Ingestre Road, Camden
Assisted Living Project
Design Report

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Date: Sept 2018
Issue: Rev A
Project No. MAC 0097

Contents

1.0 Introduction

General

McKee Associates has been appointed to provide Public health, Mechanical and Electrical engineering services on the Residential project.

This report describes proposals for the following services:

- Mechanical
- Electrical & Electrical Building Services
- Public Health

The document is not intended to be a fully detailed particular specification, but should be considered as a 'live' document which will evolve during the on-going design stages and supports the Architects design.

Consequently, data contained in schedules and drawings reflect the current stage of the design and are subject to development as the project progresses.

The scheme has been designed with economic viability, ease of construction and practicality in mind.

The key objectives of this report are to demonstrate how services can be accommodated in to the building form, including options for further development. These have been established through the development of the following strategic points:

- Plant location and zones
- Primary distribution strategy (major service routes)
- Co-ordination of building cores (efficiency of the floor-plate)
- Sustainability / renewable energy integration

2.0 Brief

The brief for engineering services is considered to be as defined within this report in the absence of any client specific engineering requirements. It is proposed that this document is reviewed in detail with the client and team to ensure that all requirements are captured.

Scheme Overview

The proposed development is located in Camden and consists of a 5 floor assisted living housing development.

The development shall consist of 50 apartments over 5 levels. The apartment block is complete with ground floor amenities such as a cafe, hairdressers and lounge etc. These will be shared common areas for use by the residents.

The basement level of the development is made up of car parking, store areas, gym area and cycle / scooter store.

The plant areas within this development are contained within the basement and rooftop levels. These areas are connected via four dedicated risers for both mechanical and electrical services.

This report should be read in conjunction with Architectural Design Reports and Drawings.

Utilities – Incoming Services

Electricity

There is to be a new sub station located within the basement plant area of this development. The sub station and associated LV switchboard will supply both the landlord and residential areas of the building.

The electrical supplies to the building, will be distributed via the 4 risers and for both the landlord and residential. With the apartments being sold onto the residents, each apartment will require its own meter cut-out to enable direct utility billing. All meter cut-outs will be located within a common area of the building.

Landlord areas will be electrically serviced using local panel boards and distribution boards routed via the common services risers.

Gas

For this residential scheme the decision not to use gas is being pursued and shall be adopted under this scheme, if this matter should vary from this issue, we shall confirm in writing for a re-costing exercise.

Electric heating and hot water generation has a lower capital cost compared to gas boilers and low pressure hot water systems. Therefore this system has been proposed.

Water

The Thames Water water main records confirm that there is an existing water main in the vicinity of the site - refer to drawings.

An application for new water supplies will be submitted to Thames Water. Water meters will be located internally in groups in an accessible position with individual pipes to apartments.

Below Ground Drainage

By Structural Engineer

Services / Ceiling Voids

In the absence of engineered section drawings, it has been assumed that there is a minimum services / ceiling void of 600mm in all areas.

4.0 Mechanical

Design Criteria

For the design of all thermal loads, selection of HVAC systems and the room terminal equipment selections, the following external design conditions will apply:

- Winter -4ºC db -4ºC wb
- Summer 26ºC db 19ºC wb

Data taken from CIBSE Guide A - Table 2.4 – 99.6% and Table 2.6 – 0.4%.

For all external systems, equipment and frost coils the winter design condition will be -10ºC.

For all external systems, equipment and heat rejection plant the summer design condition will be 35ºC.

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

Location	Winter	Summer
Living Rooms	22ºC ± 2ºC dB	Uncontrolled
Bedrooms	18ºC ± 2ºC dB	Uncontrolled
Bathrooms	22ºC ± 2ºC dB	Uncontrolled
Stairs, Circulation	16ºC min	Uncontrolled
Public Areas	21ºC ± 2ºC dB	21ºC ± 2ºC dB

Additional overheating analyses can be carried out to assess risk. This should be carried out as part of the Building Regulations Part L1 Criterion 3, as stated previously McKee Associates have been informed that this will not apply.

Apartment cooling is dealt with via opening windows / natural ventilation. Mechanical extract is to be provided for the kitchens and bathrooms only. Building regulation ventilation rates below;

Kitchen hoods minimum	60l/s
Bathroom minimum	15l/s
Public Areas	10l/sec/person

Internal gains for overheating calculations and if cooling becomes a requirement:

Occupants	100 W/person sensible 50 W/person latent
Lighting	10 W/m²
Home Equipment	10 W/m²

Ventilation within apartments

As buildings are constructed to be more airtight it is necessary to provide adequate outdoor air ventilation using fans and/or specially designed window openings (Trickle ventilators).

Apartments will be naturally ventilated via trickle vents for minimum fresh air requirements and opening windows for enhanced ventilation in summer.

Mechanical extract is provided within the apartment kitchens and bathrooms to reduce levels of humidity for condensation damage and removal of odours. Each apartment will be provided with its own extract system, which will discharge through the façade.

Extract fans will operate on demand either via light switch interface of extractor hood on the cooker.

Extract ductwork within the apartments will be constructed from insulated flat ductwork components, and terminating with wall or ceiling grilles to suit the room finishes, condensate traps shall be installed to ensure no stagnant water is standing.

Ventilation within common areas

All common areas within the building will be mechanically ventilated using ceiling mounted heat recovery units with an efficiency of 80% or higher fitted with co2 sensors to modulate airflow based on occupancy levels.

The heat recovery units will be installed within the ceiling voids with ducted intake and extract connections routed to the external façade where louvres are integrated into the building envelope. Attenuators will be provided for noise break out and cross talk.

Ductwork will be constructed from insulated flat/round ductwork components, and terminating with wall or ceiling grilles to suit the room finishes, condensate traps shall be installed to ensure no stagnant water is standing.

The kitchen extract will be routed through the building in a fire rated compartment and discharge at roof level. Access doors will be provide at each level for cleaning.

For ventilation by location, please refer to appendix A.

Heating and Domestic Hot Water

Both the domestic and commercial hot water demand will be served by a community-heating scheme. The hot water will be produced using 8 to 10 rooftop mounted air source heat pumps. The hot water will be stored within each apartment using local hot water cylinders where each apartment will be individually metered for billing purposes. Hot water requirements for the public areas will also be designed with local hot water storage via cylinders linked into the community heating scheme.

The domestic hot and cold water services shall be installed in compliance with the building regulations Part G.

Heating for the apartments will be provided from the rooftop air source heat pumps. Within each apartment, the heating will be via under floor heating within the lounge, dining, kitchen and bathroom areas. Within the apartment bedrooms wall mounted fan assisted radiators will be fitted to work with the low temperature heating systems.

Bathrooms will also be provided with switched electronic time controlled towel heaters.

Heating and cooling for common areas will be satisfied with reverse cycle heat pumps. Corridors will have background heating using fan-assisted radiators linked to the community heating scheme.

All heaters shall comply with the new EEC directive LOT 20.

For heating by location, please refer to appendix A.

Smoke Ventilation

Smoke ventilation requirements should be checked with the fire consultants drawings and report but the minimum requirements are corridor ventilation by AOV's linked to the fire alarm is a requirement.

Refuse Ventilation

Not envisaged as being a requirement.

Fire Fighting Ventilation

Refer to fire strategy documentation.

BMS/Controls

A central BMS system will be required for the monitoring and control of the rooftop central hot water system. Within the apartments temperature sensors will be provided in each room these will be digital thermostat controllers suitable for the fan assisted radiators and underfloor heating.

Common area ventilation and heating / cooling will be controlled from a head end BMS controller. The software will be desktop computer based and allow for full temperature feedback of each area along with full adjustment.

The systems will incorporate time clocks with set-backs periods and weather compensated.

Electrical

Design Criteria

Electrical system

From new incoming supply from the client's transformer, the arrangement for the metering of the apartments will fall under the following guidance for the development.

The BNO (Building Network Operator) will be responsible for all equipment that is beyond the network (UKPN), cut-out.

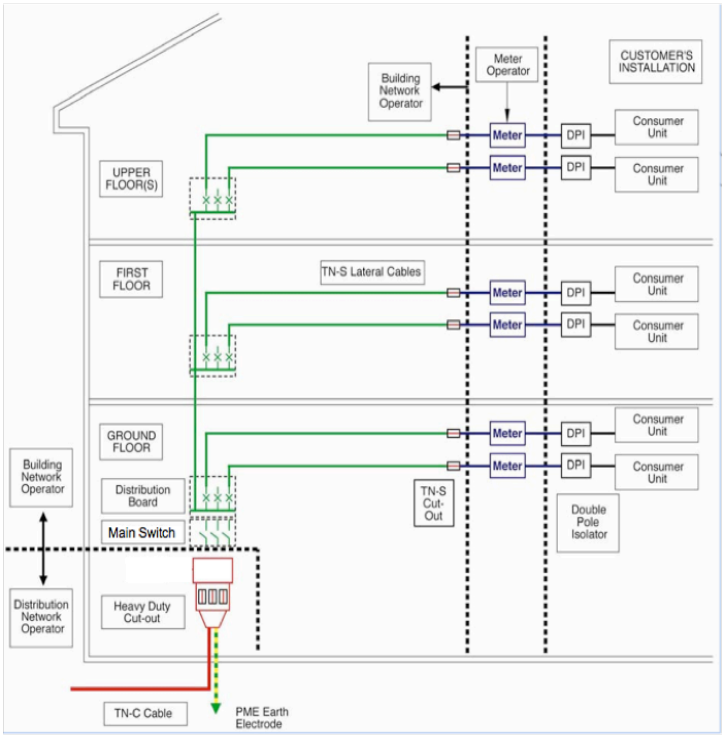
The BNO will arrange for the fitting and connection, by the appropriate meter provider.

Metered electrical supplies will be provided to each apartment serving consumer units. A final distribution system will be provided from the consumer unit serving lighting, small power, plant equipment and apartment supplies.

A feed for landlord's lighting and power within the corridors will also be provided from distribution boards located in riser cupboards on every other floor.

The risers will be fed via the landlords switchboard.

See details on the schematic below:



LIGHTING

The new lighting system shall be provided both externally and internally throughout the building, to suit the illumination requirements of the specific area, all generally based on C.I.B.S.E. guidelines.

Internal Lighting

Low energy LED lighting will be provided throughout the scheme, together with daylight and occupancy controls in external and circulation areas as appropriate.

Apartments will be provided with LED downlights to all areas.

Switching for lighting in common areas will be via ceiling mounted PIR's and day light dimming. Lobbies and Circulation area lighting shall be by a mixture of surface and flush, low energy lighting to create the desired atmosphere with PIR and daylight dimming where indicated.

For lighting and control by location, please refer to appendix A.

Emergency Lighting

This shall be provided to the areas of the building comprising monitored self-contained, non-maintained, 3 hour rated luminaries and comply with local building control requirements and with BS5266. Where possible these luminaries shall be integral to the general lighting installation. An LED within the fitting shall identify these luminaries. Emergency lighting tests are to be controlled and monitored using a DALI control system inline with IEC62386.

Emergency lighting shall be installed along all notional escape routes and toilet areas to provide of minimum service luminance of 1.0 lux along the centre line. Emergency lighting shall also be provided by the following luminaries; Fire exit signs on all fire exit doors consisting of approved ICEL luminaries operating in a maintained mode, both inside and outside.

Emergency lighting batteries are to be built into each fitting and alert when in failure. All emergency lighting shall be on a DALI monitoring system to enable the building managers to ensure testing and problematic issues are recorded for the building logbook.

External Lighting

The intention of the external lighting strategy is to enhance the security and safeguard while whilst not been intrusive to residents and neighbors. External lighting covers the perimeter of the building including entrances and exits. Lighting levels are kept to a reasonable level as to not be excessive for neighbouring residents.

Inline with the ILP guidelines, it is assumed that the local planning authority of Camden has categorised the development site under a Zone E4 - Urban area. Inline with the environmental zone E4 light limitation targets set out within ILP guidelines we have selected luminaries to suit. It is expected the sky glow limit of 15% will be excessive based on the fittings specified, fittings directly exposed to the sky are specified with 0% upward light. Light intrusion and intensity limits will be managed with dimming outside light controls along with the option of automatically actuated closing window blinds.

Lighting will be provided to the external areas as shown on the drawing supplied with this brief. This shall focus on the courtyard entrance, the roadway, the car park entrance and the associated footpaths.

This shall be provided by low energy, high efficiency luminaires mounted both on the building. The overall lighting control system shall be driven with a photocell / solar dial time clock arrangement with an over-ride switching facility if required. For details on the external lighting levels, fixtures and fittings please refer to appendix B.

In compliance with BREEAM 2014 external lighting requirements, the following building specification design parameters shall be adhered too;

HEA01 & HEA06 – Outdoor lighting levels and controls are to be designed to accommodate both routine and non-routine outdoor tasks such as cleaning, deliveries and maintenance etc. Delivery entrances are to be controlled independently from the balance of the perimeter lighting with lower output lighting options for post curfew periods.

ENE02 – The average luminous efficiency for the external luminaires must exceed the minimum requirement of 60Lumins/Watt. All specified fittings under appendix B exceed with requirement.

TRA03 – Functional path lighting required for cyclists to illuminate automatically when inside of planned and set curfew periods. This will be controlled and adjusted with seasonal changes.

POL04 – Under the ILP guidelines, the luminaire intensity during pre and post curfew hours will be assessed and suitably controlled inline with predicted operations such maintenance, deliveries and other out of hours actions / tasks. Lighting during post curfew hours will be at a significantly lower level than that of pre curfew hours.

MAN05 – Seasonal commission shall be scheduled at periodic 3-month intervals post commissioning to adjust the external lighting levels to suit the development use and operation.

Small Power

This shall be provided to the landlords areas of the building comprising supplies to socket outlets, access control units, CCTV camera's, the accessories shall be to a white plastic standard. The circuits shall emanate from the local landlords distribution boards.

Adequate quantities of socket outlets shall be provided for maintenance and cleaning with dedicated RCD protection at the distribution board.

All new small power systems to each Apartment comprising general purpose sockets, supplies to shaver sockets, fridge/freezers, washing machines, security panels, extract fans and the like.

The accessories shall be to a brushed aluminum as standard.

The system shall be cabled in new LSF twin and earth wired in new galvanised tray/trunking/conduit and shall be concealed within the building fabric at all times.

The circuits shall emanate from the apartment's dedicated consumer unit within the apartment the consumer units shall be in compliance with the new amendment of the BS 7671.

TV, Radio and Telephones

An Integrated Reception System (IRS) capable of reception and distribution of SKY Plus digital satellite TV, analogue and digital terrestrial TV, UHF, FM and DAB broadcast signals will be provided.

The system will deliver digital Satellite and analogue/digital Terrestrial TV signals plus modulated video and Digital Audio to each apartment. Each apartment will have installed a sub system, that provides distribution of TV, video and audio from the Master outlet location to the secondary outlets.

Externally a satellite dish and UHF, FM and DAB aerials will be located at roof level. Maintenance access will be required periodically.

Distribution equipment including amplifiers will be located in a position to be confirmed.

Within apartments a master outlet will be sited in the Lounge/Dining Room and secondary units will be installed in each of the bedrooms

A telephone point will be located adjacent to each outlet fed from telecoms rooms located in the basement and distributing vertically through the risers and horizontally along corridors.

Door Entry & Call / Care System

The access control and emergency call system on this site will be full intergrated and will comprise of the following equipment.

A fully integrated access system will be provided to facilitate an easy to operate infrastructure, enabling future system growth.

The door access panel will be the master control location and the origin of the communications highway. The controller will consist of a main processor based system, with on board monitored power supply and enclosed within a steel enclosure.

Residential main entrance doors will have a swipe/proxy card reader for entrance into the reception area and a 2 way speech facility to each individual apartment. The system will incorporate a one way visual link to the apartment.

Priority access to the lifts will be via the same access system i.e. lift called by proxy reader, is to be considered further during scheme design stage.

A fire alarm interface, push to exit and green break glass unit will be installed for each access controlled door set to unlock doors on the escape route.

The system will provide monitored access & egress with 2way speech & visual recognition facility from the main doors into reception & each individual apartment via a handset to allow remote access. (Residents access will be via proxy card reader).

This system will also incorporate the requirements for assisted living with the possibility of personal and carer pendant wearable devices, flood detectors, property exit alarms and other personal wellbeing accessorises.

This system and design will be will be based around a Tynetec telecare access and control system.

Fire Alarm

A fully addressable automatic fire detection and alarm system will be installed to all landlords areas and will communicate with the rest of the development in accordance with Building Control recommendations.

The system will be analogue addressable Type L1 with a battery back-up for minimum 24 hours in the event of mains failure.

Fire alarm panel

The master alarm panel will be located within the residential reception area with a zone indication panel.

The fire alarm system will comprise of detectors, sounders, manual call points & interface units to associated plant & door/security systems within the reception areas at ground floor only.

The residential corridors are envisaged to have smoke detectors only. There will be no provision for sounders or manual call points at all including the staircases.

Each residential apartment will be fitted with mains fed smoke and heat detectors interlinked with integral sounders to warm the apartment that is in alert.

Lightning Protection

There shall be a full new lightning protection system will be for the building (to be confirmed by a specialist) and in full compliance in accordance with BS 6651 1992 and will comprise the following three elements:

Air Termination

This network of conducting tapes and finials (which may form part of the structure) located at roof level.

Down Conductors

Building structural elements will be used as down conductors. Where this is not possible a network of conductor tapes will be utilised.

Earth Electrodes

The reinforced concrete piles will be tested and utilised as earth electrodes where possible. Where this is not possible a system of copper rods will be used.

CCTV

A new CCTV system shall be installed consisting of PTZ and fixed cameras to the internal and external areas of the development.

The external CCTV cameras shall be capable of facial recognition and be linked to a head end multiplexer and screen for the purposes of this works, the location for the head end units shall be determined under the next scheme but envisaged to be the west core on ground floor.

All lift lobbies shall be covered by CCTV cameras by the installation of Fixed CCTV cameras The following cameras should be allowed for in the tender return:

- 6no PTZ cameras
- 4no external PTZ cameras.
- 20 fixed internal cameras

Intruder Alarm

Intruder alarm provisions shall be priced on an apartment-by-apartment basis to be picked up as an optional extra as required.

Photovoltaics

On this development the will be a large percentage of the roof area allocated for PV, the size of this system is yet to be determined. The electrical power produced from the solar PV will be directly used to supply the site load (ie heat pumps and ventilation).

5.0 Public Health Services

Incoming Water Supplies

The mains cold water supplies to the development will be taken from the new water main.

A new incoming water main will enter the building and serve a domestic potable water tank located within the basement plantroom.

This will in turn serve a domestic water booster pump. A network of fusion welded plastic pipework will emanate from the booster and serve headers feeding groups of apartments. These headers contain banks of individual

apartment meters to be installed by the Utility Company to allow direct billing of tenants.

The tank and booster system will provide eight hours water storage so that in the event of mains failure the apartments will not be immediately affected. On entering apartments the water is split to feed the hot water vessel and general cold feed. Pressure reducing valves will be installed on each leg in an accessible position in the cylinder cupboard and set to balance the pressure between hot and cold feeds.

A metered landlord supply will be distributed to any landlords facilities and bib taps for maintenance.

An Ultra Violet (UV) disinfection units will be provided on entry to the tankroom.

The cold water storage tank has been sized to provide 8 hours storage based on the Institute of Plumbing guidance.

Automatic air vents and water-hammer arrestors will be provided at the top of all vertical risers.

Hot Water Supply

Refer to the Mechanical Section of this report

Water Efficiency Options

(Optional)
To improve the efficiency of the water system flow and flush fixtures and sanitary ware will be installed.

BREEAM Construction 2011 Credit Wat 1 outlines the maximum flow rates for each fixture and sanitary ware item. The water consumption can be reduced by following:

- WC's – dual flush WC's with a reduced cistern capacity. The specification of low flush cisterns could reduce the amount of potable water used for WC flushing by up to 50%.

- Low flow taps – the specification of low flow taps or taps with flow restrictors / flow limiters will significantly reduce the amount of potable hot and cold water consumption. To reduce the water consumption levels further infrared or concussive taps could be specified. A two stage or 'click' tap may be specified for use on kitchen sinks.
- Low flow showers – the domestic hot water generation will be sized to provide hot water for a peak demand based on the showers. The amount of stored hot water could be reduced if low flow showers are specified.

- Water efficient dishwasher- Innovation from manufacturers of dish washers is driving increasing efficiency in dishwasher performance. The

leading model on the market consumes approximately eight litres to clean twelve place settings worth of dirty dishes. There are many inefficient models available and in general these tend to be at the low cost end of the market.

Legionella

The water services installations will comply with the recommendations in HSC ACOP L8 and CIBSE TM13 on the control of legionella bacteria in water systems.

Standards and Codes

The water services design will comply with the Building Regulations Part G. This will be achieved by complying with the British Standard Codes of Practice and "approved documents".

The water services will be designed and installed in accordance with the latest editions of all relevant British Standards and Codes of Practice and where these do not apply, by recognised good practice, as published by construction industry research establishments and organisations. In particular the following documents will apply:

·	BS 1710	Specification for Identification of pipelines and services
·	BS 5422:2009	Method for specifying thermal insulating materials for pipes, tanks, vessels, ductwork and equipment operating within the temperature range -40˚C to + 700˚C.
·	BS 5970:2001	Code of practice for thermal insulation of pipework and equipment in the temperature range of -100˚C to + 870˚C.
·	BS 8525-1:2010	Code of practice, Grey-water systems – Part 1
·	BS 8542:2011	Code of Practice, Calculating domestic water consumption in non-domestic buildings
·	BS 8558:2011	Guide to the design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages.
·	BS 8580:2010	Code of Practice, Water quality – Risk assessments for Legionella control
·	BS EN 806-1:2000	Specification for installation inside buildings conveying water for human consumption, Part 1: General
·	BS EN 806-2:2000	Specification for installation inside buildings conveying water for human consumption, Part 2, Design
·	BS EN 806-3:2000	Specification for installation inside buildings conveying water for human consumption, Part 3, Pipe Sizing

- Building Regulations
- Water Regulations Guide, 1999
- HSC Approved Code of Practice, Legionnaires' disease, The control of legionella bacteria in water systems, L8

Above Ground Sanitation

The sanitary drainage system will be designed and installed in accordance with the Building Regulations, Approved Document H and BS EN 12056- Part 2 Code of Practice for Sanitary Pipework.

Main routes for soil, waste and vent stacks will be strategically placed in order to accommodate the provision of toilet facilities including all branch waste pipe work. The routing of such pipe work will be within vertical service risers.
The foul water drainage system will be designed to ensure all pipe work diameters and gradients are self cleansing, based upon the anticipated design flow rates from within the development.

The system will be installed to effectively convey discharges quickly, quietly and effectively without nuisance or risk to health. It is essential that foul air from the discharge pipes is prevented from entering the building.

The development sanitary drainage installations will have a secondary ventilated foul drainage installation to cater for the development and to ensure that the systems are adequately vented to prevent self and induced siphonage of water seals and to prevent foul odours and sewer gasses entering the development from the sewer infra-structure.

The apartments will be stacked to minimise horizontal offsets and access will be provided to rodding eyes. Vertical pipework between apartments will be provided with intumesent fire collars and insulated to reduce transmission of noise between apartments. The pipework will be fusion welded type.
Trapped floor gullies will be installed and connected to the sanitary pipework installation:

Above Ground Rainwater Installations

The surface water drainage system will be installed in accordance with the Building Regulations, Approved Document H and BS EN 12056- Part 2 Code of Practice for Sanitary Pipework.

Dry Riser Systems

Dry risers will be required and shall run up each core with 2 no inlet valves at the core entrance, and landing valves to the floors off the lobbies.

The system shall comply to the fire strategy as issued by the fire consultant, and queries on the philosophy of the development shall be raised to the design team ASAP.

Sprinkler Systems

Refer to fire strategy documentation.

6.0 Lifts / Fire fighting lifts.

The requirement for fire fighting lifts will be determined by the fire strategy.

The services impact to be included as part of this tender (if required) are the following:

- Auto Changeover local to the lift controller for the dual electrical supplies.
- Sump pump linked to the local drain outlet for the shaft
- Enhanced shaft lighting.
- Enhanced Emergency lighting to all the lobbies.
- Intercom within the lift to the fire alarm panel.
- AOV smoke clearance within the lobby.

This shall be outlined within the fire strategy, but shall be picked up under the M&E package.