

Liverpool Road Hotel Manchester

MEP Stage 3
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AMENDMENT HISTORY



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1 EXECUTIVE SUMMARY

This initial report forms part of RIBA Stage 3 – Developed Design for the Liverpool Road Hotel building in Manchester.

Liverpool Road is a mixed-use development consisting of the following fundamental elements, with the extent of servicing indicated in brackets:

- Basement (pool area, plant areas and back of house)
- Hotel

This report presents proposals for the building services based on the Client Brief interpreted to date, with the purpose of developing an agreed and signed off strategy for the Building Services prior to Stage 4 of the Detailed Design.

The building services comprise of the mechanical, electrical, public health, building management systems, information and communication technologies, fire and electronic security systems. The design of the project is to comprise of new building services for the building.

New utility electric, gas, water and telecommunication services are to be provided to meet the requirements of the site. Desk top assessments have been carried out and applications made to the statutory undertaker by others.

The basis of design will be taken from the following documentation: -

- British Standards, Codes of Practice and European Norms.
- CIBSE Guides, IHPE Guides and Technical Memoranda.
- Local and Statutory Authority Requirements.
- Supply Authority Regulations.
- Building Regulations.
- IET Wiring Regulations BS 7671 Incorporating all Amendments.
- Society of Light and Lighting Guidance
- BSRIA Guides

The criteria used to design the base building services shall be in accordance with CIBSE recommendations as and where appropriate, the Development Brief and the Specific Client Technical Requirements.

The design principles for the building services are to provide low carbon, high energy efficient systems integrated and in sympathy with the building design as part of the environmental and sustainability strategy as follows:

- High-quality facades to achieve 'g' and 'U' values that control solar gains and minimise heat losses.
- Hot water energy efficient / low loss storage calorifiers.
- Mechanical ventilation systems to incorporate heat recovery methods, allowing energy to be recovered from the exhaust air stream. All fans to have low Specific Fan Power.
- High efficiency VRF system in hotel and amenity spaces where feasible and as required.
- Lighting will be low energy LED lighting systems complete with automatic controls.

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- Electronically controlled EC/DC type fans/pumps with variable speed inverter control shall be installed on major systems fans and pumps to reduce power consumption.
 - Automatic control of all building services via Building Management System.
 - Automatic energy metering and monitoring will be incorporated throughout the building to enable usage to be logged and verified against the design and best practice energy benchmarks.

2 INTRODUCTION

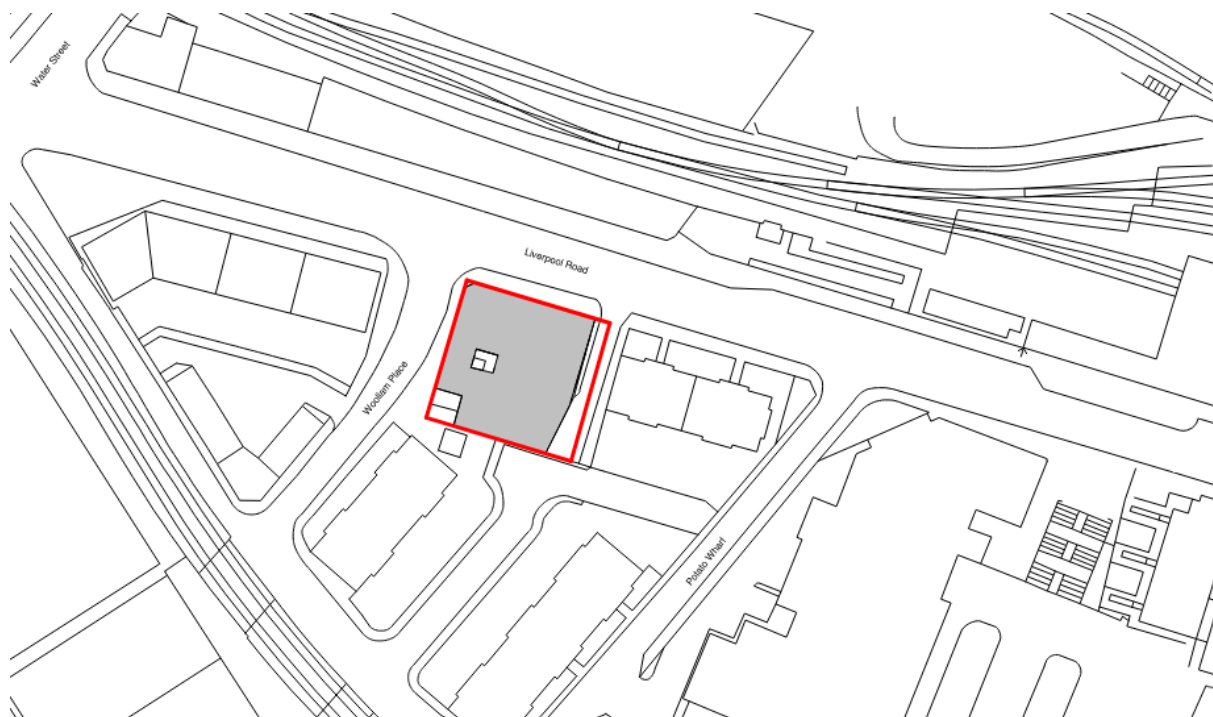
This initial report forms part of RIBA Stage 3 – Developed Design for the Liverpool Road Hotel building in Manchester.

This report presents proposals for the building services based on the Client Brief interpreted to date, with the purpose of developing an agreed and signed off strategy for the Building Services prior to Stage 4 of the Developed Design.

The building services comprise of the mechanical, electrical, public health, building management systems, information and communication technologies, fire and electronic security systems.

Mechanical and electrical services strategy layouts and As Designed Part L2 SBEM/BRUKL are detailed in a separate report.

Figure 1 Site Location Plan



3 CLIENT BRIEF



3 CLIENT BRIEF

The Mechanical and Electrical Building Services proposal's contained within are based on discussions with Domis Construction and the design team.

Company	Document Type	Document /Drawing No/Revision	Description
Tim Groom Architects	Architectural Drawings	Stage 3- Jan 2023	Architectural Drawings / Revit model

4 UTILITIES

An appraisal has been made of the existing and proposed utilities, and load/flow assessments have been carried out to enable applications to be made to the statutory undertakers.

The incoming LV supply has been applied for through Electricity North West.

The incoming water has been applied for to United Utilities.

The incoming gas has been applied for to GEC, (Gas and Electricity Connections).

5 BASIS OF DESIGN CONSIDERATIONS

5.1 GENERAL

There are a number of design items that form the basis of the design that have been considered. These inform and influence final system selections, design and spatial requirements for the building services, plant, risers etc for the proposed systems and occupancy comfort to meet the Clients aspirations.

5.2 STANDARDS AND GUIDANCE

The basis of design will be taken from the following documentation: -

- British Standards, Codes of Practice and European Norms.
- CIBSE Guides, IHPE Guides and Technical Memoranda.
- Local and Statutory Authority Requirements.
- Supply Authority Regulations.
- Building Regulations.
- IET Wiring Regulations BS 7671 Incorporating all Amendments
- Society of Light and Lighting Guidance
- BSRIA Guides

The criteria used to design the base building services shall be in accordance with CIBSE recommendations as and where appropriate.

5.3 DESIGN PRINCIPLES

The design principles for the building services are to provide low carbon, high energy efficient systems integrated and in sympathy with the building design and environmental / sustainability strategy as follows:

- High-quality facades to achieve 'g' and 'U' values that control solar gains and minimise heat losses and gains.
- Hot water energy efficient / low loss storage calorifiers with hot water provided by gas fired boilers.
- Mechanical ventilation systems to incorporate heat recovery methods, allowing energy to be recovered from the exhaust air stream. All fans to have low Specific Fan Power.
- High efficiency Air Source Heat pumps for heating / cooling as appropriate to the hotel and amenity areas.
- Electric panel heaters to provide heating to all area's that do not require, i.e. Back of House areas and basement areas.

- Lighting will be low energy LED lighting systems complete with automatic controls to front of house areas. Decorative and feature lighting shall be provided to the hotel bedrooms as detailed by the interior designer.
- Electronically controlled EC/DC type fans/pumps with variable speed inverter control shall be installed on major systems fans and pumps to reduce power consumption.
- Automatic control of all building services via simplified Building Management System.
- Automatic energy metering and monitoring will be incorporating throughout the building for all fuel types to enable usage to be logged and verified against the design and best practice energy benchmarks.

5.4 LOCATION OF BUILDING AND SERVICES

The location of the building services will carefully integrate with the existing and new structure and architectural arrangement.

Provision of external heating, cooling, ventilation plant, supply/exhaust louvres, external lighting, TV aerials/dishes will be in sympathy to the building design and visual appearance.

5.5 INTERNAL ROOM NOISE

The noise level in rooms and external areas at the development hereby approved shall meet the noise standard specified in BS8233:2014 "Guidance on Sound Insulation and Noise Reduction for Buildings" and the Hann Tucker Associates acoustic report.

5.6 EXTERNAL NOISE FROM PLANT/MACHINERY/EQUIPMENT

Prior to the commencement of the building, details shall be submitted to and approved in writing by the Local Planning Authority, of the external sound level emitted from plant/ machinery/ equipment and mitigation measures as appropriate.

External noise emitted from plant/ machinery shall be within the limits as specified within the Hann Tucker Associates Noise Impact Assessment acoustic report.

A post installation noise assessment shall be carried out where required to confirm compliance with the sound criteria and additional steps to mitigate noise shall be taken, as necessary.

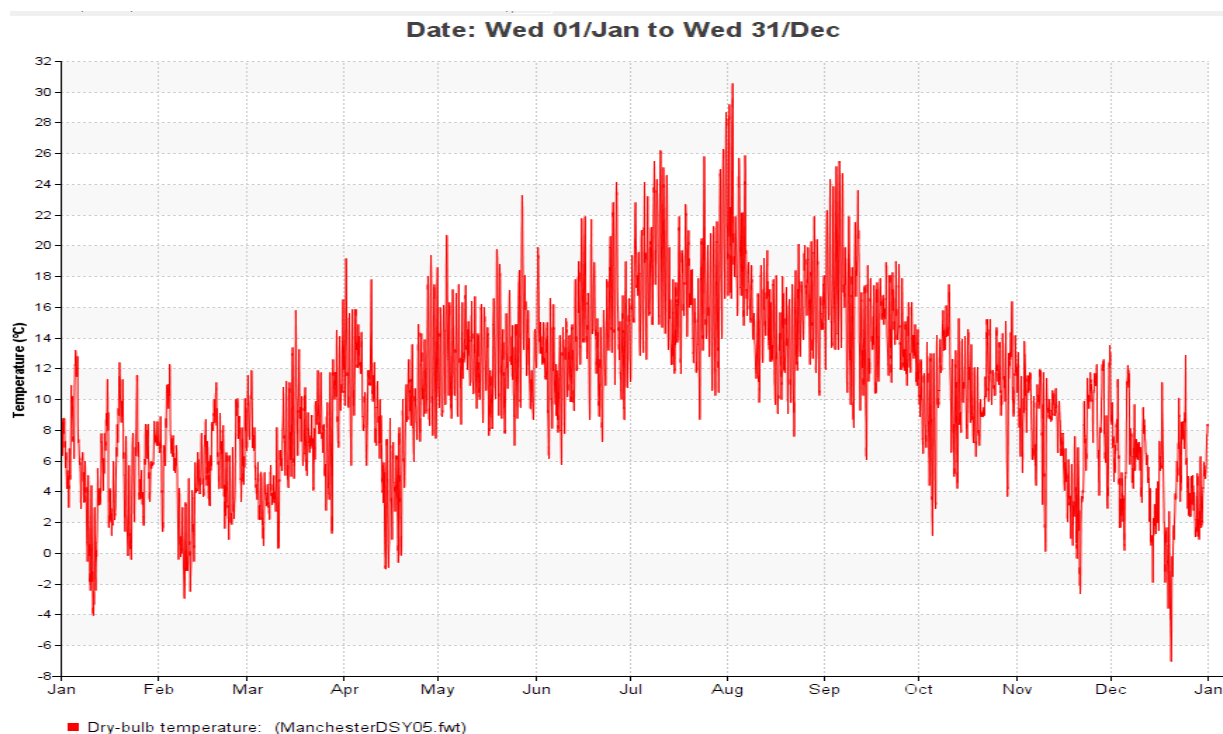
5.7 WEATHER DATA

The below graph represents a typical year defined by CIBSE as a Design Summer Year (DSY) which shows the temperature for Manchester as obtained from CIBSE weather files.

The weather data file Manchester DSY01_2020_High50 is based on current weather data with an adjustment made for future provision climate change effects.

Thermal overheating / modelling shall be carried out to demonstrate acceptable levels of occupancy comfort are provided to meet current and future requirements. This weather file is used for the hotel CIBSE TM 52 analysis.

Figure 2: Weather Data File



5.8 AIR QUALITY

Mechanical ventilation is to be provided to all areas due to the city centre location, the amended Approved Document Part F, BREEAM, etc and overheating.

5.9 DESIGN LIFE OF BUILDING COMPONENTS

The design life of the various types of building components and services equipment will obviously have an impact on the overall cost of the project.

Services plant and equipment are to have a design life in accordance with CIBSE Guide M 'Maintenance Engineering and Management' 2008 Appendix 13.

5.10 BUILDING CONSTRUCTION

The building services shall be designed in cohesion and in conjunction with the overall construction of the building.

Structural input regarding plant/equipment bases, forming of structural opening and supports, chasing out and cast in situ service entries / holes is to be further developed as part of the next design stages.

5.11 CDM REGULATIONS

In addition to the general responsibilities of designers to consider all aspects of the installation, there is a specific obligation under health and safety legislation and The Construction (Design and Management) Regulations 2015 (CDM Regulations) to ensure that the designs can be safely installed, maintained, operated, replaced and to identify areas of abnormal risk related to these activities.

5.12 OPERATION AND MAINTENANCE

The O & M Manuals shall be prepared to Class D in accordance with the BSRIA Handover, O&M Manuals, and Project Feedback. A toolkit for designers and contractors (BG 1/2007).

The as installed drawings shall also include all existing services to make a common set of as installed information available to the client that accurately depicts the routing and sizes of all services contained in the project.

To negate issues with any guarantees and warranty of the main plant and equipment and to ensure efficient operation regular servicing and maintenance is required in line with the manufacturer's recommendations, via the use the use of specialist maintenance personnel where required.

5.13 PART L / ENERGY STRATEGY

The building shall be designed with low u-values, air conditioning heat pumps, LED lighting.

This is covered in a separate energy report.

6 MECHANICAL SERVICES STRATEGY

The section of the report is intended to provide a high-level overview of the recommended systems for the project.

6.1 HOTEL

6.1.1 Incoming Natural Gas Supply

A new natural gas supply shall be brought into the building to serve the swimming pool plant and domestic hot water calorifiers.

6.1.2 Foul drainage systems

The development will be fitted with an independent foul drainage system to serve all sanitary appliances and other drainage outlets within the building. Foul drainage will be collected from each level and transported via gravity to the basement and then to the below-ground drainage system to suit the structural engineer's requirements.

Where necessary, ventilating pipework will be installed to suit either the below-ground drainage system or the sanitary plumbing system, terminating at the roof to meet architectural and technical requirements.

The drainage system will be designed and installed to ensure that:

- Appliances drain quickly, quietly and completely at all times without nuisance or risk to public health.
- Discharge is conveyed without crossflow, back-fall, leakage or blockage.
- Foul air from the system does not enter the building.
- It can be adequately tested, cleaned and maintained.

The current internal layouts on each floor differ and, in some cases, provide little vertical alignment for the drainage system to follow. This is not ideal and poses a risk to the effectiveness of the above-ground drainage system. With insufficient vertical alignment between floors, there will be a need to offset the drainage stacks, which will increase the risk of noise break-out and blockages.

In some locations the pipe offset could also impact on the ceiling void depth and therefore the floor-to-ceiling height, with the required ceiling void depth increasing the further the offset has to run. In addition, all horizontal pipe runs and every change of direction, will require access hatches for rodding points, causing access issues.

Every effort has been made with the design team to coordinate the layouts and limit the number of offsets necessary. Where offsets cannot be eliminated, they will be acoustically insulated and boxed in, and additional relief venting installed as necessary.

6.1.3 Rainwater drainage systems

The rainwater drainage will drain all roof areas, terraces and balconies, receiving rainfall, via a gravity rainwater system using the minimum of pipe and fittings to discharge all rainwater to the below ground surface water systems at ground level.

The form and extent of rainwater collection will be as detailed by the architect and the below ground connection and conveyance will be as detailed by the structural engineer.

The pipework will be thermally insulated, and vapour sealed where they are located immediately below roof soffits, for their whole length and until they connect to a vertical section of pipework. The rainwater pipes will be routed with a minimum gradient of 12mm/m, but to suit the individual flow characteristics of each rainwater pipe, to achieve a minimum self-cleansing velocity. The development includes a large number of areas deemed to be sensitive to noise and pipework routed in proximity to these areas will be acoustically insulated in accordance with the requirements of the acoustic specialist.

6.1.4 Hotel Heating and Cooling

The Hotel bedrooms, Restaurant and office areas shall be heated and cooled by VRF systems. The systems shall be provided to serve each floor of accommodation with a condenser located on level 3 of the external plant deck.

The VRF heat recovery system which shall provide simultaneous heating and cooling operations according to the area condition/requirement.

The outdoor units shall be installed at level 3 with unobstructed air flow and adequate space to permit safe and easy servicing of all internal components and the cleaning of heat exchanger surfaces.

Each outdoor unit shall be mounted so that no vibration is transferred into the building structure and a bigfoot type support frame shall be used.

A heating/cooling unit shall be provided for each room that requires heating and cooling.

Indoor units shall be ducted void mounted chassis units fixed to the building structure and shall be ducted to supply air diffusers within the VRF control zone served as indicated on the design intent drawings. Return air to the units shall not be ducted.

The supply and return air diffuser and plenum boxes shall be provided.

Indoor units shall be a minimum of 3 speed and shall be sized and selected to provide the duty for the zone served whilst satisfying the design acoustic criteria. Generally, fan coil units shall operate at low speed.

Each indoor unit shall be capable of having filter changes via a bottom or rear access unit.

Each indoor unit shall be provided with a condensate lift pump with a failsafe feature. The condensate pump shall be wired to overrun when the indoor unit switches off to prevent a build-up of condensate. The pump shall have a clear plastic discharge pipe extended to a high-level common drain.

Condensate from the units shall be routed to local SVP's.

The installation shall comply with BS EN 378: 2000 Parts 1 – 3, BS 4434 and Guidance Note (EH40) from the HSE where applicable.

The systems shall be fully compliant with the F-Gas Regulations.

In accordance with BREEAM Credit Pol 01 Refrigerants all systems (with electric compressors) must comply with the requirements of BS EN 378:20081 (parts 2 and 3) and where refrigeration systems containing ammonia are installed, the Institute of

The following specialist manufacturers, or equal and approved, shall be used to provide the VRF and heat pump systems.

Hitachi Air Conditioning Europe.

Supply air from the indoor VRF units shall be distributed from spigot connections on an insulated rectangular section plenum box. Supply air shall be distributed through insulated solid ductwork to supply air diffusers mounted within the suspended ceiling zones.

6.1.4.1 Controls

Each floor shall be controlled independently of all other areas via a centralised controller and associated BMS interface located in the core riser which shall connect to the BMS.

The systems shall be time clock controlled to permit separate time control of each floor of the hotels rooms with the facility to input different operating hours for each day of the week including weekends.

The control system shall enable easy change of working hours if required. The controllers shall additionally enable local temperatures to be viewed and provide fault feedback.

The control system shall enable the operation, fan speed, temperature etc. for each individual indoor unit to be controlled and adjusted individually or as a group.

To enable energy apportioning of the VRF and heat pump systems the centralised controllers shall be connected to a principal controller(s) which shall store and apportion energy data for all the systems. Energy apportioning licenses shall be purchased as necessary. A web user pin shall be provided for each centralised controller to enable the building users to assign virtual controllers without the need for any additional controllers to be installed.

To facilitate the energy apportioning of the systems each individual power supply to any outdoor condensing units shall be provided with a suitable analogue pulse output energy meter. These meters shall be wired back to the associated centralised controller for the apartment they serve.

The Contractor shall include for installing and commissioning all necessary software upon the Building Management System computer.

All indoor units shall have the facility to connect to an individual controller if required.

6.1.4.2 Condensate

Gravity condensate drains shall be installed from each indoor unit and refrigerant control boxes with a clear plastic discharge pipe extended to a high-level common drain.

The common condensate drain shall be insulated copper or un-insulated PVC which shall be 25mm dia minimum and laid to a minimum fall of 1:80.

PVC pipework shall be robust and suitable for its application. Additional supports shall be provided in order to maintain the future robustness of the installation.

Pipework shall be adequately supported in such a manner as to permit free movement due to expansion and contraction.

Pipework shall run to waste and shall be fitted with transparent cleanable traps. On completion a leak and function test shall be carried out.

6.2 HOTEL VENTILATION

The hotel will be ventilated by a number of separate systems, of varying configurations, which can be best summarised as follows

The Pool Area Air Handling Unit (including plate heat exchanger heat recovery) that shall be located at basement level with ductwork distributed to the basement level to serve the pool area and the fresh air and exhaust rising up to ground floor level to connect to louvres on the external façade. The pool plant shall be selected by a pool specialist at RIBA Stage 4.

A central extract system shall be provided to serve the basement store areas, the ventilation shall discharge locally through the external façade.

The guestrooms within the listed building area of the development shall be ventilated from a central air handling unit located on the external plant deck at level 3 in lieu of local MVHR units to avoid any services penetrations through the listed façade. Supply and extract ductwork shall be distributed within the roof void and drop locally within each bedroom via risers as coordinated with the architect.

A number of guestrooms within the listed building development are to be provided with a kitchenette, a low volume extract point will be provided to these rooms, but the cooker hood will be a recirculation unit and will not be connected to the MVHR system, to reduce the risk of grease infiltrating into the central ventilation system. All diffusers, grilles and exhaust valves will be selected in consultation with the interior designer.

The new build guestrooms shall be ventilated via local MVHR units to each room. The units shall be horizontally mounted MVHRs and will be installed within areas of deeper ceiling void generally over Ensuite areas.

Outside air from the MVHR will be introduced directly into the space via the indoor FCU unit, whilst the exhaust will be via the bathroom valves/grilles. The outside air is drawn in to the MVHR and the vitiated air discharged via discreet façade features detailed by the architect.

A dedicated supply fan to the Kitchen c/w electric heating coil and filtration will serve the Kitchen. The fan will be located within the ceiling void of the kitchen at ground floor level.

The kitchen extract fan shall be mounted at roof level shall be fitted with a vertical discharge cowl to comply Manchester City Council requirements. The final details of the extract system shall be detailed at Stage 4 once further details are known and the system shall be designed to HVCA DW172 standards.

All WC areas shall have local extract fans, discharged locally through the façade.

Smoke ventilation shall be provided as detailed in the fire consultant's report, the duty/ standby smoke extract fans will be located at roof level.

6.2.1 Hotel Domestic Water

The hotel domestic water services will be a metered boosted cold-water service taken from the cold-water storage tank located in the basement. Hot water will be generated by gas fired boiler plant located at level 2 that shall heat the hot water storage calorifiers. The pipework distribution will be a pumped return arrangement with automatic balancing (flow control) valves at the end of every branch or riser.

Each guestroom will be provided with centrally fed cold and hot water supplies, which will then be distributed throughout the guestroom to feed all the outlets.

The kitchen, restaurant, spa, dining areas and associated WCs shall all be fed from the central hotel hot water plant located at level 2.

The architect / interior designer will select fittings to provide compliance with Part G of the Building Regulations/ United Utilities water use calculator and where that is not possible, flow limiters will be provided to individual outlets. However, there is a recognition that market perception will call for enhanced flow rates to be available, particularly to the hotel bedrooms.

6.2.2 Stair core depressurisation

The development shall incorporate fire-fighting shafts as denoted in the fire consultant's report. A dedicated builder's work smoke shaft is provided, with a closed base and extract fans on the roof to draw smoke through the shaft. AOVs will be installed in the shaft wall, connecting to the protected lobby at each floor.

An AOV will also be installed at the head of the protected stair, connecting to atmosphere and providing a route for make-up air. During operation, air enters the staircase, reaching the floor being ventilated through the doors connecting the lobby and staircase.

Under design conditions, with the lobby door open, the system will provide an equivalent extract ventilation rate to a naturally ventilated shaft, aiming to keep the staircase free of smoke. When the lobby doors are closed, the ventilation rate will automatically modulate to avoid excessive depressurisation of the lobby, which would make opening the doors difficult. A two-position fireman's override switch will be provided at each floor level for fire service manual override of the fans.

- Stair AOV
- Smoke extract fans
- Mechanical smoke extract shaft
- Fire floor
- Common corridor or firefighting lobby

6.2.3 Building management system

A digital Building Management System (BMS) will be installed to monitor, log and control the functions of the MEP services, including metering of services to all separate users and principle loads. Local standalone microprocessor based intelligent out-stations networked via a data loop will gather data from sensors and provide local DDC control.

7 ELECTRICAL SERVICES STRATEGY

7.1 INCOMING SERVICES

A preliminary calculation to determine the load for the building has identified that the electrical demand will be as follows:

- Hotel – 295kVA

The main incoming service terminates within ground plant room from the Northern Power Grid (NPG).

The electrical supply to the building will terminate on low voltage switchgear located within the basement LV switch rooms.

7.2 HOTEL

7.2.1 Low Voltage Distribution

The low voltage distribution comprises of the main electrical infrastructure such as switchgear, distribution boards and cabling to deliver the electrical services throughout the building.

Low voltage utility metered supplies shall be provided from the main distribution board located in the plant room to supply to each of the demises / areas.

The low voltage distribution cables shall be routed on cable tray within risers, ceiling voids throughout the building.

The supplies shall terminate into new distribution boards/consumer units/isolators in agreed locations.

7.2.1.1 Life-safety supplies

A separate landlord switch-panel will be provided for secondary power supplies to the life-safety and other critical systems, smoke extract fans, smoke ventilation systems, drainage sump pumps.

This will be located in the UPS room and be supplied from the standby UPS which will provide life safety supplies throughout the site. The primary and secondary power supply systems will be physically separated and follow diverse routes as far as possible, so that a failure in a cable or equipment, either by mechanical breakdown or damage by fire, in either supply, does not affect the other.

Automatic transfer switches (ATS) with manual bypass will be provided at all dual-supplied loads, as well as primary and secondary manual bypasses on major plant to allow the essential supply to meet the load on failure of the primary supply. Each ATS will provide a start signal for the generator in the event.

7.2.1.2 Power Factor and Harmonic Filtration

Allowance for CT's and VTs on switchboard will be made only for post construction installation of power factor and harmonic filtration units if they are deemed to be required.

7.2.1.3 Metering

Sub-meters will be installed on all the main distribution panel outgoing ways and on all the distribution boards throughout the building. This is in accordance with the Building Regulations Part L such that at least 90% of the building energy consumption can be assigned to an end-use category and such that all room types in the building are separately metered.

Meters will be current transformer (CT)-operated with a Modbus output and will transmit their readings to a dedicated Automatic Meter Reading (AMR) system.

7.2.1.4 Life safety generator

A UPS shall be provided to supply the life safety plant in lieu of a diesel-powered generator. The UPS shall provide power to fire-safety and other critical systems in the event of the primary power system failing to the development. The UPS will provide power on detection of mains failure to any of the life safety automatic transfer switches and will connect to the secondary switch-panel once the output voltage and frequency is within the specified range.

7.2.2 Wiring and Containment Systems

Cable containment systems to serve the various electrical installations will comprise the following:

- Cable tray and cable ladder for Sub Mains cabling
- Cable tray and cable basket for security, CCTV, access control and fire alarm cabling
- Cable trunking and conduit for final circuit small power and lighting cabling
- Cable tray and cable basket for data and communications cabling
- Underground ducts for incoming and outgoing electrical services: mains supply, sub mains, lighting, communications, security systems and future systems cabling.

The wiring and containment systems will be concealed above ceilings or surface mounted when there is no ceiling and routed in risers.

7.2.3 Small Power Systems

7.2.3.1 Hotel

Several power circuits will be distributed from the consumer unit in the guestroom, throughout the bedroom, to limit the disruption caused by the isolation of a single circuit. Rooms with permanently installed fixed equipment, will be provided with dedicated circuits for that equipment, separate to the power sockets in those rooms. All socket outlets within the bedroom will be protected by RCBOs at the consumer unit.

BS7671 recommends that socket outlets are protected by AFDD, and this will be provided; however, the client can undertake a risk assessment and remove this if the risk profile outcome is low.

7.2.4 Interior Lighting

7.2.4.1 General Space Lighting Systems

The interior lighting solutions will integrate natural and electric light sources to provide dynamic visual environments that respond to user requirements in an energy efficient manner. Lighting solutions will embrace the architecture and will form an integral part of the interior space planning/interior design detail.

Individual material reflectance and light absorption properties will be considered in the development of the lighting design, in order to strike a balance between the brightness of surfaces and the degree of reflected light, whilst achieving the appropriate degree of visual comfort and visual interest.

The lighting proposals will be developed to consider both the aesthetic styling of the spaces and the functional demands of typical tasks undertaken in such environments.

High efficiency Luminaires with LED sources will be used where appropriate for each application. It is proposed that suspended, surface and recessed luminaires are used.

The lighting design will be as per the various CIBSE/SLL lighting codes/guides, in particular:

- SLL Code for Lighting
- BS EN 12464-1: 2011 Lighting of Indoor Workplaces
- BS EN 12464-2: 2014 Lighting of Outdoor Workplaces
- SLL Lighting Guide 6 (LG06): The Outdoor Environment

Consideration will be given to future maintenance, lamp replacement, equipment standardisation and energy consumption.

7.2.4.2 Hotel Guestrooms

The interior designer will be providing the lighting design as part of their proposals, this will be developed at Stage 4.

7.2.4.3 Ancillary & back-of-house areas

All landlord areas will be controlled via a centralised Dali lighting control system. A dedicated head-end controller for the system will be provided in the electrical plant room, with area lighting controllers in the electrical risers throughout the building.

Front-of-house areas will have a range of feature lighting effects, to suit the architectural aspirations for the spaces, using recessed LED dimmable luminaires to provide a bright and welcoming environment. Lighting will be automatically adjusted via a centralised lighting control system in the electrical plant room.

Corridor lighting will generally comprise of recessed architectural down-light luminaires, utilising LEDs lamps. These luminaries will always be on in a dimmed mode and will use local proximity PIR detection to increase to full brightness when the corridors and stairs are occupied.

Stair lighting will generally comprise of surface luminaires, utilising LEDs lamps. These luminaires will always be on in a dimmed mode and will use local proximity PIR detection to increase to full brightness when the corridors and stairs are occupied.

Back-of-house and plant room lighting will be provided by LED fittings, with manual switching adjacent to all exits. The car park will be fitted with LED luminaires, which will be permanently switched on in a dimmed mode and will use local proximity PIR detection to increase to full brightness when in use.

7.2.5 Emergency Lighting

Emergency lighting will be provided in accordance with BS5266 and the requirements of the building control authority.

The emergency lighting will be provided by the standard luminaires with integral battery packs, to provide the required minimum lighting levels in the event of a power failure. The installation will also include illuminated exit signs and a self-testing and reporting system as required by the various tenants.

7.2.6 External Lighting

The External Lighting will be provided to conform to current relevant British Standards, Codes of Practice and CIBSE Code for exterior lighting.

Exterior illumination will be provided to offer functional security and access illumination around the site. Higher levels of lighting will be provided immediately adjacent the building to provide safe pedestrian access and actuate the building at main entrances.

External lighting will be controlled by photocell and time clock controls with manual override for testing and security purposes. External (emergency) lighting will be required outside all final exits to meet the requirements of BS 5266.

7.2.7 Lighting Management and Control

The lighting controls within the building will comply with Part L2A of the Building Regulations.

In all area where the lighting is not manual, the following lighting control system will have the following features:

- Individual addressing, switching and dimming of each luminaire.
- Individual addressing of local control devices
- Local control of lighting from wall switches and presence detectors
- Testing and monitoring of emergency lighting
- A number of different scenes will be programmed into the lighting control system for certain room types which will be agreed in the following design stage.

7.2.8 Fire Alarm System

A comprehensive fire strategy will be developed and agreed with Building Control and the Fire Engineer and will determine the extent of fire detection and protection required for the building.

An open protocol fire alarm system to BS 5839 Part 1:2017 shall provide automatic detection throughout all areas of the office, hotel and residential landlord's areas to the required Category. This will consist of electronic sounders, smoke/heat detection, flashing beacons, interfaces and manual call points installed throughout the building as required.

The main fire alarm panels will be installed in the main building entrance with repeater panels located as required by the fire strategy. Fire alarm panels will have 72-hour battery back-up and report to the remote manned receiving centre.

Sounders will be used throughout the building to alert occupants of an alarm. Flashing beacons will be provided to comply with the Equality Act and in spaces where there are high ambient noise levels.

The appropriate type of fire detection will be selected for each area and the type of fire detection selected must be the most suitable for an area, task performed, or equipment stored.

Interface units shall be provided to the following equipment to safely shut down and/ or isolate systems for compliance with the British Standard: mechanical control panel, all doors with access control, ventilation systems and automatic doors.

Zones for the fire alarm system will be assigned according to the fire compartmentation, smoke control zones and the building structure, affecting the action taken by the fire alarm.

7.2.8.1 Hotel

The Hotel will be provided with a point addressable intelligent central fire alarm system which will cover all the hotel communal areas and the guest accommodation. Evacuation will be in accordance with the fire engineers recommendations. It will be linked to an external monitoring station.

7.2.9 Disabled WC

A disabled alarm system will be installed in all disabled toilets and showers. Each toilet and shower will be provided with a pull cord alarm switch and a reset button within the room. An indicator lamp and tone generator will be located outside above the door.

Hotel alarms will report to an alarm panel located at the ground floor main reception desk.

7.2.10 Disabled Refuge Intercom System

A disabled refuge alarm system will be provided to aid evacuation control in the event of a fire alarm. A two-way intercom system will be provided in each disabled refuge in accordance with BS9999 and BS5839, for communication in the event of a fire evacuation. The system will have battery back-up for standby duration of 24 hours and 3 hours operational capacity.

The system will link the disabled refuges on each level back to an indicator panel, adjacent to the addressable fire alarm panel at ground floor level where fire services will enter the building in an emergency.

The system will be linked to the fire alarm panel and will only become active when the fire alarm sounds, to prevent nuisance use. Fire alarm sounders will be positioned away from the panels, to ensure speech levels are audible above the alarm. Upon activation, the system will provide visual and audio alarm

signals both locally at the point of activation, and to the main indicator panel. The central panel will indicate the source of the call and allow a two-way conversation to be set up to one or all call-points.

7.2.11 Data Distribution and Telecommunications Systems

7.2.11.1 Communications network

Provision will be made in the basement for intake communications rooms. Communication services will be brought into the building from the Comms Utility 1 networks in Road. From the road, cable duct will be installed to carry the Comms Utility 1 infrastructure into dedicated communications intake rooms in the basement.

Fibre connections will be taken from the road, along diverse routes to distribution points in the communications intake rooms. The equipment in the rooms will allow both fibre and copper connections to be distributed throughout the building.

7.2.12 Radio and Television Distribution Systems

A fibre-based integrated reception system (IRS) will be installed to provide with a comprehensive range of media services (digital TV, satellite TV and digital radio).

Three satellite dishes will be provided on the roof to receive television signals from the Astra (Sky), Hot Bird and Arabsat transmission systems. Additionally, a high-gain UHF aerial and a single dipole DAB aerial will be installed for terrestrial TV and radio services. A head-end amplifier located at the top of the riser will be installed to boost the signals before connecting to the IRS distribution system. Fibre cables will run down the electrical riser from the roof, connecting into fibre-copper converters at intermediate levels. From the fibre-copper converters, coax cable will be fed into a digital Satellite Cable Router (dSCR), allowing all satellite and terrestrial signals to be transmitted into a residence along a pair of coax cables.

7.2.13 Hard of Hearing

Hard of hearing systems will be provided in compliance with the Equality Act, Part M of the Building Regulations and BS 8300.

As a minimum, permanent hard of hearing systems will be provided at the reception desk.

7.2.14 Call and Alarm Systems (Disabled Refuge Call)

A disabled refuge intercom system will be provided to aid evacuation control in the event of a fire alarm in all stair cores. The system will link the disabled refuges on each level back to an indicator panel, adjacent to the main fire alarm panel in the local reception. The system will be linked to the fire alarm panel and will only become active when the fire alarm sounds, to prevent nuisance use. Upon activation, the system will provide visual and audio alarm signals both locally at the point of activation, and to the main indicator panel. The reception panel will indicate the source of the call and allow a two-way conversation to be set up to one or all call-points.

7.3 LIGHTNING PROTECTION, EARTHING AND BONDING

A lightning protection system will be provided to the building in accordance with BSEN62305, with the extent subject to the lightning protection assessment result.

8 PLANT SPACE AND SERVICES DISTRIBUTION ROUTES

Primary plant locations have been agreed early in the project to ensure that building services systems can be efficiently coordinated, maintained and operated.

The main incoming utility services for the electric will terminate within basement switch room. Water shall terminate in the basement where it enters the building before being distributed through the building as required. Telecoms shall terminate in the basement IT/data rooms. Gas shall enter at ground level and connect to the utility meter from where it shall route to the second-floor plantroom.

The main plant and equipment shall be laid out to provide adequate space to enable maintenance, operation and replacement to be safely and easily carried out.

The external plant comprising of air source heat pumps shall be located within a designated plant area at level 3. An air handling unit plant will be at dedicated plant areas, i.e., level 3 and roof level for centralised systems. Space has been allowed for the condensers to the Beer Coolers, final selection to be carried out at Stage 4.

The internal room layouts and ceiling designs has undergone careful coordination with the Architectural proposals to ensure services can be accommodated and heating/cooling units, ventilation ductwork and primary pipework distribution and containment can be installed and maintained.

The building services shall generally distribute from the main plant room throughout the building within service risers and ceiling voids which will allow access for installation and future maintenance.

The use of AutoCAD REVIT will enable effective coordination and setting out to be carried out, and to identify the required space for installation and maintenance as part of the collaborative design team approach.

9 APPENDICES

9.1 APPENDIX A SCHEDULE OF MANUFACTURES

Appendix A

Schedule of Manufacturers

Mechanical Schedule of Manufacturers (Equal and Approved)	
Product	Manufacturer
Grilles / Diffuser	Senior Coleman Gilberts
VRF/ DX Systems	Hitachi Air Conditioning Europe
Electric Panel Heaters	Adax Neo Domis
Fire Dampers	Actionair Waterloo
Valves	Hattersley Newman Hender Crane
Attenuators	Caice Alloway
AAV's	Flamco Yorkshire Fitting
Extract Fans	Nuaire Solar & Palau
Air Handling Unit	Swegon Solar & Palau
Thermostatic Mixing Valves	Danfoss Horne
Pumps	Grundfos Wilo
Boosters	Grundfos Wilo
Calorifiers	AO Smith Ormandy Rycroft
Air Curtain	Diffusion Biddle
Flues	Jerimias A1 Bridge Flue
BMS/Automatic Controls	Open Protocol

Electrical Schedule of Manufacturers (Equal and Approved)	
Product	Manufacturer
Lighting	Ricoman
Lighting Controls	Exor Lighting Controls CP Lighting Controls
Panelboards/Distribution Boards/MCB's/Metering	Schneider Square D
Containment (Cable Tray, Trunking, Conduit, Unistrut)	Cablofil Pemsa Swift MK
Accessories	MK Legrand
Cables	BASEC Approved Prysmian Draka Eland
Fire Alarm	Hochiki
CCTV	Hikvision
Intruder Alarm	Bosch
Access Control	Salto
Disabled Call	Notifier Gent Chubb
Induction Loops	C-Tec Professional Range
Voice/Data System (Cat 6 Cabinets, Patch Panels, Cabling, Outlets, Patch Cables)	Brand Rex Excel