



**FRASER HOUSE
36 CHARLOTTE STREET
MANCHESTER**

MECHANICAL AND ELECTRICAL ENGINEERING SERVICES

SERVICES STRATEGY REPORT

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MECHANICAL AND ELECTRICAL ENGINEERING SERVICES SERVICES STRATEGY REPORT

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Revision	Date	Section	Description
A	02/12/2022	All	First issue.

**MECHANICAL AND ELECTRICAL ENGINEERING SERVICES
SERVICES STRATEGY REPORT**

1.0 INTRODUCTION

This report has been produced to review the proposed strategy for the provision of engineering services at Fraser House, 36 Charlotte Street, Manchester as part of its conversion to residential use.

The services design concept has been developed in conjunction with other members of the design team to ensure that engineering solutions balance functional, energy efficiency and sustainability issues. Consideration has also been given to likely requirements for statutory compliance and the impact of the services design on planning considerations.

1.1 Existing Building

The building comprises the following:

- Basement containing redundant plant and storage space.
- Lower-ground floor – former kitchen and restaurant space.
- Upper-ground floor – former kitchen and restaurant space.
- First to fourth floors – disused storage space.

The building requires a further asbestos survey prior to further services stripout to ascertain the risk of asbestos contaminated materials. The current report provided (ASTRA report ref. ASTRA/CINNS/1705011/MR) does not include the lift shaft, basement or ground floor.

The building has been out of use for a number of years. Repairs have been made to some floors and structures, but there is widespread disrepair. Existing services have largely been stripped out, although some, including elements of the former kitchen extract systems, remain. The external ductwork which formerly service the kitchen extract system is still in place, rising up externally to roof level.

1.2 Proposed Building

The basement will provide plant and utility space for landlord services. The lower ground and upper ground floors will provide food and beverage units. The upper floors will be converted to residential accommodation.

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2.0 OVERVIEW

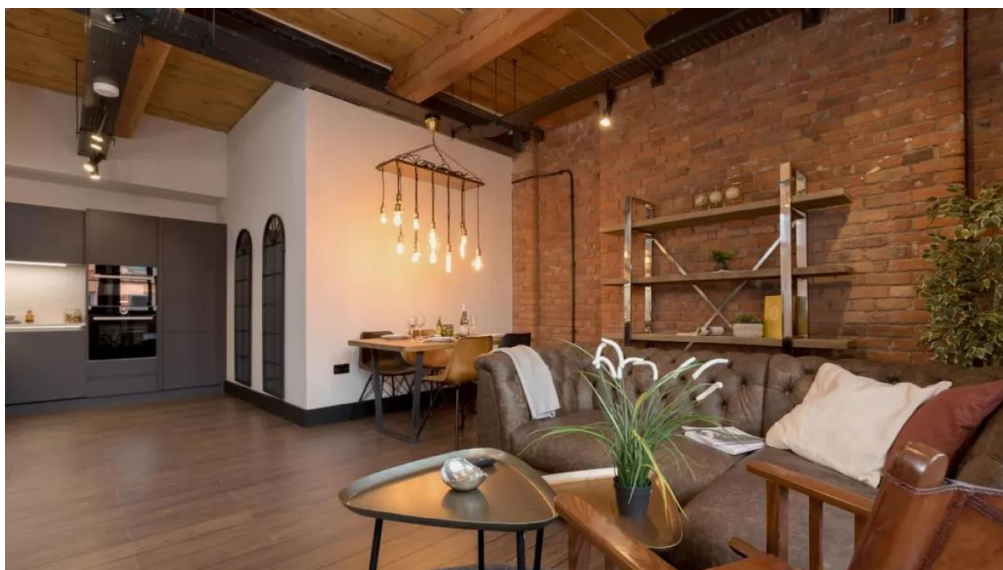
The services design concept has been developed to deliver a solution that provides mechanical and electrical services to meet current building regulations and meet market expectations, whilst remaining sympathetic to the nature of the existing building.

Ceiling voids in which to conceal services are likely to be limited to bathrooms within apartments. Rather than box in services in an attempt to conceal them, the intention is to express the services and ensure that they are installed in an aesthetically pleasing manner. In order to ensure control of the aesthetics, services will be run in or above open cable trays. Ductwork would be run in galvanised steel circular ducts. The intention is that all ductwork and containment are painted black to ensure uniformity.

Precedent photographs showing similar installations in Manchester City Centre are included below.



Basil House, Portland Street, Manchester



Basil House, Portland Street, Manchester

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Basil House, Portland Street, Manchester



Basil House, Portland Street, Manchester

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Waterloo Street, Manchester



Waterloo Street, Manchester

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King Street, Manchester



Chorlton Mill, Manchester

3.0 MECHANICAL SERVICES

3.1 Design Criteria

Design criteria are provided for the residential element of the development only. The commercial units would be designed and fitout by the incoming tenant.

Design Conditions

i) External Design Conditions:

Summer	+ 28°Cdb, 20°Cwb
Winter	- 4°C fully saturated

ii) Internal Heating Design Conditions:-

Bedrooms	-	21°C
Living/Dining	-	23°C
Bathrooms	-	19°C
Kitchens	-	19°C
Circulation	-	19°C

iii) Fresh air Allowance:

Whole house heat recovery ventilation to residential areas to meet the requirements of Approved Document F Volume 1 (2021 edition).

iv) Noise Criteria

Bedrooms	-	NR 25
Living/Dining	-	NR 30
Bathrooms	-	NR 35
Kitchens	-	NR 40
Circulation	-	NR 35

3.2 Heating

The existing heating system has largely been stripped out. Pipework remains in areas throughout the building. Heat emitters appear to have been removed.

A redundant oil fired boiler and associated storage tank was located in the basement. This equipment is beyond repair and serves no useful purpose for the proposed development.

The oil tank will require specialist de-gassing cleaning prior to removal, due to the possible presence of fuel oil and vapors.

Proposed Food and Beverage Units

Services would be designed and installed by the incoming tenant. Typically, a restaurant would expect to provide a split or multi-split comfort cooling and heating system to service the dining space. The external loading bay on the Rayner Street elevation has been identified as a suitable location for the associated external condensers. Refer to the drawings for details.

Proposed Apartments

There is no suitable external space or roof space to allow the installation of external air source heat pumps to service the heating of the apartments.

Gas fired heating has been discounted on the basis of the government's drive to reduce reliance on fossil fuels.

Electric panel heaters with programmable controls will be provided to all apartments and communal spaces.

3.3 Domestic Services

3.3.1 Cold Water

The existing cold water service enters the building at basement level from Rayner Street as indicated in *Figure 3.3.1*. The incoming service appears to be a 25mm MDPE pipe with an internal stop tap. The meter is external to the building within the street.

A new water supply will be required to service the proposed development. This will then be split to serve each of the commercial units and the combined apartment service via separate metered supplies.

A cold water storage tank of approximately 2,500 litres capacity (typically 2.0x1.2x1.2m dimensions) will service the apartments as well as a residential sprinkler system. The sprinklers will be served via a priority demand valve and sprinkler pump set.

Refer to the drawings for further details.

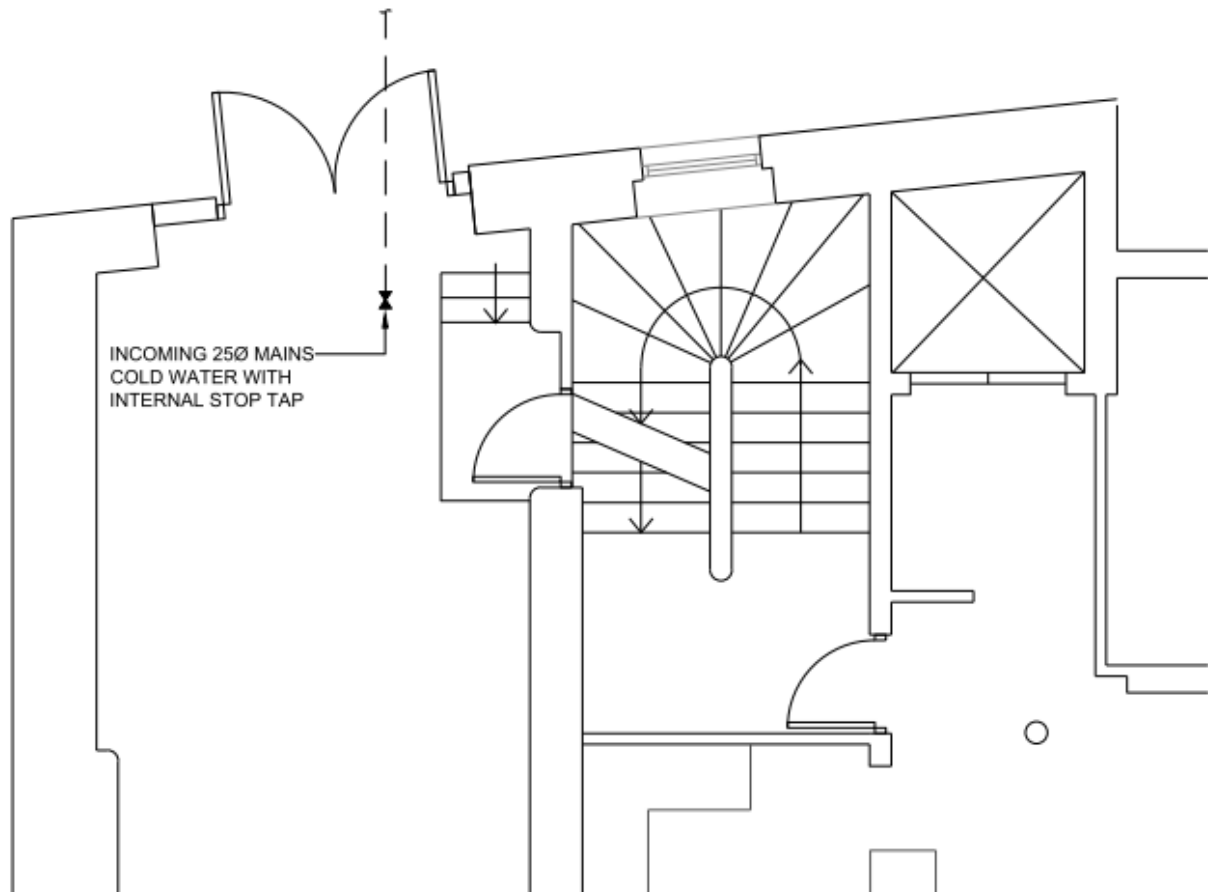


Figure 3.3.1: Existing Incoming Mains Cold Water Service

3.3.2 Hot Water

Hot water to the food and beverage units would be installed by the incoming tenant. It is likely that these would be electric storage type.

Each apartment will require its own electric hot water cylinder. These will be located in store cupboards within each apartment

3.4 Ventilation

The proposed food and beverage units will require kitchen extract. The type and extent of this system and any associated odour treatment would depend on the kitchen equipment and cooking type. A flue route for the kitchen extract is indicated on the drawings. This follows the route of the existing flue, rising up the building on the Rayner Street façade to discharge above roof level.

To comply with Part F of the Building Regulations, the apartments will be served by individual mechanical whole-house ventilation systems with heat recovery (commonly referred to as MVHR). These would extract damp and warm air from kitchens and bathrooms and return heat to incoming fresh air as it is delivered to bedrooms and living areas. Such systems offer greater control over the quality of the internal environment and provide a ventilation solution that does not rely on opening windows for background or

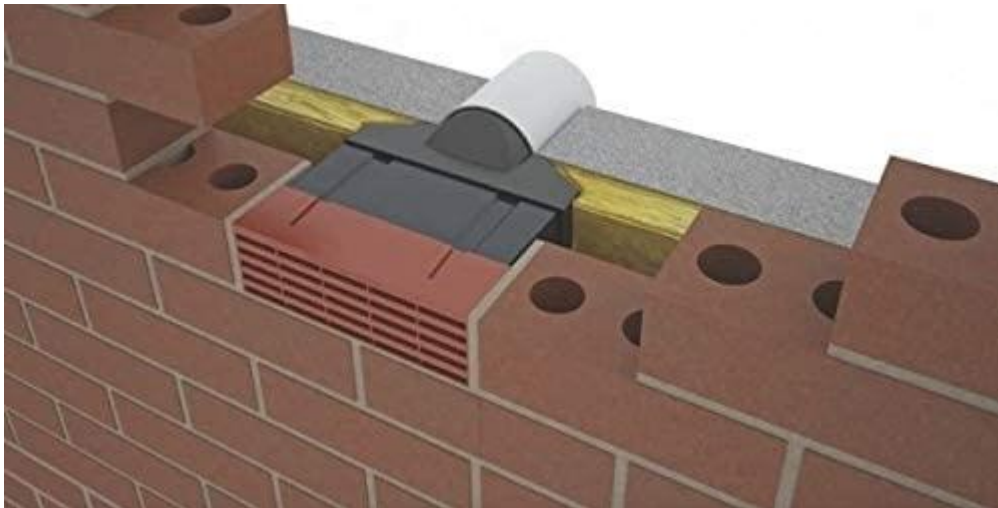
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purge ventilation. The location of the building and local noise levels will make MVHR a necessity.

MVHR would be designed to run continuously to provide 'trickle' ventilation. A boost function would be provided, linked to the use of the bathrooms or kitchen to increase the air change rate within the apartment. An MVHR unit will be installed within the store room within each apartment.

Ducting will be galvanised steel and could be painted to match containment and ironmongery. Refer to the drawings for details.

Each MVHR system would require its own supply and exhaust penetrations through the external walls of the building. It is proposed that these are installed as brick vents. These would be coloured to match the brickwork to ensure that they are discrete. Their installation is considered reversible, as the vents could be removed and replaced with bricks in future if required.



Brick Vent Installation Image

3.5 Comfort Cooling

As referred to in section 3.2, it is anticipated that the food and beverage units would require comfort cooling. The external loading bay on the Rayner Street elevation has been identified as a suitable location for the associated external condensers. Refer to the drawings for details.

There are no proposals to provide comfort cooling to the apartments.

Cooling will be required to the UPS room to ensure that the battery systems are maintained at a suitable temperature. Refer to the drawings for details.

3.6 Gas

There are 4No existing gas service entry points and 3No meters located on site. These are marked up on *Figure 3.6, 3.7 and 3.8*. Meter reference numbers are noted where

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these could be read. Some meters were inaccessible or their ID plates too corroded for reference numbers to be taken. See appended photographs for details.

Cadent will be approached to rationalise the incoming gas services. It is proposed that 1No service be retained/renewed as required to serve the food and beverage units. The remaining gas services would be removed from the site.

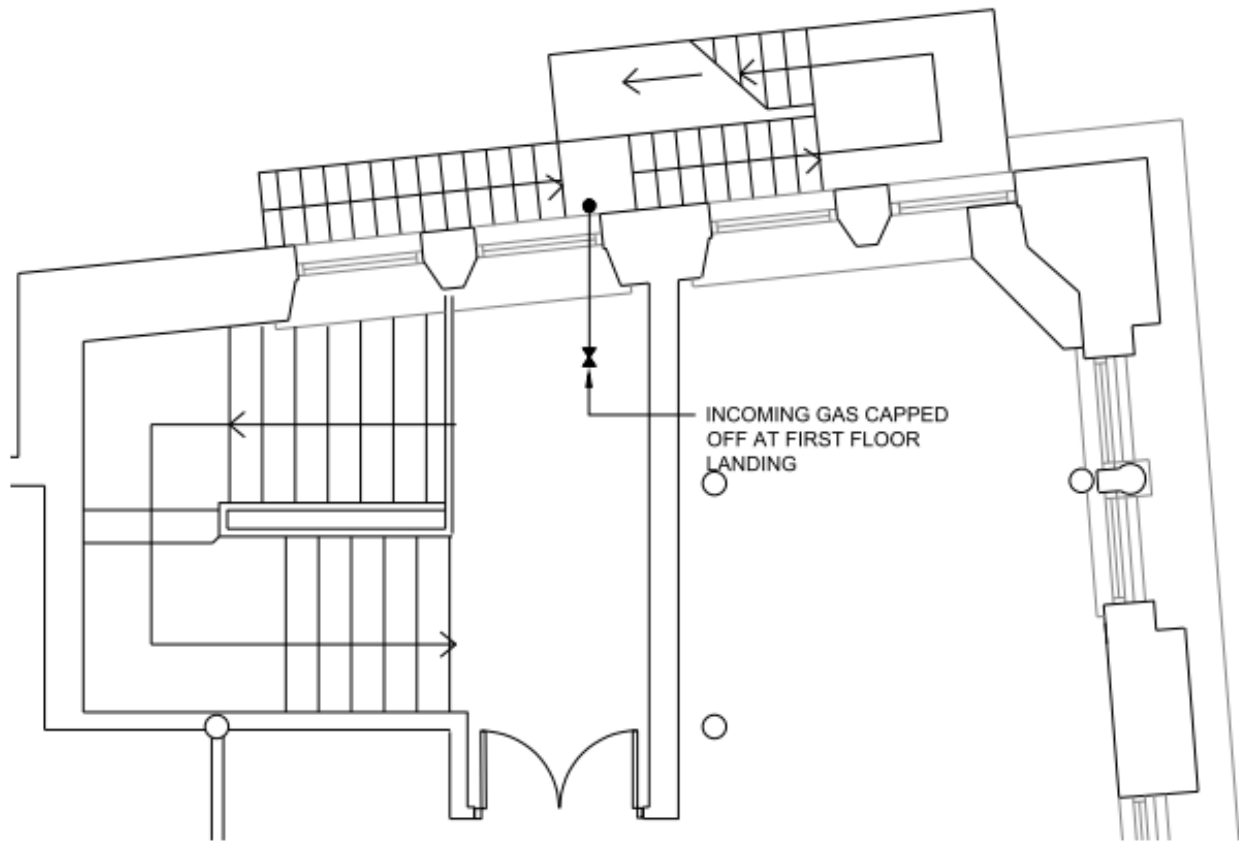


Figure 3.6: Incoming gas service to 1st floor level.

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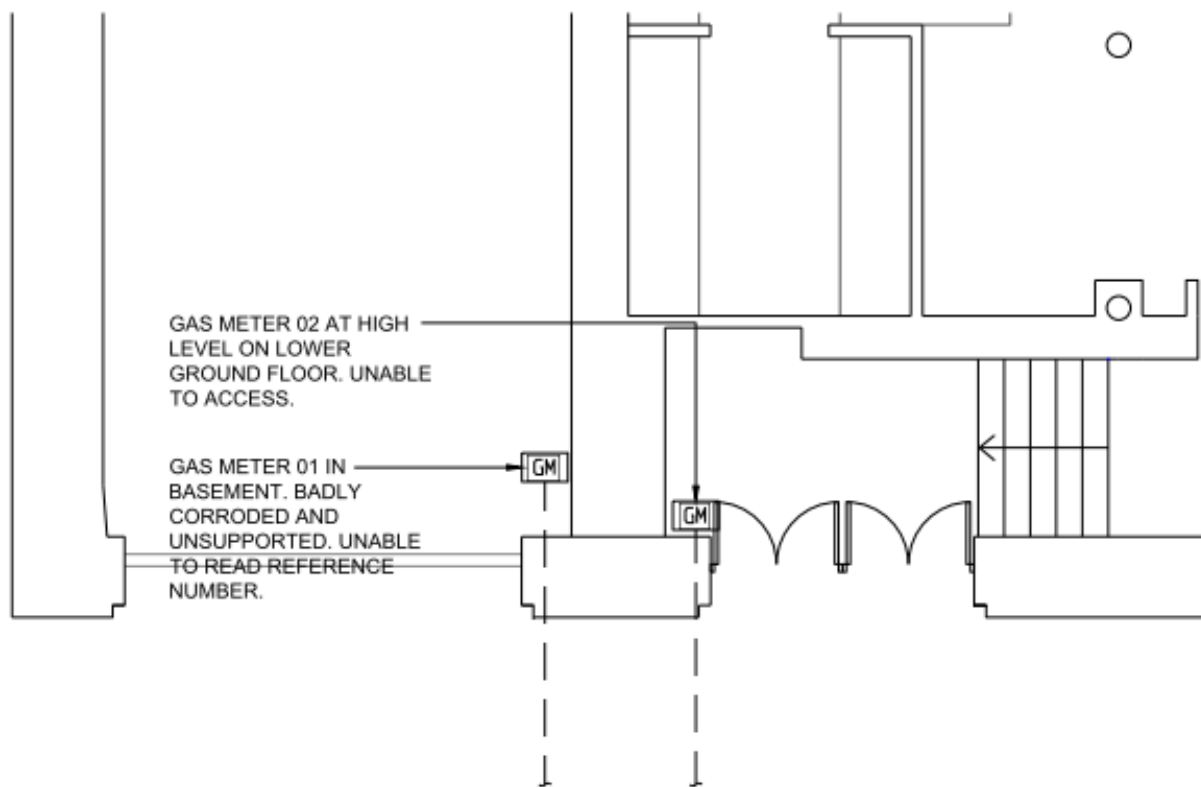


Figure 3.7: Incoming gas services to meter 01 and meter 02.

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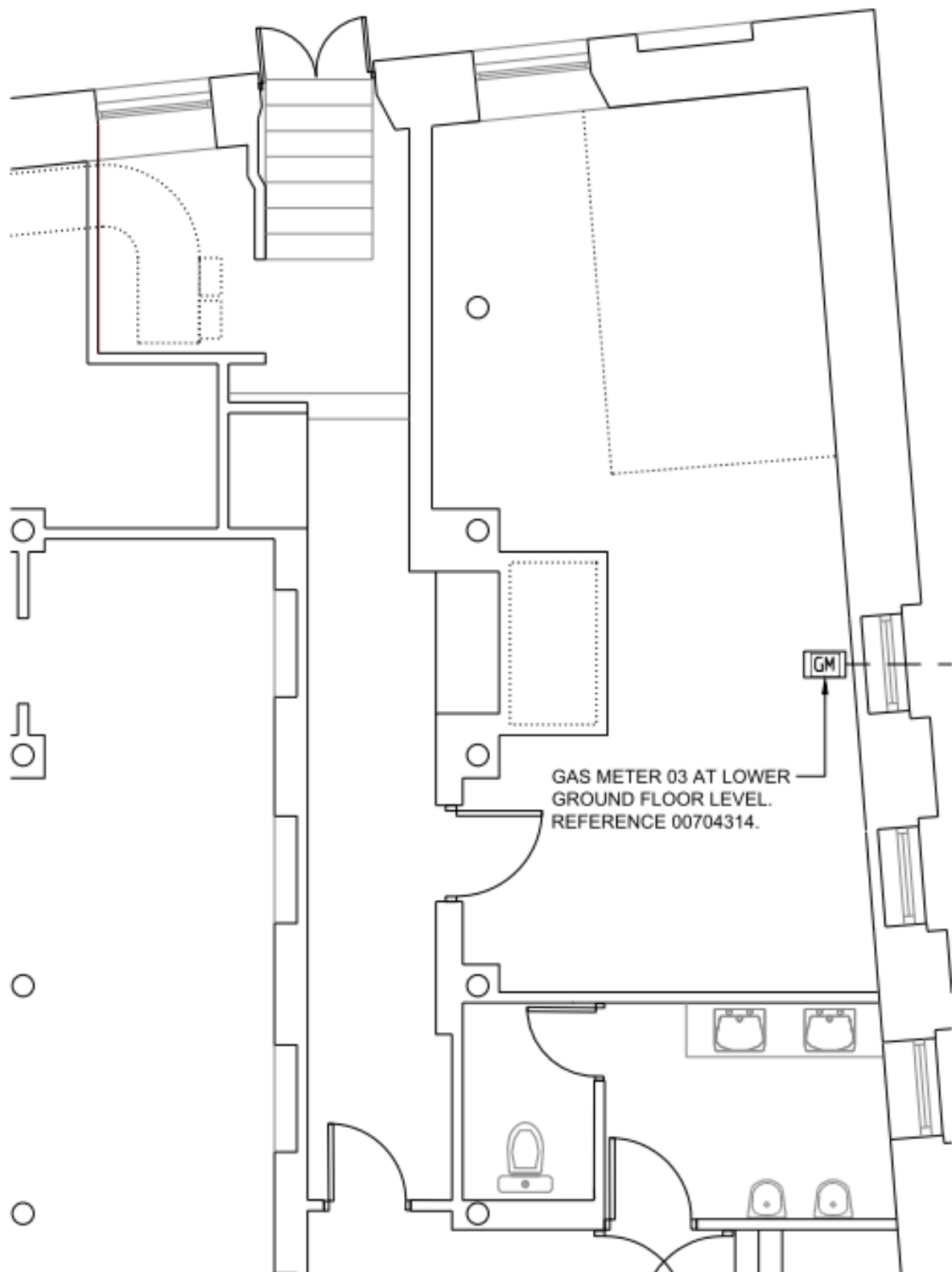


Figure 3.8: Incoming gas service to meter 03.

3.7 Automatic Controls

Any remaining existing controls systems would be removed. Services within apartments would be provided with their own stand-alone controls. There are no proposals for a site-wide controls system.

3.8 Above Ground Drainage

Existing above ground drainage is provided at a number of WCs on different floor levels and to the former kitchens. Drainage runs down to lower ground floor level and under the floor to enter the basement.

Existing above ground pipework is in poor condition and needs to be replaced.

All drainage appears to terminate at a single exit point within the basement near the basement access stair.

A number of new soil vent pipes (SVPs) will be required to serve new bathrooms and kitchens. These should ideally terminate through the roof. However, as the building is of limited height it may be possible to terminate these with air admittance devices within apartments. Refer to the drawings for details.

4.0 ELECTRICAL SERVICES

4.1 Design Criteria

I) Illuminance Levels

Bedrooms	-	100 lux
Kitchen Area	-	200-300 lux
Living/Dining	-	100/150 lux
Bathroom	-	150 lux
Lift Lobbies	-	100 lux
Circulation	-	100 lux
Plant Areas	-	100-150lx

II) Emergency Lighting Level

Emergency lighting to comply with BS 5266: 2011.

Defined Escape Routes	:	1 Lux Min. floor level.
Undefined Open Areas	:	0.5 Lux Av. Floor Level

III) Within all areas, luminaires shall comply with the requirements of CIBSE lighting guide LG09 and Part L.

4.2 Electrical Supply and Distribution

Given the expected loads from the new development, condition of the existing cutout, and potential new metering requirements, our initial view is that an upgrade will be required to support the proposed development.

We would expect the existing cutout to be replaced with a BEMCO fused distribution board, this would provide separate metered supplies to the commercial units, apartments, and a landlords supply.

The apartments will be fed from the BEMCO cutout, with each sub-circuit connected to separate kWh MID Approved meters within the plant room, before terminating into the apartments consumer unit. Separate DP Isolators will be connected from the meters, to enable separate safe isolation of each apartment.

A separately metered dedicated Landlords distribution board will be installed within the meter room to feed the associated landlord lighting and power services, fed from the BEMCO.

The electrical distribution installation works shall comply with the latest edition of BS7671.

The supplies for mechanical plant and the fire safety system shall also be fed from the landlords distribution board.

A UPS system will be provided to deliver emergency power to smoke vnet and sprinkler systems.

4.3 Metering

Individual utility meters shall be installed for the landlords supply, commercial unit, and each individual apartment.

4.4 Lighting

All new lighting to the building shall be installed to suit the new architectural layouts.

A general lighting installation shall be provided throughout the building. The lighting design shall comply with all relevant CIBSE guides including code of lighting LG09 and Part 'L' of the building regulations.

The lighting shall generally be provided via the following:

Landlord areas:

Surface mounted LED luminaires within stair cores, store rooms and plant rooms. LED downlights shall be installed within the corridors, suspended from the containment to limit disturbance to existing building fabric.

The lighting throughout the landlord areas shall be locally controlled using a stand alone lighting control system. Presence/absence detection shall be provided via automatic lighting control systems to regulate the output of light fittings and minimise energy consumption in unoccupied areas.

Apartments:

A mixture of containment-mounted and suspended GU10 LED luminaires shall be installed throughout the apartments to provide a modern aesthetic look with adequate lighting levels. IP rated luminaires shall be installed within the bathrooms. Decorative feature lighting shall be provided in accordance with the client's interior design plan.

Localised manual light switching shall be provided within the apartments to control the lighting.

Commercial Units:

Lighting would be installed by the incoming tenant. Minimal lighting shall be provided to allow safe access to each space.

External Lighting:

New external lighting will be required. This shall be designed in accordance with the recommendations given in CIBSE Guide LG6 "The Exterior Environment"

External lighting shall be achieved through building mounted and over door high efficiency luminaires to provide adequate lighting at the main entrance and means of escape.

All the cables used for external lighting installations shall be XLPE/SWA/LSF cables unless otherwise stated. Connections between the luminaires lamp circuit and the HRC fuse out shall be by means of a 2.5mm², 3 core heat resistant flexible cable.

4.5 Emergency Lighting

The proposed emergency lighting installation system shall comply with the requirements of BS5266: Part 1: 2011 and provide 3 hours duration.

The emergency lighting system shall cover all means of escape, stairs and corridors.

Emergency lighting shall generally be provided via self contained battery packs within the general lighting luminaires complying with the requirements of ICEL and British Standards.

Where it is not practical to use or convert normal luminaires into emergency fittings, dedicated emergency luminaires shall be provided.

Dedicated emergency signage luminaires shall be provided in or on all final exits and main escape routes utilising edge-lit signage types and in further locations to satisfy the requirements of BS 5266.

4.6 General Purpose Power

A complete small power installation shall be provided throughout the building.

Small power to the apartments shall be distributed via fixed brushed steel/chrome or plastic socket outlets, fed from the local consumer unit. These would be surface fixed and fed by exposed galvanised steel conduit on existing walls and recessed where fixed to new studwork walls.

Suitable fire and/or acoustic pads will be fitted to outlets fixed to party walls.

The final specification of the accessories shall be confirmed by the client depending on target tenants and project budget.

The proposed small power installation shall be designed in accordance with the latest IEE wiring regulations and BS7671 latest addition.

The circuits shall be arranged in ring or radial formation and protected by suitably rated MCB's within the local distribution board. Each circuit shall be provided with an earth cable finished green/yellow. RCD protection will be provided where required to comply with the requirements of BS7671 amendment 3.

The wiring system shall generally be single core LSF sheathed copper cables, installed within conduit, walls and ceiling voids. Containment will generally be exposed and painted to ensure a coherent aesthetic across the services installation and ironmongery. Refer to the drawings for indicative routes.

Service plant rooms and common circulation areas shall be provided with small power outlets for general purpose, cleaning and maintenance.

4.7 Fire Alarms

It is proposed that a new analogue addressable fire alarm system shall be installed to the landlord areas, consisting of smoke and heat detection as per the requirements of BS5839. A fire strategy report has not yet been conducted for this building, however, it is expected that the system will be designed and installed in accordance with the requirements of BS 5839-Part 6:2004 to at least a Category L2 system.

Fire protection within the apartments will comprise of mains driven fire alarm detectors fed from a dedicated circuit off the local consumer unit, in accordance with the requirements of BS 5839-Part 6:2004 to at least Grade D Category LD2 standard system. This system will be independent to the landlord fire alarm system.

The system shall comply in all respects with the requirements of BS 5839 Part 1.

Fire alarm interfaces shall also be interfaced to the main entrance access controlled doors.

The commercial unit shall be provided with a fire alarm interface to enable connection to the addressable fire alarm panel located in the residential development.

4.8 Data/Comms

It is proposed that a new comms cabinet shall be installed within the plant space to facilitate the new wireless/wired network system and PoE CCTV and access control systems.

From the central comms rack, all new CAT5e data cabling shall be installed and distributed throughout the building via a cable containment system within the ceiling void, and wired to designated RJ45 outlets serving the equipment.

The electrical services contractor shall provide the structured wiring infrastructure only, i.e cable containment, data cabling, RJ45 sockets and comms rack/patch panels. Each data cable shall be terminated into RJ45 points and wired back to the local rack. The cable shall be labelled, tested and left ended off (crimped) and coiled with sufficient length for final rack configuration, terminations and testing by the appointed client I.T specialist.

4.9 TV Distribution

A TV distribution system shall be installed to provide TV, radio and satellite services to each apartment via media outlet plates installed within the living room areas. The system will allow each tenant to access Digital Terrestrial TV (Freeview), FM and DAB Radio services, and a provision for Sky/Sky Plus digital satellite services as an additional option to the tenant. An ariel array, satellite dish and associated bracketry will be installed on the roof of the building, with the associated amplifiers and multiswitches installed within the electrical riser on each floor.

It is the responsibility of the appointed TV distribution specialist to ensure the roof mounted cell transmission system does not affect the signal of the tv distribution in any way.

4.10 Security and Access Control

A video or audio entry intercom system (specification to be agreed to suit budget) will be installed throughout the building to provide controlled access to the apartments. Each apartment will have a handset linked to the main intercom panel at the main entrance. Tenants will gain access to the building via a fob or code entry system, with a reader installed at the residential entrance.

All associated power and ELV/data cabling will be routed through the building via the cable containment system, and installed within the building fabric.

A PoE IP CCTV system will be installed throughout the building, and shall be connected to the buildings network system by the appointed I.T specialist. A CCTV 8-channel network video recorder (NVR) shall be rack mounted within the comms rack.

The CCTV cameras will be fixed to the ceiling or building façade, to cover the external main entrances to the building, internal main entrances and lift lobbies to each floor. The cameras will be installed by the I.T specialist, with all associated cable infrastructure installed by the electrical contractor.

4.11 Lift Installation

A new passenger lift will be provided. Supporting power, fire alarm interface and telephone line shall be provided as per the lift manufacturers requirement.

5.0 SUSTAINABILITY & STATUTORY COMPLIANCE

5.1 Mechanical Services

Mechanical services to the domestic units will be specified to comply with the Domestic Building Services Compliance Guide. Performance criteria (such as fan efficiencies) will be determined by SAP compliance requirements. SAP assessments on similar schemes indicate that individual MVHR systems will offer the best SAP ratings.

5.2 Electrical Services

Electrical services to the domestic units will be specified to comply with the Domestic Building Services Compliance Guide. Performance criteria (such as lighting energy performance, controls and renewables requirements) will be determined by SAP compliance requirements. LED lighting throughout with automatic lighting control to common areas will offer the best SAP ratings.

5.4 Land Use

Equipment will be contained within the building footprint.

5.5 Noise

The proposed kitchen extract and external condensers would generally be expected to emit noise no greater than 5dB lower than recorded ambient levels. Equipment selections will ensure this during design development. Significant external plant (including kitchen extract systems and external condensers) is already present along Raynor Street.

It is anticipated that the UPS room condenser will be a single Mitsubishi MUY-TP50VF unit. The acoustic details for these units are detailed below:

- Sound Power Level 61dB(A)
- Sound Pressure Level 47dB(A)

MVHR ventilation is to be provided to the apartments to limit the impact of local ambient noise on residents.