



iQ Echo Street, Manchester

RIBA Stage 2 Building Services Engineering Philosophy Report
7054-WBS-ZZ-XX-RP-MEP-10002

27th April 2023

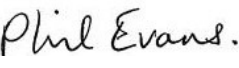
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Client Name: iQ Student Accommodation
Document Reference: 7054-WBS-ZZ-XX-RP-MEP-10002
Project Number: BSD14517

Quality Assurance – Approval Status

This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2015, BS EN ISO 14001: 2015 and BS EN ISO 45001:2018)

Issue	Date	Prepared by	Checked by	Approved by
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Comments

P03	27/04/2023	Final Issue
P02	17/04/2023	Updated to include Lift.
P01	22/02/2023	Preliminary Issue

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1. INTRODUCTION

Waterman Building Services have been employed to develop the detailed design of the MEP services for the Propose Built Student Accommodation (PBSA) for iQ, located in Echo St Manchester. The purpose of this report is to communicate the building services design philosophy.

When complete the development will provide 1,224 individual bed spaces, based over 3 interlink tower blocks and amenity spaces. The blocks are at differing heights and interconnecting links comprising of cluster bedrooms and studios.

The height of Block as follows:

Block A: adjacent to Vimto Gardens - 16 storeys, 150 studios, 75 cluster bedrooms.

Link Block A-B – 80 bed spaces.

Block B: middle block - 22 storeys, 115 studios, 255 cluster bedrooms.

Link Block B-C – 112 bed spaces.

Block C: adjacent to Echo St – 28 storeys, 162 studios, 275 cluster bedrooms.

Figure 1: Echo Street, Granby Row, Manchester, M1 3QJ



The design of the building is to generally meet the requirements of the iQ Employer's Requirements.

This report is a summary of the current development of the scheme and concepts at RIBA Stage 2 and proposes areas of further investigation still to be progressed at RIBA Stage 3 and beyond into detailed design.

This report addresses the following areas of design development: -

- 1) General Services Philosophy (Mechanical)
- 2) General Services Philosophy (Electrical)
- 3) General Public Health
- 4) Vertical transport system

1.1 Key Energy Efficiency Initiatives

- Fabric improvements above the minimum required to meet building regulations.
- Low energy ventilation strategy with heat recovery.
- Variable speed drives on pumps and fans.
- Low energy lamps and good lighting controls (LED lighting).
- Building management system (BMS) to optimise the building services and maintain internal environmental conditions efficiently.
- Advanced metering strategy.
- Occupancy based heating controls ensuring minimum heating energy wastage.
- Low carbon technology – An air source heat pump providing the building's hot water load.
- Regenerative drives for lifts.

1.2 Sustainability

The building is intended to be robust and durable with design service life being of primary concern in the design.

The building is to be designed to meet local planning policies in terms of energy usage and carbon emissions.

The project is targeted to be BREEAM excellent rating.

1.3 Thermal Overheating

This assessment looks at the internal air temperatures over a simulated period, factoring in thermal sources from occupants, lighting and small power, as well as from external sources, with solar gain and external air temperatures. This method of assessment is referred to as the Dynamic Simulation Method (DSM) and has been carried out to demonstrate compliance with Approved Document Part O. The model has been simulated using accredited software, using IES Virtual Environment. Room geometry is created, and thermal properties are assigned throughout the model to define the building. Time profiles and internal gains are then assigned within the model, including ventilation rates and natural ventilation opening areas. It is then simulated against external weather data.

For further information on the thermal overheating refer to the Water Building Services document Energy Statement & Overheating Report 7054-WBS-ZZ-XX-RP-MEP-10001.

2. MECHANICAL SERVICES

2.1 Schedule of Design Data

Internal temperatures shall in the main be in line with the recommendations of CIBSE, with the following specific requirements.

The plant shall be sized to achieve the following internal room temperatures.

Table 1: Internal Design Temperatures

Room	Winter	Summer
Cluster flats and studios	21°C $\pm$ 2°C	To meet CIBSE TM59
Kitchens	21°C $\pm$ 2°C	To meet CIBSE TM59
Bathrooms/shower rooms	18°C $\pm$ 2°C	Uncontrolled
Communal WCs	18°C $\pm$ 2°C	Uncontrolled
Laundry	18°C $\pm$ 2°C	Uncontrolled
Common room	21°C $\pm$ 2°C	21°C $\pm$ 2°C
Offices/Quiet study	21°C $\pm$ 2°C	21°C $\pm$ 2°C
Bin store lobbies	Uncontrolled	Uncontrolled
Parcel room	18°C $\pm$ 2°C	Uncontrolled
Comms room	21°C $\pm$ 2°C	21°C $\pm$ 2°C
Maintenance room	21°C $\pm$ 2°C	To meet CIBSE TM52
Welfare	21°C $\pm$ 2°C	21°C $\pm$ 2°C
Tank room	Frost protection only	Uncontrolled
Circulation	20°C $\pm$ 2°C	To meet CIBSE TM59
Hot water plant room	Uncontrolled	Uncontrolled
Cleaner's stores	18°C $\pm$ 2°C	Uncontrolled

Source: Waterman Building Services

The design shall be based on the following external temperatures.

Table 2: External Design Temperatures

External temperature	Winter	Summer
External Conditions	-5°C DB / 100% RH	32°C DB / 21°C WB

Source: Waterman Building Services

Table 3: Fresh Air Ventilation

Room	Fresh Air Provision
Cluster flats and studios	4 air changes per hour
Kitchens	4 air changes per hour
Bathrooms/Shower rooms	To balance flow rates in adjacent bedroom/studio
Communal WCs	6 Air changes per hour negative pressure
Laundry	6 Air changes per hour, negative pressure in the main area. Ventilation for equipment to be advised by specialist
Common room	10 litres per second per person
Offices/ Quiet study	10 litres per second per person
Bin store lobbies	25 Air changes negative pressure
Parcel room	10 litres per second per person
Comms room	10 litres per second per person
Maintenance room	10 litres per second per person
Welfare	10 litres per second per person
Tank room	Natural ventilation only to control tank water temperature
Circulation	Natural ventilation
Hot water plant room	Natural ventilation to prevent overheating
Cleaner's stores	6 Air changes per hour negative pressure

Source: Waterman Building Services

2.2 Building Thermal Performance

In line with the project energy statement produced by Waterman Building Services, the building shall achieve u-values no worse than listed in Table 4. Good air tightness design will reduce heat losses in winter and heat gains in summer and will increase the efficiency of the mechanical ventilation systems. The target design air permeability for the proposed development is 3.0 m³/hr/m² at 50Pa. This represents an improvement of 70% over the maximum requirements set out in Part L 2021 (i.e. maximum design air permeability is 10m³/hr/m² at 50Pa).

Table 4: Building Thermal Performance Values

Construction Element	Approved Document Part L2A (W/m ² K)	Development (W/m ² K)
Exposed Wall	0.35	0.18
Exposed Floor	0.25	0.13
Exposed Roof	0.25	0.13
Windows & Rooflights	2.2	1.2, G value 0.4
External Doors	2.2	1.5

High Usage Doors	3	3
Air Permeability	10	3

2.3 Heating and Cooling Systems

2.3.1 Electric Heating

Space heating shall be provided by electric panel heaters. In each flat the heaters shall be provided with timeclock, occupancy control and boost facility, with each heater defaulting to setback conditions in the event of no occupancy or user input. In landlord areas the heaters shall be controlled by timeclock with tamper proof controls.

All heating controls for the single bedrooms and studios shall be in the form of Prefect Control IRUS system.

The inclusion of the Prefect system is to allow better control of the heating within rooms by monitoring temperature and room presence. The system is linked and connected back to a central controller via mains bourne signalling (MBS), using the Earth and Neutral wires to transmit data to and from the room control unit. Installation to be fully designed and installed in line with Prefect's requirements, mainly the appropriate number and location of SIFUs (which is dependent on the circuit design, number of blocks, total number of nodes etc.) to allow remote monitoring and control via the Prefect portal.

The design shall be reviewed and checked by Prefect to guarantee the correct provisions are being put in so the system can operate effectively. Prefect are to undertake onsite commissioning as part of the supply costs. The contractor is to ensure that all other site commissioning is complete (network, etc) prior to Prefect visiting site.

As well as heating control, the individual room sensors can also monitor humidity, CO2, light and decibel levels to ensure environmental conditions conducive to safe, comfortable living and study. All these conditions shall be capable of being stored and can be viewed online in real time and up to 30days history for each room.

All cabling between the key switch fused spur, power unit, control unit and panel heater are to be concealed. No cables are to be exposed or surfaced mounted.

2.3.2 Low Temperature Hot Water Circuit

The low temperature hot water circuit shall provide heating to the circulation spaces in the form of wall mounted radiators throughout the building.

A network of mild steel pipework shall be routed via the services void to all areas. Air source heat pumps (ASHP) shall be provided at roof level of the towers to serve the heating system. The heating shall be design not to have a flow temperature above 55°C flow.

The central heating system for each tower shall comprise pressurisation and expansion equipment, circulating pumps, and strainer equipment. The plantroom shall also house the main motor control panel for the building (Building Management System).

The ASHP's will be used to provide a low grade, low carbon heat source that can reduce the overall buildings carbon footprint. The centralised heating systems shall serve all heat emitters generally as indicated on the Engineer's philosophy drawings.

2.3.3 DX VRV Cooling and Heating

Cooling shall be provided to the Amenity Spaces, Reception, Study Rooms and Café areas. Cooling and heating shall be provided by ceiling mounted cassettes linked to external condenser plant.

Refrigeration pipework and connecting cables shall be routed to the external condensing units, located at roof level.

2.4 Mechanical Ventilation Systems

2.4.1 Studio Ventilation

Each studio shall have its own self-contained Mechanical Ventilation with Heat Recovery (MVHR) unit to meet the requirement of overheating and building regulation. The studios vary in size and layout, therefore the designs of different studios will vary but the principles will remain the same.

In typical studios, the MVHR systems will be sized to provide continuous ventilation. The requirements for purge ventilation, background ventilation and thermal overheating shall be met using the MHHR unit.

However, in studios for ambulant/disabled students, the MVHR system shall provide a higher continuous rate in meeting the requirements for background ventilation and thermal overheating the units will have the facility to boost the ventilation rate to for purge ventilation.

The supply and extract ventilation unit which serves the studios shall be a Sentinel Kinetic Cooker Hood as manufactured by Vent-Axia. Supply air to the room shall be pre-heated by the extract air via the integrated composite plastic counterflow heat recovery cell. When a signal is received, the fans shall either vary their speed proportionally or on a trickle and boost principle.

The Sentinel Kinetic Cooker Hood shall consist of a telescopic Hood and galvanised steel duct connection to the MVHR Unit. The Hood construction shall be of grey powder coated steel with Brushed Aluminium or White painted fascia. The Hood shall trigger the MVHR unit to a pre-defined boost speed and open the summer bypass when opened and shall have two low-energy lamps illuminating the hob top.

Each self-contained MVHR unit shall be ducted directly to the external façade, giving maximum separation between inlet and exhaust. The inlet and exhaust shall terminate via a proprietary air brick product or integrated with the façade design where possible.

2.4.2 Cluster Bedroom and Kitchen Ventilation

Cluster bedrooms and kitchens shall each have a dedicated MVHR unit in each room. The MVHR system shall provide continuous in meeting the requirements for background ventilation and thermal overheating but will have the facility to boost the ventilation rate for purge ventilation.

The supply and extract ventilation unit which serves the single bedrooms shall be a Sentinel Kinetic MVHR as manufactured by Vent-Axia. Supply air to the room shall be pre-heated by the extract air via the integrated composite plastic counterflow heat recovery cell. When a signal is received, the fans shall either vary their speed proportionally or on a trickle and boost principle.

The ventilation system shall comprise of an inline carbon filter within the intake airflow ductwork, the filter shall be in the form of Pure Air filter as manufactured by Vent Axia. The Vent Axia Pure Air filter shall incorporate two types of filtration as follows:

- Enhanced activated carbon filter which removes unpleasant odours and harmful gasses such as Nitrous Oxide (NO₂).

- ISO 65% Coarse (G4) or ePM2.5 (F7) particulate filters which can remove tiny airborne contaminants such as pollen, bacteria and even PM2.5 diesel particulates.

Each self-contained MVHR unit shall be ducted directly to the external façade, giving maximum separation between inlet and exhaust. The inlet and exhaust shall terminate via a proprietary louvre integrated with the façade.

2.4.3 Refuse Stores

Refuse stores shall be ventilated using permanent ventilators at high and low level in line with BS 5906.

Bin store lobbies shall be ventilated mechanically at a rate of 25 air changes per hour to ensure no risk of smells reaching the corridors.

2.4.4 Laundry Ventilation

Laundry ventilation shall be provided as required to suit the equipment being installed by the specialist installers.

2.4.5 Amenity Space Ventilation

The amenity space shall be provided with local MVHR units mounted at high level in the space, to provide ventilation at a rate of 10 litres per second per person.

2.5 Domestic Cold Water Services

The domestic water design shall have a Water Management Plan (WMP) in line with CIREG Guidelines. The design shall incorporate automatic shut off devices with active flow monitoring installed to any mains incoming pipework (permanent and temporary), immediately prior to or after any booster pump set including intermediary boosters and immediately after any stored water tank (which must be operational prior to any testing and commissioning of the water systems).

Mains cold water (MCWS) shall connect from the water authority termination point at the site perimeter where it will serve a manifold within the basement and extend to serve commercial sprinkler tank, wet riser tanks and combined domestic water and domestic sprinkler tank. From the domestic cold-water storage tank, boosted cold water shall be distributed to serve water around the building including all domestic water outlets and external bib taps. The boosted cold-water system shall have a low pressure and high-pressure system as required for pressure throughout the towers.

Where bib taps are to be provided within the bin store as part of the CAT 5 system to provide flow back protection. A CAT 5 system shall be provided to serve the laundry rooms located in Block B.

Double Check Valves and pressure reducing valves shall be provided on each shower room pod to prevent backflow of water between pods and to regulate pressure. TMVs are only to be installed in accessible/adapted rooms as well as communal amenity spaces such as disabled WCs and showers.

2.6 Domestic Hot Water Services

Domestic Hot Water (DHWS) shall be provided by a central air source heat pump system for each block with storage vessels and pumping equipment located at roof level.

Hot water shall be distributed by a flow and return system to ensure reduced dead legs at appliances. The return pipework shall connect to within 300mm of the last appliance on any run.

All hot water outlets to wash hand basins in DDA rooms shall require a TMV3 blending valve to limit water

temperature at outlets to 41°C.

Double Check Valves shall be provided on each bathroom pod to prevent backflow of water between pods.

2.7 Gas

The current proposals do not allow for bringing any gas into the new building, meaning all laundry equipment including water heating shall be electric only.

2.8 Smoke Ventilation / AOVs

AOVs shall be required at the head of each stair, in addition, automatically opening smoke vents are required within the central corridor of each block. A specialist smoke clearance contractor shall be employed to fully developed smoke clearance system in line with the fire consultant report. Smoke extract fans shall be located at the head of each smoke extract and intake are shafts at Roof Level.

2.9 Fire Protection

2.9.1 Wet Risers

Wet risers shall be required to serve levels of the building and per the fire consultant report. Water storage tanks and diesel pumps shall be located at Basement level. The system shall be designed in line with BS 9990.

2.9.2 Domestic Sprinklers

The potable cold-water storage tank shall be a combined domestic sprinkler and potable water storage tank sized to serve the entire building and providing sprinkler protection to residential areas in accordance with BS 9251.

2.9.3 Commercial Sprinklers

A separate sprinkler system shall be designed under BS 12845 which shall provide sprinkler protection to commercial elements of the building. The commercial sprinkler tanks and diesel pumps shall also be located at Basement level.

All fire protection proposals shall be verified and confirmed by the project Fire Engineer.

2.10 Building Control System

All plant shall be automatically controlled via a networked building management system. The BMS shall consist of a series of networked controllers and sensors. The general functionality of the control system shall be but not limited to the following: -

- Time Clock Control
- Fault Monitoring
- Energy Monitoring
- Timed zone and extension provisions
- Fire Alarm Interface
- Water Usage Monitoring

- Metering and Sub-metering
- Out of range values

The BMS shall be accessible via an internet-based interface, with password protected access.

3. PUBLIC HEALTH SERVICES

3.1 Above Ground Drainage

The above ground drainage installation shall connect to suitably positioned 'pop-up' locations from the below ground drainage.

The system shall collect soil and waste pipes from WC's, washbasins, sinks and condensate drains in strategically located gravity soil and waste stacks which connect to the underground drainage system.

Where condensate discharge lines must connect to a soil vent pipe, a dry sealed trap shall be provided to prevent odours passing back up the drain lines.

All stacks shall be routed through the building in risers and ducts and terminate externally at roof level to provide a fully ventilated system. The architect shall be responsible for the specification of all sanitary ware. The main contractor shall be responsible for their supply, installation and commissioning.

4. ELECTRICAL SERVICES

4.1 General

This document forms the report for the electrical services installation for the proposed new development.

The following outlines a summary of the electrical engineering services scope of works that are proposed for inclusion within the development: -

- Incoming electrical utility supply
- Telephone and Data Utility Services
- LV Electrical Distribution
- Earthing Systems
- Metering
- Power factor correction
- Photovoltaic Installations
- Internal Lighting Installations
- External Lighting Installations
- Emergency Lighting Installations
- Lighting Controls
- General Small Power
- Power Supplies to Mechanical Services Equipment
- EV Charging Equipment
- Comms cabinets and equipment
- Structured cabling for Data & Telephone services
- Audio Visual receiving & distribution systems cabling
- Standby Generator
- Fire Alarm & Detection Systems
- Disabled Refuge Communications Systems
- Disabled Toilet Alarms Systems
- Hearing Induction Loop Provision
- Intruder Alarm
- Access Control
- CCTV
- Lightning & Surge Protection
- Sprinkler supply
- Smoke Extract System & Controls
- Vertical transport systems

4.2 Design Criteria

The complete electrical installation shall be designed, installed, and commissioned in accordance with all current relevant British Standards, CIBSE guidelines and all accompanying rules and regulations.

The electrical installation shall be designed to be as sustainable, environmentally sympathetic as is practicable.

4.2.1 Lighting Design Criteria

The following lighting design criteria and parameters will be used to accurately predict the overall lighting levels in accordance with the relevant CIBSE guidelines and recommendations:

Reflectance Values

- Ceiling 70%
- Walls 50%
- Floor 20%

4.2.2 Lighting levels

The basis of the design will be undertaken using CIBSE Lighting Guide 9 – Lighting for Communal Residential Buildings and The SLL code for lighting.

Table 5: Lighting Levels

General Area	Maintained Illumination Level	Uniformity
Lift Lobbies	200 lux at floor level	0.4
Reception Entrance	200 lux at floor level 30 lux on desk	0.4
Stairs	100 lux on treads	0.4
Corridors	100 lux at floor level	0.4
WCs (Public Areas)	100 lux at floor level	0.4
Showers/Bathrooms/WCs (Public Access)	100 lux at floor level (DDA 200 lux)	0.4
Area	Maintained Illumination Level	Uniformity
Plant rooms	200 lux at floor level	0.4
Kitchen / Kitchenette	200 lux at working plane	0.6
Laundry	300 lux at working plane	0.6
Offices	300 lux at working plane	0.6
Comms Rooms	200 lux at floor level	0.6

Common Rooms	200 lux at floor level	0.6
Study Rooms	200 lux at working plane	0.6
External Entrances	To SLL Guide	

Source: Waterman Building Services

4.2.3 Lighting Controls

The lighting controls are to be provided to minimise energy waste and capitalise on any natural daylight available inside the building. Generally lighting control will be provided as indicated in the table below.

Table 6: Lighting Controls Strategy

General Areas	Control
Lift Lobbies	Presence Detection
Reception Entrance	Presence Detection
Reception Desk	Presence Detection – Daylight Dimming TBC
Stairs	Presence Detection
Circulation	Presence Detection
WCs	Presence Detection
Common Rooms	Absence Detection – Daylight Dimming
Study Rooms	Absence Detection – Daylight Dimming
Plant Rooms	Manual
Offices	Absence Detection – Daylight Dimming TBC
Comms Rooms	Manual
External	Timeclock

Source: Waterman Building Services

4.2.4 Emergency Lighting

- Defined escape routes 1 lux minimum on centre line
- Stair treads 1 lux minimum on tread
- Open areas 0.5 lux minimum
- High Risk Areas As defined by LG13 Emergency Lighting

Where specific values are not provided, comply with the relevant CIBSE Guide.

4.2.5 Spare Capacity

Spare capacity is to be allowed for across the entire installation including the site maximum demand in accordance with industry best practice and recommendations. For this reason, the following allowances have been made:

- Maximum Demand 20%
- Spare capacity on main LV panel 20%
- Spare Capacity on distribution boards 20% (number of ways where possible)
- Spare capacity on sub main cables 20%

Is to be noted that the main MCCB boards supplying individual studios and bedrooms will have limited overall spare capacity if any due to the number of outgoing submain cables required, which has been derived from the overall metering strategy as instructed by the client.

4.2.6 Design Service Life

Electrical systems shall achieve the minimum anticipated life expectancy levels as defined and set out in CIBSE Guide M.

This is based on the expectation that building maintenance recommendations are followed, and the building is used for its intended design. Electrical plant specifications shall be based upon suppliers that achieve equipment life in line with current industry good practice and quality.

4.3 Outline Scope of Electrical Services

4.3.1 General

This part of the report provides further details of any specific requirements required for the proposed development. It is intended that all electrical services systems shall be part of the holistic building and residential site design.

4.3.2 LV Electrical Utility Service

A new supply application has been made at the request of the client, to bring a new dedicated LV supply into the Echo Street development. This will require the provision of a dedicated new 2MVA HV/LV substation which currently falls outside the scope of these works and will be undertaken by the client directly.

4.3.3 Telephone and Data Utility Services

Telephone/data service cable(s) shall be provided to the new development, formed of Blocks A, B and C.

To enable the installation of these services, dedicated ducts from the boundary of the site will be installed to the internal main server/comms room location.

Fibre optic services from the utility provider to the server will then be distributed throughout the building to intermediate comms rooms. From these intermediate comms rooms a minimum of Cat6 copper cables will distribute to RJ45 data connection outlets. The client appointed preferred specialist shall be fully responsible for the overall data and comms design throughout.

In addition to general phone and data services 'Red Care' GSM monitoring or similar will be provided for the lifts, intruder and the fire alarm installations.

4.3.4 LV Electrical Distribution

From the dedicated new substation and utility metering point the new LV supply will connect to a Main Electrical Switch-panel in the adjacent LV switchroom.

The electrical power will be distributed from the main electrical switch-panel, via XLPE/SWA/LSF, multi core, copper cables, routed and secured to suitable containment, to localised sub circuit distribution boards, isolators and equipment.

In addition to the main distribution to each of the 3 No. blocks will be by rising busbar. Each busbar will rise from GF in its respective riser.

General landlord services small power and lighting boards shall be of the split metered type, fed from the main switch panel or individual rising busbar tap off units within the core risers.

Cluster flats and studios shall be supplied from MCCB panel boards located in the main services risers to each block.

4.3.5 Metering

A main electricity meter will be provided at the main intake location within the electrical switchroom and will enable the entire building to be metered by the utility company.

In addition, sub-meters will be installed for all lighting, small power, mechanical services and individual bedroom and studio consumer units, as well as any other dedicated supplies deemed necessary in accordance with Building Regulations and CIBSE TM39.

All sub metering shall be installed at the local distribution boards/consumer units or at the main panel, as appropriate.

All installed main billing meters will be Measuring Instruments Directive (MID) approved and certified with the exception of those installed within individual consumer units to individual bedrooms and studios which will be for energy monitoring purposes only.

Each meter will be linked to the BMS.

4.3.6 Power Factor Correction

Power factor correction will be provided to the development to maintain a Power Factor at 0.95 lagging or better. Any additional power factor correction will need to be confirmed once the installation has been commissioned and any further requirement identified.

4.3.7 Earthing & Bonding

Provide a complete earthing and bonding installation throughout the development in accordance with BS7671 and all associated documentation.

4.3.8 Standby Generator

The building's life safety systems (sprinklers/smoke ventilation/fire-fighting or evacuation lifts) will require standby power, in the event of the failure of the main building supply. A central stand-by generator is being provided for the development.

4.3.9 Photovoltaic Systems and associated LV Distribution

The development is to be provided with a suitably sized and rated PV installation to meet the requirement of the energy model. The current PV design is utilising optimiser due to the very high parapets and significant shade from neighbouring towers. Path Energy has carried out extensive study with regards to the shading from neighbouring towers and have proposed their panel model JAM54S31-405MR-1000V numbering 166 in total delivering a system size of 67.23kW.

The installation of a dedicated PV array shall meet statutory and local authority energy performance and renewable energy targets.

The PV panel arrays will be roof mounted to blocks A, B and C.

An application will be made to the utility company to enable any unused electricity to be exported back to the grid, however this is a discretionary provision, dependant on the suitability of the local network and is not always possible.

4.3.10 Internal Lighting Installations

The lighting installation will be designed to meet the criteria outlined in the relevant CIBSE Lighting Guides.

The full detailed lighting design will be undertaken using industry recognised software. The lighting design will be based on the use of energy efficient LED sources.

All luminaires will be selected to ensure that a minimum lumens per circuit Watt is no less than 125 as per the Energy Statement and Overheating Report. This is a betterment on Part L of the Building Regulations in the region of 31%.

4.3.11 Lighting Controls

It is recognised that maximising the use of natural daylight is beneficial in terms of enhancing the quality of the space whilst making best use of energy efficiency, therefore lighting controls which are deemed suitable for the type of room will be installed.

4.3.12 External Lighting Installations

The complete external lighting system will reflect the architectural and aesthetic requirements while minimizing light pollution. This shall be achieved utilising a combination of localised and area lighting around the building perimeter as required.

Highly energy efficient LEDs, light fittings with suitable Impact Protection (IK) and Ingress Protection (IP) shall be used.

4.3.13 Emergency Lighting Installations

Emergency lighting shall be designed and installed in accordance with the requirements outlined in BS5266 and will provide sufficient emergency illumination for the safe evacuation of staff and visitors to the facility such that in the event of an emergency safe passage can be provided.

Generally emergency lighting shall be provided using integral 3hr emergency conversion packs within the general area light fitting. In areas where the main light fittings preclude this approach standalone LED emergency lighting will be provided.

4.3.14 General Small Power

Small power installations will be installed to suit the FF&E scheme and any other requirements. Socket outlets will all be earth leakage protected.

Sufficient small power outlets shall be provided for the effective occupation and use of the unit and its facilities, equipment and services throughout. To enable safe, sufficient use of cleaning machines, desk mounted and floor mounted appliances, cooking/catering equipment and to provide power supplies to mechanical services control panels, plant and equipment, life safety systems, fire protection equipment, intruder alarm and access control systems and the like throughout the entire development.

Cleaners' sockets shall be installed in all communal areas throughout at 450mm AFFL and will be spaced at a maximum of 20m centres along an imaginary corridor. All cleaners' sockets are to be wired on dedicated RCD/RCBO protected circuits, all cleaners' sockets are to be clearly labelled as 'Cleaners Power'.

Final circuits are to be protected by 30mA RCDs/RCBOs and Arc Fault Detection Devices (AFDD) as recommended by BS7671:2018 IET Wiring Regulations current amendment.

Outlets are generally to be PVC throughout, flush installed, with the exception of the plant rooms, external areas or particular situations where impact damage is considered likely. Faceplates shall be of a colour of sufficient contrast to their background to meet Building Regulations Part M for the visually impaired.

4.3.15 Mechanical Services Supplies

Electrical power supplies are to be provided to all mechanical services equipment. This is to include a new cold water booster/domestic sprinkler pump-set, hot water generation equipment and circulation pumps, ventilation and cooling systems.

4.3.16 Telephone and Data Utility Services

Telephone/data service cable(s) shall be provided to the development throughout. The client appointed ICT site specialist is to facilitate the provision of a dedicated new fully structured data cabling and telephone network for the development. Service routes are to be agreed with the appointed specialist and are to provide diverse routes to the main comms room. From here fully structured data network cabling utilising CAT6A cables will be installed in dedicated cable baskets routed through ceiling voids and risers to serve all data points.

4.3.17 Fire Alarm and Detection Systems

A complete fire detection and alarm system will be installed throughout the building. This will include but not be limited to manual activation devices to staff monitored areas and escape routes, automatic detection devices, sounders, beacons, interface units, wiring and main fire alarm panel.

Connecting cables between the control panel and the remote refuge units shall be fire rated to the appropriate category for the fire strategy.

The fire alarm system will be as a minimum category L2 system in accordance with the iQ Health and Safety Standards Blue Print and as defined by BS 5839.

Interface units will be installed throughout where required although it is to be noted that within cinema room the fire alarm interface is required to stop play upon the activation of the alarm.

A "cause and effect" matrix will be produced in accordance with the fire strategy to allow for either "simultaneous" or "phased" evacuation dependant upon the recommendations of the Fire Strategy Report

The fire alarm system will be 24-hour remote monitored by a 'Red Care' Advanced.

In addition to fire alarm detection system each studio kitchen which is located next to the entrance door is to be installed with a Stove Guard or suppression system. The Stove Guard system if installed shall provide an audible alarm to the room occupant and shall also automatically cut power to the appliance should the alarm not be acknowledged. Whereas fire suppression system shall activate during alarm conditions.

4.3.18 Fire Refuge Emergency Voice Communication System

Refuge Alarm call point systems shall be provided as required by the fire strategy. These call points shall only become "active" when the fire alarm system signals an evacuation.

Connecting cables between the control panel and the remote refuge units shall be fire rated to the appropriate category for the fire strategy.

4.3.19 Evacuation Alert System

An Evacuation Alert System (EAS) for use by the Fire and Rescue Service (FRS). The EAS is to be for exclusive use by the FRS and is only to be used in the event of a fire. The EAS is to provide evacuation alerts to all confirmed areas within the fire strategy.

4.3.20 Disabled Toilet Systems

All accessible toilets will be provided with an alarm call system which will comprise of pull cord, local visual /audible indicator and reset button. Each accessible toilet alarm will provide a means of local indication of operation only.

4.3.21 Audio Frequency Induction Loop System (AFILS)

An Audio Frequency Induction Loop System will be installed within the main reception area and is to conform to the Equality Act 2010 BS 7594 as a minimum.

4.3.22 Access Control and Door Entry Systems

A complete access control installation will be installed to supervise and limit access to the site, the building and circulation within the building.

Access control shall be provided at the designated control points/stations. This shall comprise of magnetic door locks, proximity entry reader, push button egress and emergency egress break-glass.

Access control to individual rooms shall be provided by as part of the door furniture. These shall be "stand alone" type and not connected to the main access control system. The same card/fob shall provide access to both common areas and an individual's room.

The access control strategy is to be further developed in conjunction with the building users.

4.3.23 CCTV Systems

A complete CCTV installation will be installed throughout the building. This will include but not be limited to PTZ and fixed cameras, wiring, recording and viewing media and a control station.

The system will monitor and record images both internally and externally, throughout common rooms and circulation areas.

4.3.24 Vertical Transport Systems

In addition to this report a detailed analysis of the vertical transport systems has been undertaken and identifies the available options. This information has been issued separately.

4.3.25 Integrated Reception System (IRS)

There has been no allowance or consideration made at this stage for the provision of a fully Integrated Reception System.

4.3.26 Lightning and Surge Protection

To provide a comprehensive lightning and surge protection system to the proposed development to protect the building, its contents, and occupiers, from the effects of lightning strikes and overvoltage of the supply.

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