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31 DALEHAM GARDENS, LONDON

Mechanical and Electrical Services Strategy Report

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Contents

Registration of Amendments

Revision and Date	Amendment Details	Revision Prepared By	Revision Approved By

1.0 INTRODUCTION

1.1 Create Consulting Engineers Ltd has been appointed as MEP engineering consultant for the proposed development 31 Daleham Gardens in Camden, London. Create Consulting Engineers will be responsible for engineering consultancy on Mechanical, Electrical and Public Heath Engineering.

Project Description

1.2 The proposed development is in the London Borough of Camden on a derelict site that was struck by fire but has now been demolished, as part a regeneration strategy in Daleham Gardens, Camden. It is to provide 14 new homes of 1 bed, 2 beds and 3 beds apartments within 6 storeys of residential accommodation.

Project Team

1.3 The project team will be as follows:

Client:	NW3 CLT
Proposed Main Contractor:	TBC
Project Manager:	Altair
Lead Architect:	Mole Architects Ltd
Structural/ Civil Engineer:	Simple Works
Sustainability Consultants:	Create Consulting Engineers Ltd
Services (MEP) Engineer:	Create Consulting Engineers Ltd
Cost Consultant:	Calfordseaden
Landscape Architect:	
Traffic Consultant:	
Fire Engineer:	Fire Integrity

Purpose of Report

1.4 This Mechanical and Electrical Services Strategy is being submitted in support of an application for the 31 Daleham Gardens Development in Camden, London. It describes the Mechanical, Electrical and Public Health Engineering Services for the development.

1.5 This Stage 2 report covers MEP engineering progress relating to the site works for the development at 31 Daleham Gardens, London.

1.6 The information within this report has been issued to provide the client and cost consultant outline scope of works to inform their cost plan. It should be noted that this is preliminary and subject to further refinement and amendment during the following stages of design. A

suitable cost contingency should thus be made to allow for on-going design development and coordination plus unknowns and associated risks to the project.

2.0 THE SITE

Location

2.1 The proposed development is located at National Grid Reference (NGR) 526673, 185076 off Daleham Gardens, London NW3 5BU.

Figure 2.1: Site Location Plan

3.0 DESIGN CRITERIA

Standards and Regulations

3.1 The design shall comply with all statutory obligations arising from current legislation and regulations, together with other requirements, including, but not limited to the following:

- Statutory obligations (where applicable):
  - Building Regulations
  - Clean Air Act
  - Confined Spaces Regulations
  - Construction Design and Management (CDM) Regulations
  - Construction Health, Safety and Welfare Regulations
  - Control of Pollution Act
  - Control of Substances Hazardous to Health (COSHH) Regulations
  - Electrical Equipment Safety Regulations
  - Electricity at Work Regulations
  - Environment Act
  - Environment and Safety Information Act
  - Environmental Health Officer's requirements
  - Environmental Protection Act
  - Fire Precautions Act
  - Health and Safety at Work Act
  - Lifting Operations and Lifting Equipment Regulations
  - Local Authority Building Inspector's Requirements
  - Local Authority Bylaws, Regulations and Notices
  - Local Fire Officer's Requirements
  - Management of Health and Safety at Work Regulations
  - Manual Handling Operation Regulations
  - Personal Protective Equipment at Work Regulations
  - Pollution Prevention and Control Act
  - Pressure Equipment Regulations
  - Pressure Systems Safety Regulation
  - Provision and Use of Work Equipment Regulations
  - Public Health Acts
  - Water Regulations and Bylaws - Water Act
  - Workplace Health, Safety and Welfare Regulations

- Other requirements:
  - British Standard Specifications and Standard Codes of Practice
  - BS 7671: 18th Edition- Requirements for Electrical Installations - IET Wiring Regulations
  - CIBSE Lighting Guidelines
  - CIBSE Guides to Good / Current Practice and Technical Memoranda

- CIBSE Heat Networks: Code of Practice for the UK
- BES Ductwork Specification Standards
- CIBSE Commissioning Codes
- BSRIA Commissioning Guides
- BSRIA Technical and Application Guides
- Insurance Company Requirements
- IEC Standards

Design Criteria

3.2 The following design criteria have been referred to for the developed design of the mechanical and electrical engineering services for 31 Daleham Gardens.

Parameter	Condition
External Summer Design Condition	28°C dry bulb/20°C wet bulb
External Winter Design Condition	-3°C
External Noise Criteria	To be produced by the acoustic consultant
Internal Noise Criteria	Refer to the acoustic report
Internal Winter/Summer Design Conditions	Refer to the appended environmental matrix
Above Ground Drainage Discharge Units	Discharge Units for appliances taken from Table 2 of BS EN 12056 Part 2 (2000). • Shower: 0.4 DU • Gulley: 1.2 DU • WC: 1.8 DU • Basin: 0.3 DU • Sink: 1.3 DU The design of the system shall be in accordance with BS EN 12056:2, 2000, System 3.
Water Services Design	Maximum Velocity 3m/sec pipework 100-200mmø. Less than 2m/sec for pipework less than 80mmø Demand Units for pipe sizing as listed within Table 14 in the Institute of Plumbing (IOP) Design Guide, based upon medium frequency of use. Cold water storage sizing shall be based on Table 6 of BS EN 806-2:2005 (105L per person), with the tank sized on 8 hours storage. The incoming flowrate shall be based on a 4hour refill rate.
Low Temperature Hot Water Distribution Temperatures (in apartments)	60-40°C

Parameter	Condition
Heating Maximum Pipe Velocity (Pipe sizes 100-200mmØ)	Less than 1.5m/sec (or otherwise specified by the appointed heat network operator)
Heating Maximum Pipe Velocity (Pipework less than 80mmØ)	Less than 2.0m/sec (or otherwise specified by the appointed heat network operator)
Air Change Rates	As required under Approved Document Part F
Ductwork Velocity	As per manufacturer requirements for MEV/ MVHR System (Part F System Type 3 and 4).
Lighting levels – General	In accordance with CIBSE Lighting Guide 9 Refer to the appended environmental matrix

Table 3.1: Design criteria referred to for site design.

4.0 NEW UTILITIES SUPPLIES

Incoming Mains Water Supplies

4.1 We recommend that new utility services are provided from offsite to new mains positions from where it will be distributed within the building.

4.2 Close planning and coordination will be required with all utility companies to formulate a plan of action in line with the routes and programme.

4.3 From a review of the utility services within the vicinity of the site, we do not foresee any issues with providing the quantity of load required for the site from each utility provider. During the next stage of the project detailed applications will be made and detailed assessments of available utility loads will be completed.

Gas

4.4 There is no gas connection required to the site. 100% electric.

Main Water Supplies

4.5 A new mains water service (MWS) connection shall be sized and provided from the utility mains in Daleham Gardens and distributed to a dedicated water tank room in the lower ground floor.

4.6 A Boosted Cold-Water Services (BCWS) shall be provided including domestic sprinkler services from the tank room to each apartment.

4.7 The new water distribution infrastructure shall utilise multi-service trenches that will allow for the installation of multiple utilities to follow the same routing throughout the site.

Electricity

4.8 It has been confirmed via UPKN that new LV services will be provided to the site and fed from a local LV point of connections on the street. Budget costs have also been provided and issued to the design team.

4.9 As the design stage progresses, a final load assessment will be undertaken, applications can be made to UKPN to ascertain any reinforcement requirements and subsequent programme/cost implications.

BT Openreach

4.10 Applications will need to be made with BT Openreach for new services to dwellings. A below ground ducting system will need to be provided for BT Openreach Services to the site to the residential building core.

4.11 It is anticipated that the existing BT Openreach infrastructure on Daleham Gardens can be extended to provide new services to the development.

4.12 Typically, BT Openreach applications take up to 12 weeks for a response to applications.

4.13 It is anticipated that all new BT Openreach services will be utilising the developer self-install approach where BT Openreach will pay the developer a fee per plot for installing all containment and cabling. All ducting and cabling will be free issued by BT Openreach to the developer.

Virgin Media

4.14 Applications will need to be made with Virgin Media for new services to dwellings. Virgin Media will require a separate ducting system around the site to the residential building core. It is anticipated that the existing Virgin Media infrastructure on Daleham Gardens area can be extended to provide new services to the development.

4.15 Typically, Virgin Media applications take up to 12 weeks for a response to applications.

4.16 It is anticipated that all Virgin Media services will be utilising the developer self-install approach where all cabling and ducting will be free-issued by Virgin Media to the developer.

Fire Main and Hydrants

4.17 The existing fire mains supply within the vicinity of the site will be utilised for the fire mains services to the buildings. Fire hydrant position to be confirmed with the fire consultant report.

5.0 PUBLIC HEALTH SERVICES

Incoming Mains Water Supplies

5.1 New incoming mains water services will be provided from the 'onsite' mains cold water infrastructure as detailed below:

- Metered landlord/residential service to apartment building (each residential tenant to be provided with a Thames Water billing meter)

5.2 The supplies will be compliant with the 1999 Water Regulations, Local Water Authority requirements and Local Authority guidance.

5.3 All buried blue MDPE pipework will be 'barrier' pipe in case some ground contamination is present.

Domestic Cold-Water Services

5.4 Domestic cold-water services within the building will be split dependent on area/use. Landlord and residential areas will be supplied via cold water storage tanks and booster pumps.

5.5 The tank room will be provided with its own dedicated pre-insulated GRP sectional cold water storage tank located in the lower ground floor plant room, to serve the landlord and residential areas. The tank will be complete with all central divisions, access hatches, screened overflows and warning pipes, vents, tank drains and access ladders.

5.6 From the cold-water storage tank room, domestic water services will be distributed through the buildings by packaged booster sets, complete with multiple vertical turbine variable speed pumps.

5.7 Appropriate water filtration/treatment/conditioning will be provided to the domestic cold-water system, type and arrangement is dependent on water quality sampling and will be confirmed at the next design stage.

5.8 The distribution pipework will be pressurised from the main cold water booster pumps set accounting for building height, distribution losses to provide a minimum pressure of 3.0 Bar at point of entry to each dwelling. Local pressure reducing valves will be installed to limit pressures as necessary. The cold-water distribution to the apartments will serve both general potable use and the residential sprinkler system.

5.9 The pipework will be distributed up the building within the core riser and then run horizontally to serve each unit.

5.10 Point of entry to each apartment will be complete with isolating valve, drain valve, double check valve and a branch serving the domestic sprinkler system. Each apartment will be provided with a Thames Water billing meter located within the utility meter cupboard adjacent to the entrance door of each apartment and accessible from the communal area.

5.11 After the incoming valve arrangement to each apartment, the boosted cold-water main will connect to the EAHP/Cylinder and distribute to all other taps and domestic cold-water points of use. To reduce risk of leakage, water damage and simplify maintenance, domestic cold water distribution arrangements within each apartment will be as a 'point-to-point' installation comprising sanitary manifolds and multi-layer pipework with pressed joints.

5.12 All sanitary fittings and water outlets connected to the boosted cold-water supplies will be WRAS approved in accordance with the 1999 Water Regulations. WC cisterns will incorporate internal overflow arrangements approved as part of the WRAS certification.

5.13 All concealed distribution pipework will be thermally insulated, and all visible pipework will be chromium plated.

5.14 The landlord supply will also serve new CAT5 installations each comprising a break tank and booster pump (multistage) arrangement. The CAT5 installations are located at lower ground and roof levels and will serve irrigation, refuse store and PV wash down services.

Hot Water Services

5.15 Hot water shall be supplied via the hot water cylinder located within the exhaust air heat pumps (EAHPs) or separate hot water cylinders associated with the ASHPs.

5.16 The cylinders shall be provided with indirect heating pipework to generate the hot water. The cylinders shall also be provided with electrical immersion heaters as standard, if the EAHP/ASHP fails to operate.

5.17 The hot water supply system shall feed sanitary appliances and fittings as required. Where practical manifolds may be used for final connections to appliances and fittings. Distribution pipework shall generally be in copper with mineral wool insulation. Where applicable, final connections from manifolds to appliances and fittings shall be in cross linked polyethylene with nitrile rubber insulation; joints in pipelines shall be avoided. An isolating valve shall be provided to each appliance and fitting. Thermostatic mixing valves shall be provided to all baths, basins, and showers.

5.18 All concealed hot water distribution pipework will be thermally insulated, and trace heated if dead legs over 3m in length, and all visible pipework will be chromium plated.

Soil and Waste Installation

5.19 A series of soil vent stacks and waste vent stacks will be provided to drop vertically through the building and horizontal run outs will be in uPVC plastic pipework and configured to suit the kitchen and bath/shower room core layouts and appliances.

5.20 All internal stacks will be cast iron or HDPE, insulated using appropriate acoustic insulation. All sanitary fittings will be selected by the Architect.

5.21 Vertical stacks will be located within the bathrooms, kitchens and utility cupboards, and will offset at high level ground floor to enable discharge under gravity to the associated stacks provided at below ground.

5.22 Tank room will be provided with drainage gully and, where required, will drain to the below ground sewer.

6.0 FIRE PROTECTION SERVICES

Dry Risers

6.1 Dry risers shall be installed to BS9990 to serve the residential and landlord areas that are being designed and designated for 'firefighting' purposes. The inlet location will be close to the residential entrance where the Fire Brigade will enter the building. Outlet (landing) boxes shall be finished in stainless steel.

6.2 Dry riser pipework shall be installed utilising heavy grade galvanised steel pipework.

Apartment Sprinklers

6.3 The apartments shall be provided with a sprinkler system in accordance with BS 9251.

6.4 The combined cold-water storage and sprinkler tank shall be able to provide the minimum storage for a category 2 sprinkler system. A branch shall be taken before the cold-water tenant's valve assembly and provided with appropriate backflow protection followed by a sprinkler test point complete with flow switch, pressure gauge, test branch and isolation valve. The arrangement shall be installed in the ceiling void outside of each apartment door. A drain line from the test point will be run to discharge via a tundish and waterless trap connected to the above ground drainage within the apartment being served.

6.5 Sprinkler pipework shall be extended throughout the apartment to serve the heads. Design and installation shall be by a certified sprinkler specialist/contractor.

6.6 Flow switch monitoring will be provided via the fire alarm system to give indication of water flow at the fire alarm panel. Refer to the electrical section of this report for further details.

6.7 Facility shall be provided at each floor level to test the sprinkler pipework.

7.0 MECHANICAL SERVICES

Heating Systems

7.1 Heating to the apartment will be provided by EAHPs for 1 bed and 2 bed apartments and ASHPs to 3 bed apartments.

7.2 Exhaust air heat pumps (EAHP) are proposed to be in each apartment (1 bed/ 2 bed), which can provide extract ventilation, space heating and hot water to each dwelling. Reference should be made to the section above for hot water.

7.3 Exhaust air heat pumps (EAHP's) utilize the dwellings extract ventilation system to produce heat which can be used to supply domestic hot water and space heating systems. The dwelling exhaust air flow, which is commonly at a temperature of 18-21ºC, passes through the EAHP as it is extracted from the residence. As the air passes through the heat pump, heat held in the air is exchanged into a refrigerant circuit and this is subsequently transferred into the water circuit for use within the dwelling.

7.4 If the heat stored in the extract flow is insufficient to meet the heating and hot water demand, outdoor air can be used as a supplement to increase the output of the EAHP.

7.5 For larger 3 bed apartments, heating will be provided by ASHPs located at roof level to cylinders located in the utility cupboard in each apartment and this will provide space heating and hot water to each dwelling. Ventilation in these dwelling will be provided by MVHR units.

7.6 Air source heat pumps (ASHP's) utilize the outdoor air to produce heat which can be used to supply domestic hot water and space heating systems. As the air passes through the heat pump, heat held in the air is exchanged into a refrigerant circuit and this is subsequently transferred into the water circuit for use within the dwelling via the hot water cylinder.

7.7 After the heat has been transferred to the heating pipework, this either distributes around the dwelling to the emitters or it can be diverted to the hot water cylinder located within the EAHP/ASHP cylinder, via a three-port valve. The hot water demand will always take priority over the space heating.

7.8 Distribution pipework unit shall be in copper with mineral wool insulation from the EAHP/Cylinder to the UF heating manifold. A removable magnetic filter shall be installed on the return connection to the EAHP.

7.9 The proposal for this scheme is to have underfloor heating throughout all the apartments. The UFH manifold shall be located at low level within the utility cupboard as indicated on the layout drawings.

7.10 All safety discharge pipework shall be in copper. All condensate pipework shall be in MUPVC.

7.11 The system controller shall be provided for the heating system in all dwellings. It shall have integral back-up battery and digital display, and its functions shall include the following.

- Real-time clock and calendar
- Programmable time switch (single channel for space heating, with two time periods)
- Adjustable, fixed-time period ('boost') override switch.
- Frost protection

Ventilation Systems

1 Bed/2 Bed Dwellings

7.12 A mechanical extract ventilation system i.e., continuous mechanical extract ventilation shall be provided in each dwelling. The ventilation shall be incorporated within the exhaust air heat pump, which essentially draws extract from the wet rooms (utility, kitchen and bathrooms) and uses this as part of a heat exchange process as described in the section above. Exhaust/discharge air from the EAHP is then routed to the external façade.

7.13 All ventilation systems within each dwelling shall be designed to meet the minimum requirements set out in Approved document Part F of the building regulations for System 3.

7.14 The system shall be variable volume, having normal, boost and purge modes of operation. Acoustic attenuation shall be provided as necessary to meet the design criteria.

7.15 Fresh air to the habitable rooms shall be achieved via trickle ventilators as detailed by the architect. The requirement for filtration and attenuation to the trickle ventilators should be reviewed against the acoustic report.

3 Bed Dwellings

7.16 A whole dwelling ventilation shall be provided to each dwelling. Each dwelling shall be provided with a dedicated Mechanical Ventilation and Heat Recovery (MVHR) unit connected via flat ductwork to both internal grilles in living areas/bathrooms/kitchen as well as external louvres/airbricks for intake & discharge to atmosphere. These external louvres/air bricks shall be coordinated with the Architects and an appropriate fire seal provided.

7.17 The unit shall be provided with boost facility, integral humidity sensor to provide automatic boost and summer bypass. The unit shall discharge vitiated air to the atmosphere via air brick or termination vent.

7.18 The system is to provide constant trickle ventilation from all wet areas, with boosted flow being controlled by lights switches in bathrooms, w/c, and shower rooms.

7.19 All ventilation systems within each dwelling shall be designed to meet the minimum requirements set out in Approved document Part F of the building regulations for System 4. The MVHR unit will be located at high level with the utility cupboard inside each of the dwellings.

7.20 For both EAHPs and MVHRs, acoustic attenuators shall be provided as necessary to meet the design noise levels under boost mode (see below) and to avoid crosstalk. Room air terminals shall be the valve type with adjustable core to regulate the flow rate.

7.21 Each unit shall have an integral controller for commissioning, diagnosis, and user control. The unit shall operate continuously. Boost mode shall be activated by any of the following:

- occupancy sensors in WCs and bathrooms, for a pre-set period.
- momentary switch in kitchen, for a pre-set period.
- humidistat integral to the unit.

7.22 The purge mode, i.e., 0-maximum flow (100 %), shall be manually activated, for a pre-set period, and deactivated at the controller.

7.23 For both boost and purge modes, adjustable timed overrun shall be provided.

8.0 ELECTRICAL SERVICES

Electrical Supply Infrastructure

8.1 Spatial allowance has been made for incoming service head, CT metering for landlords and MSDB units feeding residential units.

8.2 As confirmed earlier within the report, it has been confirmed that the supply for the site can come from a local LV point of connection on the street based on current estimated max demands.

8.3 Current estimated maximum design loads (MD) 135kVA

8.4 Separate metered LV supplies will be provided to:

- Each apartment.
- The landlord's supplies and landlord's mechanical plant.

8.5 Meters for landlord's distribution systems and. Meters for each apartment will be located within dedicated metering cupboards at lower ground floor. All tenants will be billed directly by their selected energy company rather than through the landlord. Spatial allowance has been made for a rising sub-mains for vertical distribution through the main core area.

8.6 It is envisaged that all of the LV infrastructure up to each meter will be installed by the contractor to the agreed building network operator (BNO) requirements and adopted by iDNO upon completion. The client may wish to engage with an alternative network operator, which can be discussed at the next stage.

8.7 All details for the electrical supply infrastructure works are subject to IDNO review and approval.

Landlord LV Distribution

8.8 Dedicated metered electrical supplies will be provided to support the following landlord electrical loads to:

- Landlord Electrical Services

8.9 The main LV switchgear will be housed in a dedicated LV switch room at lower ground floor which will also house the metering CT's and metering equipment for landlord electrical supplies. Landlord electrical switchboards for

8.10 Landlord main LV switchboard will be the primary point of distribution for landlord LV supplies and will incorporate connections for local power factor correction equipment to maintain the power factor above 0.95. Outgoing supplies to landlord sub distribution switchboards will be individually metered where required by CIBSE TM39 to enable the building management to monitor electricity usage by area or by system.

8.11 Power to landlord main plant and distribution boards within each building will be distributed through the building central core electrical risers using sub-main XLPE-SWA-LS0H.cabling installed on dedicated cable containment.

8.12 Landlord distribution boards within the central electrical risers to serve local small power, lighting and mechanical loads in common areas. These will typically be 100A TP&N distribution boards serving ground floor, apartment corridors, stair core and roof plant.

8.13 Landlord final circuits to lighting and small power will be wired in single core copper low smoke cabling to BS7211 installed in galvanised metal trunking and conduits through the building central core and ground floor areas.

Life Safety Supplies

8.14 Secondary supplies to life safety systems are required to comply with the fire consultant's fire strategy for the site wide complex. Items such as- Sprinklers, Escape lift.

8.15 Evacuation Lift supply, a secondary supply will be provided by separately fused circuit from the main landlords electrical supply within a fire rated enclosure as BS8519.

8.16 The life safety switchboard will provide secondary power supplies to sprinkler pumps, Evac lifts and smoke extract system. Power supplies will be wired in fire rated cabling to comply with the requirements of BS8519 and BS9999.

8.17 Diverse cable routes will be taken to maintain fire separation between primary and secondary power supplies. Primary supply cables will generally follow the main cable routes and electrical risers. Secondary supplies will generally follow alternative routes, utilising the fire-fighting lift shafts, comms risers etc.

8.18 In accordance with BS8519 and BS9999, automatic transfer switches will be provided at each life safety load with bypass arrangement to maintain power in the event of loss of mains supply to the building. Transfer switches should conform to BS EN 60947-6. This to be further developed as the design progresses.

Electrical Service Cable Routes

8.19 Primary and Secondary LV supplies for life safety systems will be routed through diverse routes to maintain separation between supplies.

8.20 Details of the electrical cable route will be reviewed with the design team to ensure that a suitable level of access is provided for installation, maintenance, and replacement.

Apartment LV Distribution

8.21 Each apartment will be provided with a check/smart meter and isolator within MEP utility cupboards. Each apartment consumer unit via a sub mains cable connection. Utility smart meter will provide a remote energy display meter adjacent to the consumer unit within each of the apartments.

8.22 All power supplies within the apartments will be derived from the consumer unit, located within the apartment utility cupboard. Each consumer unit will have a sheet-metal body to the IET Wiring Regulations and have a minimum of 22 outgoing ways.

8.23 Apartment final circuits will be provided with separate integral residual current device (RCBO) to protect the end user from any shock risk and reduce the need for mechanical protection to outgoing final circuits. Power will be distributed to fixed equipment such as kitchen appliances, small power outlets, lighting etc. Wiring will be concealed within wall cavities, ceiling voids etc. The mains fed fire detectors within apartment shall not be protected by RCBO but utilise MCB and wiring cable shall incorporate earthed metallic covering to IET regulation requirements.

8.24 Setting out and finishes of power outlets, switches etc. will be coordinated with the architect and typical layouts submitted to the client for review during the next design stage.

Typical Electric Points

- Living room – 4 double socket outlets
- Studio Bedroom – 2 double socket outlets, 1 to include USB point
- 1 Bedroom – 3 double socket outlets, 1 to include USB point
- 2 Bedroom – 3 double socket outlets, 1 to include USB point
- 3 Bedroom – 2 double socket outlets and home office zone
- Hallway – 1 double socket outlet
- Kitchens – 2 double socket outlets, 1 to include USB point
- Kitchens – power outlets to suit kitchen appliances
- Home office zone – 2 double socket outlets
-

Communications/BT

- Home office zone – 2 telephone points
- Living Rooms – 2 telephone points
- Bedrooms & Living Room – 1 aerial point.

Lighting Control

- Manual switches to be located on pull side of internal doors

General Lighting

8.25 General lighting will be provided within each building throughout the landlord and residential spaces and within the ground floor area where applicable.

8.26 Luminaires will generally incorporate LED light sources and will be selected to achieve the performance and visual appearance required for each space. LED luminaires are able to offer high levels of energy efficiency, reliability and longevity at similar per-unit costs as equivalent fluorescent/compact fluorescent fittings. Linear LED vandal proof light fittings will be used for plantrooms, car parking and lift shafts.

8.27 Proposals for the selection and arrangements of luminaires for front-of-house and residential spaces will be determined with the architect during the next design stage.

8.28 Lighting levels for all landlord areas will be designed in accordance with the relevant CIBSE lighting guides and CIBSE code for lighting.

8.29 Lighting within landlord spaces will be controlled through local hard-wired PIR presence detection where appropriate as an energy-saving measure. Hard-wired manual switching will be provided to areas such as plantrooms, lift shafts etc., where automated control is not appropriate.

8.30 Apartment lighting will be controlled through manual switching.

8.31 Landlords' areas will be controlled by local presence detection and will incorporate the facility for dimming.

External Lighting

8.32 External lighting will be provided to the buildings main entrances and will combine lighting for general circulation, feature lighting and emergency final exit lighting. Proposals for the selection and arrangements of luminaires for front-of-house spaces will be determined with the architect during the next design stage.

8.33 External lighting will be provided to roof-top plant areas for circulation and maintenance activities.

8.34 External lighting will be controlled using hard-wired or contactor-controlled photocell and timeclock.

Emergency Lighting

8.35 Emergency lighting will be designed in accordance with BS 5266, to enable illuminated passage during general or local power failure. Emergency lighting will be provided to:

- Landlord internal common areas,
- Landlord plant rooms and back-of-house spaces,
- Outside final exits

8.36 The emergency lighting scheme will be integral to the normal lighting by providing self-contained 3 hr battery units which form part of the general lighting scheme. Maintained illuminated exit signs will be provided in accordance with the building's fire strategy.

8.37 Each emergency luminaire will incorporate a status LED within the light fitting to visually indicate if mains supply is available. Each emergency luminaire will also link to a centralised self-testing system to reduce maintenance time required for visual inspection by automatically performing testing routines and reporting any errors to the building management (on-site or off-site as required).

Landlord Fire Detection and Alarm System

8.38 The fire alarm system will be designed in accordance with requirements of the fire strategy for the building complex.

8.39 The fire alarm system will be designed and installed in accordance with BS 5839-1 to category L1D1. Activation of a smoke detector within the landlord corridor will activate the corridor smoke extract systems and raise an alarm at the main fire alarm panel.

8.40 It is envisaged the fire alarm panel will be located adjacent to the buildings main entrance doors for ease of access by the local fire brigade subject to agreement with the local building control officer.

8.41 The fire alarm system will be interfaced with the lifts, smoke extract systems/AOV's, sprinkler systems etc. to provide a coordinated cause-and-effect between all systems under fire conditions.

8.42 All fire alarm cabling will be installed in accordance with BS 5839 and principle cable routes will be fixed to a dedicated network of fire alarm containment.

Residential Fire Detection and Alarm System

8.43 The fire alarm system will be designed and installed in accordance with BS 5839-6. The extent of detection coverage for apartments will be LD1 as standard as defined in BS 5839-6 and fire consultants fire strategy. LD1 alarm systems are installed throughout domestic premises. Detectors are fitted in all areas that form escape routes and in all rooms and other areas, other than those that have a low risk of ignition, such as bathrooms and toilets.

8.44 It is envisaged that each apartment will be provided with stand-alone point Heat/Smoke detectors with integrated sounders with an internal back-up battery.

8.45 Additional sounders may be required where alarm volume levels would otherwise fall below the minimum required by the BS.

8.46 It is also proposed to install a test switch/silence button at low level within the Electrical MEP utility cupboard for convenience of testing and silencing false alarms.

Access Control/Video Entry

8.47 An integrated access control/video entry system will be provided at the main

8.48 Building occupants would be provided with key cards or fobs to gain entry through controlled doors to the secure side. Entry through to the non-secure side would be via manual door-release push button. Green break-glass push buttons would be provided for emergency egress to the non-secure side.

8.49 The system will utilise IP/POE devices on a dedicated structured cabling network.

8.50 Facilities for emergency services access will be discussed with the building control officer.

CCTV

8.51 It is envisaged that a CCTV system will be installed to cover common areas and entrance areas the building. The requirements for the extent and performance of the system will be developed with the client at the next design stage.

8.52 The signal shall be viewed from the site's high level 14U lockable rack. 28-day recordable footage required and all footage capable of being viewed remotely by management on PCs. Phones, tablets etc.

Telephony and Data

8.53 Provision has been made to install a telecoms network throughout the building. To facilitate the dedicated telecoms intake room has been allowed for at lower ground floor to accept fibre-optic connections brought in from the site wide external infrastructure telecoms provider networks.

8.54 Each provider will be able to house their equipment within dedicated secure incoming telecoms point of connection communication room. Telecoms cabling will then be distributed at high level across building to a dedicated telecoms riser located in the central core. The telecoms riser will allow the telecom's providers to be able to distribute their infrastructure to each apartment floor.

8.55 It is expected that the providers will provide fibre-optic connections to all apartments for phone and data. Space has been allowed within telecommunications risers for fibre-optic splitter boxes. Wired connections to lifts, security systems and for general landlord usage may utilise copper twisted pairs.

8.56 It is expected that the contractor will provide cable containment and local power supplies to support the providers cabling and equipment and that the providers will install their equipment and cabling through a direct contract with the client.

TV Systems

8.57 Each individual building will be provided with an integrated reception system (IRS) that will provide TV aerial and satellite connection to each apartment via a common TV aerial and set of satellite dishes located at the roof-top plant area. Like aerial/satellite system independent network shall be provided for Cable TV system via fibre optics i.e., virgin media etc.

8.58 The IRS distribution infrastructure will consist of fibre-optic & coax cabling connection from the roof satellite/aerial and from bottom for cable TV system to a multiplexer located within central core telecommunications riser. Fibre cabling will be distributed down/up the riser to individual optical multi-switches capable of serving apartment floors.

8.59 Cabling will then be distributed from the riser multi-switch to each apartment connection outlet to provide one dedicated satellite/aerial/Cable outlet.

8.60 At this stage it is envisaged the satellite/aerial/cable outlet within the apartments will be provided within the living room only. Details will be developed at the next design stage.

Earthing and Bonding

8.61 Earthing will be provided to the complex in accordance with the IET Wiring Regulations (18th Edition). Supplementary bonding will be provided for pipework, lift guide rails, kitchen and bathroom units, electrical containment, etc. Each apartment will be provided with a dedicated earth connection via the utility infrastructure.

Lightning Protection

8.62 A complete, new lightning protection will be provided to the building. The lightning protection system will be designed and installed in accordance with BS EN 62305, with the level of protection will be determined by protection risk assessment.

8.63 In general, the lighting protection system (LPS) will consist of a cross linked roof air termination network linking (cross bonded) to the main building structure at roof level. The lightning protection system will then use the building structure as down-conductors for the safe discharge of lightning strikes to earth. Where this is not possible, additional copper or aluminium tape will be used, with details developed with the architect to minimise the visual impact.

8.64 An air termination network of copper or aluminium tapes will be installed to the roof and any exposed equipment – Solar PV, ASHPS etc. - will be bonded to the network.

8.65 Electronic surge protection equipment will be installed to each of the landlord's LV switchboards, incoming telecoms cabling connections and roof TV aerial network to provide protection to any electronic equipment.

Lifts

8.66 There are a number of lifts to be included within the scheme as shown on the architectural drawings. These lifts will operate for both passenger travel, moving of furniture and also for evacuation purposes.