS

There is no natural gas on this scheme.

4.4 ELECTRICITY

4.4.1 GENERAL

For all aspects of the development, electric meters will be provided to satisfy two requirements:

- I. To enable direct billing of commercial unit tenants by the landlord.
- II. To meet the requirements of Building Regulations Approved Document Part L and CIBSE TM39:2009.

Incoming mains to the switchboards will be metered by utility shipper's meters to monitor overall electrical energy usage of each building.

Each outgoing device capable of supporting a 50kW or greater supply plant will also be metered.

Supply to each retail unit including Café and office space will sub-metered via MID approved MODBUS multifunction digital meters to monitor overall energy usage and to allow tenant billing.

Lighting and power distribution boards will be split metered to allow the energy use of lighting and power loads to be determined.

Switchboard and landlord distribution board meters will be MID approved MODBUS multifunction digital meters.

All Landlords meters will be connected on a serial MODBUS LAN using Belden 9841 or equivalent screened twisted pair cabling, installed on cable containment, wired to a metering data collection system if required.

5 SPACE PLANNING & PLANT REPLACEMENT

5.1 ACCESS TO PLANT, PLANT REMOVAL AND MAINTENANCE

A separate report detailed the removal strategy for the plant will be completed during the stage 4 design. Which will more detailed information than the below such as:

- Plant Weight
- Lifting Strategies
- Access Strategies
- Risk Assessments

5.1.1 VRF COMFORT COOLING SYSTEMS – UPPER & LOWER

Indoor heat pump units will be installed to provide comfort cooling and heating to the premium office spaces.

The units will be floor standing units.

The units cannot be removed without being stripped down to smaller parts in-situ.

The condenser rooms will require double door access to allow for future maintenance of the units.

The plant is designed to be stripped down and removed by manual handling or via a pallet trolley.

5.1.2 WATER STORAGE - UPPER

The Hot Water Storage cylinders are located at ground floor level.

The cylinder will be selected so they can fit through a standard single panel door, to suit the existing plantroom layout.

There is adequate access around the tank for maintenance and pallet trolley access for removal.

Two tanks shall be installed at 50% duty so the system can be maintained well one of the tanks is being maintained.

5.1.3 WATER STORAGE - LOWER

No hot water storage. Electric point of use hot water provided only.

5.1.4 LV SWITCHGEAR INSTALLATION – UPPER & LOWER

The main LV switch boards will be of modular construction manufactured and tested off site. The boards will then be broken down into delivery modules for transporting to site where they will be manually handled into the switch rooms using skates or trolleys as appropriate.

The switchgear manufacturer will re-assemble the switch boards in their final location, re-test and commission the completed switch boards and provide the required certification to enable ENWL to energise the supplies to site.

Access to the switchrooms shall be via fire rated doors providing minimum 1200mm wide and 2500mm high openings. The switchrooms shall be

separated from the building and from each other by wall construction with a duration of fire resistance of not less than 2 hours.

Future plant access, maintenance, and eventual removal at the end of their useful life will be via this same strategy.

6 MECHANICAL SERVICES

6.1 DISTRIBUTION OF MECHANICAL SERVICES

The interior design of the scheme incorporates an industrial finish with exposed services.

The services material and finished will be worked through with the interior designer to fit the scheme.

Ductwork routes are required to serve all offices as per contract drawings.

6.2 ABOVE GROUND DRAINAGE

6.2.1 GENERAL

The tower above ground drainage system shall be a primary ventilated drainage system. Stack diameters and gradients will be calculated as previously stated in Section 2 of this report.

All stacks shall terminate via AAVs. No roof terminations are permitted on this scheme.

To facilitate maintenance access, provision for rodding access shall be included in accordance with the BS EN 12056-3:2000. Vertically stacks generally require access at the base of the stack.

6.2.2 RETAIL UNITS

A 100mmØ SVP pop up will be provided in each retail space, for future connection. These will be connected into the main external sewer with the rest of the building drainage.

Where retail units are being used for catering purposes the tenants shall be responsible for providing their own grease management systems, these typically shall be below counter above ground mechanical grease traps. The kitchen drainage and foul drainage systems shall be separate stacks.

6.2.3 RAINWATER DRAINAGE

Existing perimeter guttering shall be retained. There are no overhaul works required to this service unless the existing service requires modifying to suit the roof refurbishment work.

To facilitate maintenance access, provision for rodding access shall be included in accordance with the BS EN 12056-3:2000.

6.3 DOMESTIC COLD WATER SERVICES

6.3.1 GENERAL

Domestic water services shall be designed and installed in accordance with BSEN806 parts 1:5.

All domestic water services internally shall utilise WRAS approved plastic pipework.

The incoming supply shall enter the development at ground floor, the mains cold water supply shall directly serve the following:

- Kitchenette(s)
- Retail Unit
- Welfare Facilities

6.3.2 RETAIL UNITS - LOWER

Each retail unit will be provided with a cold water supply capped and metered at the back of the unit for future extension by the tenant.

The water supplies to the retail units shall be sized to serve sanitary appliance in accordance with the minimum requirements for sanitary appliances in line with BS 6465:2009 for a place of work.

The domestic water services supplies to Retail Units shall be sized based on the units being type A1. A1 units shall have staff sanitary appliances provided only. The unit will be provided with a 22mmØ water supply.

The tenants shall be responsible for providing their own hot water generation and pressure boosting plant if required.

6.4 DOMESTIC HOT WATER SERVICES

Hot water will be provided by local electric water heaters as described in section 1.5. All hot water outlets shall be provided with anti-scalding measures.

6.5 NATURAL GAS SERVICES

There is no natural gas supply required to this building.

6.6 HEATING & COOLING SERVICES

6.6.1 OVERDOOR AIR CURTAINS

Warm Air curtains shall be provided at the main entrance and exit doors, on the door that do not have access lobbies. If the entrance/exit doors are lobbied, then warm air curtains will not be installed.

The air curtains will be electric.

The air curtains shall be linked to an external temperature sensor and modulate heat output accordingly.

In the summer the air curtain will operate in fresh air mode to minimize the conditioned internal air escaping from the building when the entrance door is open.

6.6.2 VRF HEATING & COOLING

VRF systems are proposed in: Lower Campfield Ground floor offices and in all offices and studios within Upper Campfield.

Heating and cooling to the enclosed offices (i.e. listed below) shall be achieved by VRF heat recovery heating and cooling systems incorporating high efficiency air cooled external heat pump units.

Underfloor heating, radiators or a variety of other heat emitters could be used, however as cooling is being installed to the office areas anyway it makes sense to utilize VRF system as the heat source as well.

Internal units shall Samsung Circular cassette units.

To be reviewed with Allied London and the design team based on aesthetic preference.

External heat pump units shall be located in the plant areas provided and shall serve indoor VRF units via branch controllers (BC) located within the ceiling void at each level. Interconnecting refrigerant pipework shall be routed vertically through the building via the mechanical service risers.

The VRF Heat Recovery system shall have the facility to provide simultaneous heating and cooling to the building via the ceiling void mounted chassis type fan coil units that shall be able to switch between heating and cooling mode. The unit mode shall have one central controller with local controls in each space. The central controller shall be located within the reception or managers office (location TBC).

In Lower Campfield spatial allowance has been made for Retail Tenants VRF Condenser units if required.

6.6.3 THERMAL STRATISIFICATION

The proposal is to utilize thermal stratification fans to recirculate warm air in the winter, cold air in the summer and also to provide a cooling draught effect in the summer.

The fans will be provided with their own controller which will provide speed and temperature control.

The fans shall be positioned to service the main double height area(s).

The proposed fan utilized at planning stage are Megafans HVLS range. Megafans have been engaged on this project and are going to advise on their proposed product selections for the scheme. Please see the project ventilation drawing for the details.



Figure 1 – Example of MegaFans Air Speed Industrial ceiling fan finished in white

6.6.4 COMMS ROOM COOLING

A dedicated DX cooling unit shall be installed for the Comms Rooms.

Cooling shall be carried out by side wall mounted cooling units arranged as run/standby. Each cooling unit shall be independent and shall be connected to an individual external air cooled condenser such that failure of one system does not compromise the operation of the other. The condensers are to be located internally within the building, due to their being no external space available on the project. The plant room is

naturally ventilated and will have mechanical ventilation assistance to provide adequate air changes.

Each cooling unit shall be controlled from a wall mounted controller located within the space.

Condensate shall be collected from each wall mounted condenser and pumped to the nearest surface water drainage stack via an integral condensate pump.

Cooling associated with the Comms room shall be installed in an n+1 format to provide resilience.

Each cooling unit shall be controlled via a wall mounted controller within the space. The controller shall designate the run/standby systems and rotate them on a daily basis.

Fault on a cooling unit or associated condensate pump shall be deemed a critical alarm and the controller shall enable the standby unit.

6.6.5 RADIANT HEATING – LOWER

The Mezzanine offices shall be heated and cooled via high level radiant panels.

The radiant panels are serviced via heat pumps. Heat pumps are detailed below.

The radiant heaters shall be controlled by black bulb thermostat. These will be distributed through the Mezzanine level, approximately 3 per office “zone”.

HEAT PUMP - LOWER

A new electric, a reversible air source heat pump low providing low temperature hot water and chilled water to the radiant panel system.

Please note, the plant has to be in either heating or cooling mode, it cannot offer simultaneous heating and cooling.

Please see the contract drawing for the plant location.

A primary Air Source Heat Pump (ASHP) condenser plant shall produce low grade hot water, this then services a water to water heat pump capable of providing high temperature hot water.

This two-stage heat pump strategy is required to minimise the quantity of radiant panels at high level.

Compliance items regarding the primary ASHP the contractor shall consider at tender stage if proposing an equal or approved model:

- The proposed condenser fits in the space provided.
- Any change in sound breakout is provided to the acoustician for review (see below)
- The electrical load is provided to the electrical contractor for their information.
- Any decrease in its seasonal energy efficiency performance is highlighted to the sustainability engineer for their review

Refrigerant and associated pipe work

The system will use R32 refrigerant.

The system shall have a leak detection system supplied, installed and commissioned by the refrigerant specialist. The controller specified shall be BACNET and MODBUS compatible so it is capable of interfacing with the BMS system.

All condensers shall have anti-vibration support systems and all required equipment shall be allowed for by the Contractor for installing in this area. This is a requirement of the acoustic report, as the plant area sits directly above a Meeting Room.

Refrigerant pipework shall be installed on appropriately sized tray work in coordination with all other services.

All refrigerant pipework shall be thermally insulated with Armaflex class O insulation. All external pipework shall be insulated with weatherproof class O insulation to prevent cracking of the insulation in the long term.

All refrigerant pipe work is to be carried out in refrigerant quality soft/medium drawn copper tubing to BS EN14276:2007 (or latest version) and complete with the appropriate headers and joints.

Pipe work should be installed by an Approved (certificate approval must be submitted prior to installation commencement) Refrigerant Engineer and accordance to BSEN 378 2008 Specification. All pipe work must be suitable for R32 refrigerant.

Refrigerant (R32) charge weight must be calculated to the actual installed length of pipe work in accordance with supplier's recommendations.

The charging should be carried out with an appropriate charging station.

Pipe work to be properly fixed and supported at a minimum of 1.5 metres centres and where required should be run on tray work in a finish and layout agreed with the design team. All pipe work to be labelled with ID number (condensing unit reference) at 3 metre intervals.

Joints in copper pipe shall be brazed. Brazing shall be carried out to the requirements of the HVCA Code of Practice – Brazing and Bronze Welding of Copper Pipe and Sheet.

All control wiring shall be carried out in 2-core 1.5mm² PVC shielded cabling with colour coding and tagged with ID number at 3 metre intervals for ease of identification and maintenance.

Any control or communication wiring shall not be run next to power wiring. A minimum space of 100mm between both control and power cables shall apply.

Refrigerant leak detection system supplied by others shall be monitored for alarm status via the BACnet controller. This is to achieve BREEAM credit Pol 01.

6.7 VENTILATION

Separate reports focusing on the ventilation strategy have been produced.

Please see:

Lower Campfield – Document Reference 22_023-LC-MEP-G525-RP-XX-001

Upper Campfield - 22_023-UC-MEP-G525-RP-XX-001

7 ELECTRICAL SERVICES

7.1 L.V. MAINS DISTRIBUTION

Incoming electrical supply from the Regional Electricity Company (Electricity North West Ltd.) will terminate within a suitably rated switch disconnector within an LV Panel described below.

A single LV Panel will be provided in each building. The panel shall be 400 Volt, three phase and neutral, complying fully with BS EN 61439-1, BS EN 61439-2 and BEAMA Guide to verification of low voltage power switchgear and control gear and consisting of a hinged, lockable cabinet with a full complement of suitably rated outgoing MCCB protective devices, integral switch disconnector and sub-main cabling.

All electric meters will be multifunction digital meters to Approved Document Part L and CIBSE TM39:2009. The meters for landlords services will be integral to the main LV panel, while meters for office spaces, retail units and landlords lighting and power distribution boards will be installed within distribution boards or spaces they serve due to space constraints in the LV switchroom.

All protective devices will discriminate with upstream and downstream protective devices.

The LV panels will be sized to support the current proposed distribution requirements with 25% spare capacity provided for future modifications. Spare capacity may need to be reduced to fit in restricted LV switchroom space.

Protective devices will fully comply with BSEN 80898-1 and BSEN 60947-2 as applicable as well as all other relevant British and European Standards.

Outgoing supplies shall be derived from TP&N or 4 pole MCCBs as appropriate with either Electronic or Thermo-Magnetic protection as appropriate.

7.1.1 FINAL CIRCUIT DISTRIBUTION

New final circuit distribution boards will be ABB Protecta Plus or Schneider Electric Acti9 Isobar P B Type TP&N, complying fully with BS EN 61439 and consisting of a hinged, lockable cabinet with a full complement of suitably rated MCBs and RCBOs, integral switch disconnector and MID approved, multifunction digital meters to Approved Document Part L and CIBSE TM39:2009.

Distribution boards will be fed directly from the LV Panels.

All protective devices will discriminate with upstream and downstream protective devices.

The LV distribution system will be sized to support the current proposed site distribution requirements with 25% spare capacity provided for future development.

Protective devices will fully comply with BSEN 80898-1 and BSEN 60947-2 as applicable as well as all other relevant British and European Standards.

7.1.2 RETAIL UNIT SUPPLIES

Power supplies to retail units will be derived from the LV Panel.

Sub mains into the retail units will be terminated in an isolator located at the rear of each unit with a billable meter provided next to the isolator.

7.1.3 ARC FAULT DETECTION DEVICES (AFDDS)

Although it is not essential, we recommend (in line with 18th Edition IET Wiring Regulations - BS 7671:2022) installation of AFDD devices located alongside the MCB/RCBO devices protecting final circuits.

7.2 METERING

Refer to Section 4.4 Electrical Metering Strategy.

7.3 CABLING AND CONTAINMENT

Sub-main LV cabling will generally comprise multi-stranded copper conductor XLPE/SWA/LSF Cu cables run on cable tray and cable ladder at high level.

Lighting & small power installations will comprise multi-core, L, N & E cables, LSF cables on cable tray or multicompartment trunking installed within floor structure for multiple runs or fixed direct to the building fabric using proprietary clips. The CPC within the multi-core cables will have a minimum half CSA of the phase conductor.

Lighting and small power within the retail units will form part of the retailers fit-out.

Fire rated sub main cabling will generally comprise multi-stranded copper conductor FP600 cables installed on cable ladder, tray or trunking unless specifically indicated elsewhere. Other fire rated cabling will be Prysmian FP200 enhanced grade or equal.

Containment will comprise combinations of trunking, basket, conduit, and tray. The trunking will primarily house 230 Volt supplies in plant areas. In Lower Campfield building 3- compartment trunking will be provided within mezzanine floor structure to distribute power and data in flexible working spaces.

Containment systems will be provided for mains cables, fire alarm and emergency lighting, CCTV, data, and voice systems. Each of these systems will also involve separate conduit work as appropriate to the installations. Types and grades of containment will be appropriate to the particular service. Wherever suitable, LSOH cabling will be utilised.

All cabling within emergency escape routes, or where the method of installation would be at risk of premature collapse in a fire situation (for example installed beneath containment or fixed directly to the building fabric), will be supported in a manner that provides secure support in the event of fire, such as metal clips, metal band supports etc.

7.4 SMALL POWER

Power supplies will be provided for general and fixed electrical and mechanical services, lifts, automatic doors, etc. as required.

Accessory finishes proposed (to be confirmed with Architect and Client):

Front of House (flush)	Brushed Stainless Steel
Cleaners socket (flush, lockable)	Brushed Stainless Steel
Plantrooms	Metalclad (Surface)

For mounting heights refer to the appropriate schedule in this document.

7.5 LIGHTING AND LIGHTING CONTROLS

All lighting and switching arrangements will comply with Approved Document Part L of the Building Regulations.

Internal general lighting will be by means of suspended, recessed and surface mounted luminaires, utilising LED light engines of colour temperature 4000k in back of house areas and plantrooms, and 3000K to front of house/client facing areas. Luminaire types and appearances to be agreed with Interior Designer.

For design illumination levels refer to the schedule in Section 2 of this document.

Lighting control will be a combination of automatic and manual control. Typically, circulation areas, communal spaces and store rooms will be provided with presence detection. Offices and meeting rooms will be provided with automatic absence detection and manual override. Manual switches will be provided to plant areas and other areas where automatic control might present a safety risk.

Presence/absence detectors will have an adjustable delay off facility ranging from 5 to 30 minutes.

All manual lighting control switches will have the same finish as scheduled by area in the small power clause of this report above.

In addition to general lighting, feature and display lighting will be provided in café, restaurant and garden areas. The lighting will be designed and specified by the architect/interior designer. A dedicated lighting control system will be provided for the feature lighting installation.

7.6 EMERGENCY LIGHTING

All emergency lighting will be in accordance with the current edition of BS5266, BS EN 1838, and approved Document Part B of the Building Regulations and to the Local Authority and Fire Officer's requirements and approval.

The system will be classified as a self-contained, maintained system with internally illuminated exit signs, LED light source and remote key switch testing, with 3-hour duration.

Minimum horizontal illuminances at floor level will be as defined in BS5266-1:

- Escape Routes up to 2m wide
- Open Areas
- 1.0 lux at floor level on centre line
- 0.5 lux at floor level

All luminaires within internal plantrooms will be emergency luminaires to achieve the increased level of emergency illumination in high risk areas.

Exit signage will be internally illuminated and will include directional arrows to direct occupants along the designated escape routes defined in the development fire strategy.

Back of House emergency lighting will be by means of self-contained, maintained 3 hour duration nickel cadmium charger/inverter packs in selected luminaires.

Emergency lighting double height spaces will be achieved by twin spot bright LED luminaires, non-maintained, with 3-hour battery packs and LED indicator.

Testing of the system will be by means of multi-gang double pole key switches adjacent the local lighting distribution boards to enable a test/isolation facility to the circuits supplying the emergency luminaires.

7.7 EXTERNAL LIGHTING

Both buildings are surrounded by existing street lighting.

Control of external lighting will be by means of a combination of photo-electric cell and time switching.

7.8 FIRE ALARM AND DETECTION

Protec manufacture analogue addressable fire alarm and detection systems will be provided.

The system will be designed to BS5839-1:2017 and BS5839-6 2019, and will satisfy the requirements of the fire officer, building control and the development fire strategy.

An RS485 data loop will be provided, wired in fire rated databus cable, to connect the main fire alarm panels to any additional control panels, and to the networked panels of the other phases.

Manual call points will be provided at all final escape doors from the buildings, at designated points on circulation routes, and in high risk areas such as plant rooms and switch rooms.

Detection devices will comprise smoke and/or heat point detectors as appropriate to the space protected, supplemented where required by fire beam detectors, aspiration detection etc.

Addressable Fire Alarm interfaces will be provided to:

- Mechanical Plant
- Access Controlled Doors
- Lifts
- Retail Units

Typically, but to be confirmed by the building fire strategy report, communal and BOH areas will be provided with an automatic fire detection and alarm system that complies with the requirements of BS 5839: Part 1. The system will provide Category L1 protection to all spaces unless advised to be a different coverage requirement by the Fire Engineer.

Retail unit tenants will be required to install their own fire alarm installations within the associated units, in accordance with the requirements of the above table. These tenant installations shall be linked with the main building fire alarm system via the addressable interface units installed during base build, to provide an alert of an incident within the retail unit at the main building fire alarm control panels.

7.9 DATA AND TELECOMMUNICATIONS

All equipment and flood wiring will be component compliant at ISO 11801:Ed2.2, ISO 60603-7-5, ISO 61156-5, EN 50173-1, EN50310 standards operating at frequencies up to 250Mhz, supporting Voice, Data & Video applications at data rates of up to 1Gbit/s to full 100m channel requirements.

The Horizontal Category 6 compliant system will also be backwards compatible with ISO 11801:Ed2.2, ISO 61156-5, EN 50173-1:A2:2011 level, with valid Third Party Certification provided.

The structured cabling system will be CAT 6 cable as manufactured by Excel Networking, Systemax, or of equal quality and performance, will be CPR Cca grade and provided with a 25 year warranty.

RJ45 outlets will be CAT 6 compliant, full depth with accessory plate finishes as detailed in the small power section of this report.

The majority of the security equipment (CCTV Cameras and Door Access) are to be supplied via PoE+ switches in the data cabinets. The exact power requirements of the PoE+ equipment may limit the maximum copper cabling length.

A dedicated Cat 6 voice and data network will be provided, including connectivity for other IP-connected systems (IP CCTV and Access Control), generally comprising fibre backbone, copper CAT 6 flood wiring, RJ45 outlets, data cabinets, and patch panels.

The site will be fed via connections from Openreach via ducted incoming fibre cables to Comms Rooms.

Regardless of the quantity of individual incoming fibre connections, all service cabling will route on a single dedicated cable tray as indicated on the electrical containment drawings. At this point, no redundancy or network resilience has been designed within the design strategy.

The IT infrastructure hardware comprising network switches, active equipment and wireless access points etc. will be provided and installed onto this infrastructure by the clients appointed specialist.

Similarly, all BT equipment will be supplied and installed by those companies, who will provide all cabling for a flood wired installation by the electrical contractor.

The system will comprise typically 800x600 42U data cabinets located within the main comms room, which will contain all active equipment and patch panels for the data network, together with rack mounted equipment for other systems requiring rack space, being access control, TV and entertainment and CCTV.

Due to Lower Campfield building length two comms rooms will be provided – one at each end.

7.10 ACCESS CONTROL AND INTERCOMS

The access control system to external doors will be hard-wired with designated doors secured by maglocks fitted to the top of the door operated via electronic proximity reader on the door secure side and push to exit / emergency exit break glass units on the internal side.

Office doors will be controlled by wireless battery operated units utilising proximity reader integrated into door hardware.

All such access controlled doors (unless detailed to the contrary in the development fire strategy) will be linked to the fire alarm system to fail safe open during a fire alarm situation.

The system will be either Paxton or Salto KS (TBC by Allied London) Access Control System, with standalone battery operated doors and hard wired doors being connected via an RJ45 point on the building data infrastructure.

The access control system will be integrated with Office RnD software to allow room booking automation.

The intercom system will be an IP based Comelit ViP Hard Wired Video Door Entry System, provided to designated doors throughout the development, with the master stations being at the reception desk. The master stations will have the facility to remotely release all doors provided with intercoms.

The system will operate on the building IT network with the internal devices powered by POE, adhering to standard network rules.

The system will support unlimited simultaneous audio conversations.

All devices on the network will be capable of intercommunication, disabled as default.

The system will facilitate calls between entrance panels and receptions

The system will be a peer to peer system without the requirement for centralized server.

There will be no limitations in respect to how many internal monitors or external entrance panels are connected to the network.

Main Entrance Panels will be Comelit 316Touch.

All entrance and progressive entrance panels will have the capability to incorporate an integrated Salto SVN proximity reader.

7.11 CLOSED CIRCUIT TELEVISION (CCTV)

The CCTV system will be IP PoE based and provide internal and external coverage of the building.

All equipment will be commercial grade with a minimum expected life of 15 years.

Cameras will include varifocal lenses with the focal length being set at commissioning, minimum 2 megapixel high resolution full colour supporting ONVIF standard, with integral infra-red lighting with a minimum range of 30m. Network and power supply will be via PoE Cat6 cable and 100M RJ45 ethernet port.

Cameras shall be capable of delivering images at 25 frames per second at 1920x1080 resolution and support ROI codec.

Each camera will have alarm triggers for:

- Tamper
- Network disconnect
- IP address conflict

Internal cameras will be ceiling mounted dome type in white finish.

Each external camera will be vandal resistant to IK10 and enclosed within weatherproof dome housing to a minimum rating of IP65. The housings will incorporate a humidistat and thermostatically controlled integral heater designed to prevent condensation within the housing during extreme weather conditions.

Recording will be to network video recorders, rack mounted in the main comms room.

The NVRs will provide approximately 30 days of storage at a frame rate of 6 frames per second (fps) per camera.

Access to the recording system will be by web browser password protected to prevent access by unauthorised users.

There will be a degree of integration between the CCTV system, wired access control system, external door monitoring system and fire alarm systems.

Trigger inputs from the any of these systems will cause the local camera footage to be recorded at 25 frames per second for 15 seconds before the trigger and 60 seconds thereafter.

Cameras shall be provided to the following locations:

- Circulation areas
- Lounges
- Reception desk
- Ground floor main entrance inside and outside
- Kitchens
- Back doors inside and out

- Bin store

CCTV will not be provided to the following areas, unless advised otherwise by Allied London:

- Lift cars
- Stairwells
- Back of house areas
- Building external perimeter (other than entrances)

7.12 INTRUDER ALARM

The intruder alarm system will comply with BS4737 and with DD243.

The system will comprise a multi zone control panel, data gathering points, keypads, exit setting confirmation buttons, door contacts, dual technology (microwave and infra-red) movement sensors and audio-visual alarms.

The system may if required be connected to a central monitoring station by means of a digital communicator.

The system will provide detection and verification to all points of access to the unit.

Keypads will be provided to set and unset the system. Keypads will be located at the designated staff entrance to the unit.

Magnetic reed door contacts will be provided to all external doors.

Where doors are also protected by the access control system, double reed contacts will be provided, to facilitate the additional monitoring of the door by the access control system.

Movement sensors will be the dual technology type, providing both microwave and passive infra-red detection within the same housing.

Alarm signalling will be by means of an external and internal audio/visual devices.

As stipulated in the tenant design guide, no beacons, sounders, bells, or other type of alarm will be permitted on the shop-front or elsewhere outside the tenant's demise. Any sounders must have an automatic cut-off within 20 minutes of activation.

7.13 REFUGE CALL AND ASSISTANCE CALL

Combined emergency voice communication (EVC) systems and disabled assistance call systems will be provided in accordance with BS5839 part 9:2011.

Each system will comprise a master control panel, central exchange cabinet and wall mounted fully duplex refuge call units to designated points identified in the fire strategy, and interface units at each assisted W.C. to connect the local assistance call alarms as described below.

The call system master control panel will be wall mounted local to the Concierge desk and will include a telephone type handset. Also, on the control panel will be indicator lamps for each of the remote call points and W.C. call systems.

System will provide two-way speech between each slave and master station and will be configured to prevent/minimise feedback from external sound sources such as fire alarm sounders.

Wiring between the master control panels and the refuge points will be via a conventional two or four core (star or loop wiring) fire rated cable. Battery back-up for the system is provided at the main console.

Refuges will typically be provided within the protected stairs and/or stair lobbies (to be confirmed by fire strategy).

The control panels and outstations will be flush mounted.

Disabled and accessible W.C.s will be provided with pull cord switches with 2m of cord and integral re-assurance light and a flush wall mounted reset unit. External to each WC will be an over-door repeater light/tone generator to provide local confirmation of the origin of any assistance call.

Operation of the pull cord will cause the integral re-assurance light within the pull cord switch to illuminate. Simultaneously the over-door light will also illuminate. This signal will repeat on the master control panel.

Systems will be fully monitored for fire and fault.

7.14 INDUCTION LOOPS

Stand-alone audio frequency induction loops systems complete with amplifiers, leads, tape and connections to local audio sources as required will be provided to the Concierge desk.

7.15 PUBLIC ADDRESS SYSTEM

Please refer to Lightning Protection Specification for details.

A building wide rack mounted public address system, interfaced with the building fire alarm system, will be provided if required.

7.16 TELEVISION AND ENTERTAINMENT SYSTEMS (IRS)

An integrated reception system for TV & FM/DAB+ broadcasting within reception and Café area can be provided if required.

7.17 MEETING ROOM AV SYSTEMS

Where designated meeting rooms are provided, facilities will be made available to connect two HDMI sources at a floor box position to outlets on the wall.

Cables will be installed from the floor box to a corresponding faceplate on the wall, for future connection to a TV Screen.

7.18 ELECTRONIC SURGE SUPPRESSION

Transient over-voltage Surge Protective Devices (SPDs) will be provided, fully in accordance with the latest editions of BS7671 and BSEN62305, to all incoming electrical and telecommunications points of termination.

7.19 LIGHTNING PROTECTION AND ELECTRONIC SURGE SUPPRESSION

This building will be provided with a lightning protection system designed and installed to BSEN 62305 parts 1, 3 and 4 2011 and part 2 2012.

8 APPENDIX A – PROPOSED MECHANICAL SERVICES MANUFACTURERS

Product	Manufacturer
VRF / DX systems	Samsung / Mitsubishi
Heat Recovery Units	Mitsubishi Electric / Nuaire
Extract Fans	Nuaire
Grilles and Diffusers	Advanced Air Solutions / Gilberts Blackpool
Attenuators	Caice Acoustics / Alloway Acoustics
Thermal Stratification Fans	MegaFans
Radiant Panels	ZIP Heating / SPC Coils
Heat Pump	Carrier

All plant items are open to equal and approved selections.

9 APPENDIX B – PROPOSED ELECTRICAL SERVICES MANUFACTURERS

Product	Manufacturer
Lighting and Luminaires	T.B.A. at Stage 3
Lighting Controls	CP Electronics/Lutron
Fire Alarm & Detection System	Protec
Access Control System	Paxton / Salto KS
Intercom System	Comelit Maxi VIP Range
Intruder Alarm System	Honeywell Galaxy
Disabled W.C. Alarm System & Disabled Refuge EVC Systems	C-Tec
Electrical Accessories	Scolmore Click Mode & Deco (flush mounted unless otherwise stated) Brushed stainless steel or black generally (TBC with Client & Architect) White plastic where hidden i.e. ceiling voids & risers. Metalclad in plant areas & bin store.
Data / Communications	Excel Networking
Containment	Unitrunk/Armorduct
Switchboard Protective Devices	ABB
Distribution Boards and Protective Devices	ABB
Cabling	Prysmian / Nexans / Draka
Life Safety Cabling	Prysmian or equal and approved