

Engineering Report

Blackglen Road Development
MEP BASIS OF DESIGN REPORT
PROJECT NO: K455
August 2022



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1. INTRODUCTION

Included within this report is an overview of the mechanical and electrical systems that are proposed for the Blackglen Road development. It is intended that upon agreement with the Client, this document will form the basis of the design for these systems.

Blackglen Road is a new development located on Blackglen Road, Dublin 18. The development shall consist of a new residential scheme comprising 360 no. residential units, associated resident amenity facilities and a childcare facility in the form of 9 no. new apartment buildings (A1 – C3) as follows:

- BBlock A1 (4 storeys) comprising 18 no. apartments (3 no. 1 bed units and 15 no. 2 bed units); a crèche facility of approx. 401 sq. m with associated outdoor play space of approx. 20 sq. m; and resident amenity facilities of approx. 30 sq. m.
- Block A2 Block A2 (3-4 storeys) comprising 24 no. apartments (2 no. 1 bed units and 22 no. 2 bed units) and resident amenity facilities of approx. 390m2.
- Blocks B1 and B2 (2-6 storeys) comprising 69 no. apartments (30 no. 1 bed units, 34 no. 2 bed units, 5 no. 3 bed units).
- Blocks B3 and B4 (2-6 storeys) comprising 62 no. apartments (30 no. 1 bed units, 27 no. 2 bed units and 5 no. 3 bed units).
- Blocks C1, C2 and C3 (3-6 storeys) comprising 187 no. apartments (58 no. 1 bed units, 126 no. 2 bed units and 3 no. 3 bed units); and resident amenity facilities of approx. 187.5 sq. m.

Each residential unit is afforded with associated private open space in the form of a terrace/balcony.

Total Open space (approx. 22,033 sq. m) is proposed in the form of public open space (approx. 17,025 sq. m), and residential communal open space (approx. 5,008 sq. m).

Podium level / basement level areas are proposed adjacent to / below Blocks A2, B1, B2, B3, B4, C1, C2 and C3 (approx. 12,733 sq. m GFA). A total of 419 no. car parking spaces (319 no. at podium/basement level and 100 no. at surface level); to include 80 no. electric power points and 26 no. accessible parking spaces); and 970 no. bicycle spaces (740 no. long term and 230 no. short term), and 19 no. Motorcycle spaces are proposed. 10 no. car spaces for creche use are proposed at surface level.

Vehicular/pedestrian and cyclist access to the development will be provided via Blackglen Road to tie in with the Blackglen Road Improvement Scheme. A second access is also proposed via Woodside Road for emergency vehicles, pedestrian and cyclist access only.

The proposal also provides for Bin Storage areas and 4 No. ESBN substations to supply the development. 3 no. sub-stations shall be integrated within the building structures of Blocks B and Blocks C. In addition, one Sub-station shall be classed as a unit sub-station mounted externally on a dedicated plinth.

1.1 Design Criteria

The design criteria for the heating systems are as set out in Table 1.

No cooling will be provided within the apartments; however, an overheating assessment will be completed in compliance with CIBSE TM59 (Methodology for The Assessment of Overheating in Homes) to ensure a comfortable environment is maintained during summertime.

AREA	TEMP WINTER	TEMP SUMMER	NOTES
External	-3 °C	26 °C	
Living Areas	21 ± 2 °C	No cooling	
Bedrooms	18 ± 2 °C	No cooling	
Bathrooms	21 ± 2 °C	No cooling	
Common Areas (stairwells, entrance lobbies & corridors)	18 ± 2 °C	No cooling	Heating by electric panel heaters

Table 1 Heating Design Criteria

The design criteria for the ventilation systems are as set out in Table 2 below.

AREA	VENT RATE	UNIT	HUMIDITY	COMMENTS
Continuous Extract Rate (Apartment)	0.3	l/s per m²	Uncontrolled	
Bathrooms	8	l/s	Uncontrolled	Boost Rate
Kitchens	13	l/s	Uncontrolled	Boost Rate
Utility Rooms	8	l/s	Uncontrolled	Boost Rate
Residential Amenity Areas	10	l/s/person	Uncontrolled	In accordance with Part F
Creche facilities	10	l/s/person	Uncontrolled	In accordance with Part F
Central Bin Store	10	ACH	Uncontrolled	
Common areas	Natural Ventilation	No cooling	Uncontrolled	

Table 2 Ventilation Design Criteria

1.2 Air Permeability

The target value for the air permeability within each apartment is 3 m³/hr/m² @ 50Pa.

1.3 Noise

Environmental Noise Criteria:

The M&E systems will be designed in accordance with noise criteria as set out within planning conditions and as advised by the Acoustic Consultant.

Internal Noise Criteria:

The mechanical and electrical systems will be designed in accordance with the criteria set out in Table 3.

AREA	NOISE RATING
Living Rooms	NR 30
Bedrooms	NR 25
Kitchens	NR 45
Bathrooms/Ensuites/WCs	NR 40
Halls	NR 40
Landlord Circulation Areas	NR 40
Plantrooms	NR 75 (May need to be lower due to adjacent apartments) Acoustic Consultant will advise

Table 3 Noise Criteria

2. TGD PART L (2021) / BER

A separate Part L report will be issued outlining the measures to be taken to ensure compliance with TGD Part L 2021. The Part L 2021 regulations set energy performance requirements to achieve Nearly Zero Energy Building (NZEB) performance as required by Article 4 (1) of the Directive for new buildings.

The definition of Nearly Zero Energy Buildings is defined as follows:

“‘ Nearly zero-energy building’ means a building that has a very high energy performance, as defined in Annex 1. The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby”.

Based on the current proposal for façade performance and system strategies, a token PV allocation of 1 to 2 No. PV Panels per apartment have been accounted for at this stage. However, these may be removed at the detailed design stage.

2.1 DEAP Calculation Information

The Part L calculation and BER are completed using DEAP software. The main factors which influence the calculation are as noted below. The DEAP software runs an annual simulation to predict the primary energy consumption from space heating, domestic hot water and electrical usage.

Factors which have a significant impact on the DEAP calculation include:

- Thermal envelope (u-values of walls, windows, roof, etc.);
- Thermal bridging factor (effectiveness of thermal bridging details);
- Air permeability;
- Dwelling orientation (extent of solar gain in a dwelling);
- Type of ventilation system (central extract system, MVHR, or natural ventilation);
- Efficiency of space heating and domestic hot water system (e.g., EAHP);
- Internal lighting design;
- Renewable technologies.
-

Factors which do **NOT** impact the DEAP calculation include:

- Cold Water consumption, including rainwater harvesting;
- Unregulated energy (white goods, televisions, etc.);
- External lighting.

The target BER is A3.

2.2 Renewable Technologies

Under Part L 2021, 20% of a dwelling’s energy consumption must be generated by renewable technologies. Options for renewable technologies include the following:

- Solar photovoltaic (PV) systems;
- Solar thermal systems;
- Wind power;
- Solar thermal system;
- CHP (combined heat & power);
- Biomass;
- Heat Pumps (Minimum COP of 2.5).

In this instance, it is proposed that the renewable energy ratio (RER) as defined in Part L 2021 is achieved using an Air source heat pump (ASHP) for Domestic Hot Water Production to be located within each apartment. It is an air source heat pump with an integrated high-performance compressor to extract energy for hot water production from the external air using insulated ductwork.



Figure 1 ASHP Unit



Figure 2 Typical Residential Heating System.

3. UTILITY SERVICES

3.1 Natural Gas

GNI has confirmed natural gas is not readily available and, as such will not be considered as a primary or secondary source of fuel supply.

3.2 Mains Water

A new mains water supply will be installed to serve the development from the existing infrastructure along Blackglen Road.

The incoming supply will be connected to the public mains by the main contractor as part of the civil engineering works. The main will be connected to the entry point of each building/block, and a dedicated meter will be toted in accordance with IW guidelines.

3.3 Electrical Supply

It is proposed to provide 4 No. ESN sub-stations to supply the development. 3 no. sub-stations shall be integrated within the building structures of Blocks B and Blocks C. Of these 2 no. Sub-stations shall serve Block C1, C2 & C3, and one Sub-station shall serve Blocks A1, A2, B1 & B2. In addition, one Sub-station shall be classed as a unit sub-station mounted externally on a dedicated plinth serving B3/B4.

The Sub-stations have been sized based on the following assumptions:

- Blocks A1/A2/B1/B2 – 917KVA – Served by a Single Sub-station
 - 111 Units @ 3.5KVA P.U.
 - EV Charging 63No. @ 50KVA
 - Childcare @ 35KVA

- Landlord @ 190KVA
- 4No. Cores @ 15KVA ea.

- Blocks B3/B4 – 730KVA – Served by a Unit Sub-station
 - 62 Units @ 3.5KVA P.U.
 - EV Charging 76No. @ 70KVA
 - Landlord @ 190KVA
 - 2No. Cores @ 15KVA ea.
- Blocks C1/C2/C3 – 1.0MVA
 - 187 Units @ 3.5KVA P.U. – Served by 2No. Single Sub-stations
 - EV Charging 178No. @ 160KVA
 - Landlord @ 235KVA
 - 6No. Cores @ 15KVA ea.



Figure 3 ESB Substation Locations - TBC

In total, there will be 317 car-parking spaces. As part of the planning conditions. i.e. 10% of car parking spaces will be provided with EV chargers upon completion. Future infrastructure for EV charging comprising sub-station load capacity and underground EV charge ducts will be in place for 100% of all car parking spaces.

Note the above strategy is subject to a final agreement with the ESB.

3.4 Telecoms

Eir & Virgin media services will be brought onto the site to serve the development. Services are to run to a dedicated comms room within the dedicated areas for distribution to the apartments.

4. MECHANICAL & ELECTRICAL DISTRIBUTION

For Blocks A1 & A2, the central mechanical and electrical systems (M&E) will be located in the basement of Block A2. Blocks B1 & B2 share a common basement where the central M&E systems will be located. The same strategy will apply to Blocks B3 & B4. Blocks C1, C2 & C3 are set over ground and first-floor parks, in which it is intended to locate the plant rooms serving the mechanical and electrical systems.

Central plant rooms include the following:

- Life safety generator room;
- Water storage rooms (sprinkler and potable water);
- Switch rooms;
- Comms room/point of presence (POP) rooms).

Dedicated mechanical and electrical risers will be provided within each block [1,500 x 400 (mm) per riser approx.]. Separate risers will be provided for smoke shaft systems and dry risers in accordance with the Fire Safety Certificate.

Mechanical and electrical services are to run from the plant rooms to the risers at a high level within dedicated areas. Services running from Block A2 to Block A1 will run from the A2 car park area below the ground trench to serve A1.

The ESB boards containing the apartment meters will be located at a dedicated room. The meter boards must ensure compliance with ESB guidelines.

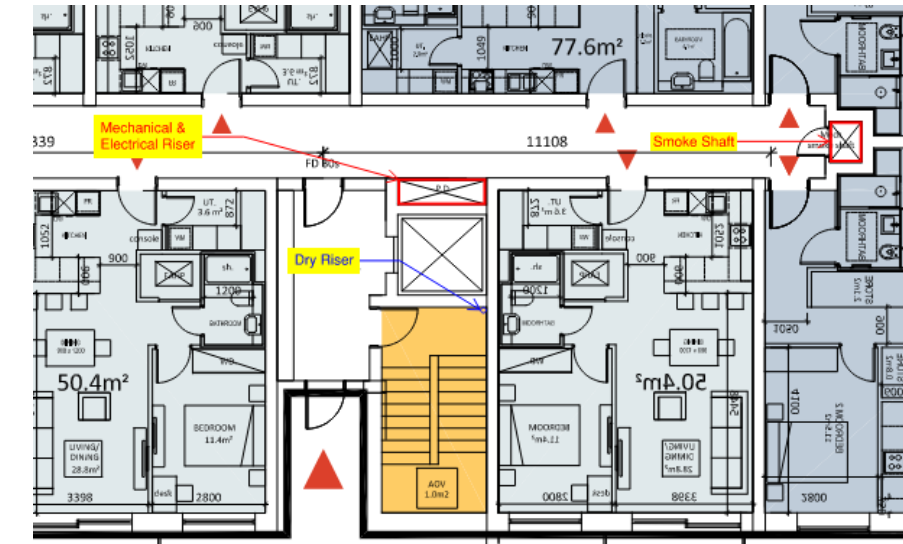


Figure 4 Typical Core Arrangement

Ceiling voids are required as follows within the development to facilitate service runs:

- Apartment entrances, common corridors: 250mm clear (Excluding ceiling build-up);
- Apartment utility area: 350mm (Excluding ceiling build-up);
- Apartment living areas/bedrooms: 200mm clear (Excluding ceiling build-up);
- Landlord corridors – 400mm clear (Excluding Ceiling build-up);
- Car park – 600 (mm) Absolute minimum.

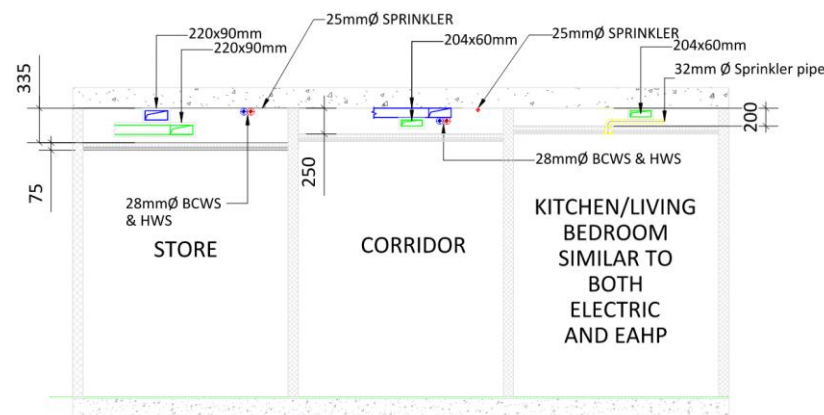


Figure 5 Typical Ceiling voids

5. SPRINKLER

Residential/Commercial sprinkler systems will be provided in accordance with BS 9251:2021 (Residential), I.S. EN 12845:2015+A1:2019 (Commercial) and the fire safety certificate for Blocks B1, B2, B3, B4, C1, C2, C3. The systems will be designed, installed, and certified by a specialist sub-contractor.

The systems will be Category 4 type with a minimum of 60 minutes of water storage provided.

The water storage tank and booster pump will be located in a plant room dedicated to a block or set of blocks. The pipework within the car park will be medium gauge steel insulated and trace heated to protect it from freezing. Pipework within the risers will be cPVC BlazeMaster. A sprinkler valve will be located within the mechanical riser on each level.

Concealed sprinkler heads will be installed within the apartments. Isolation valve for each apartment is required as per TDGB.



Figure 6 Residential sprinkler head

6. MECHANICAL SYSTEM DESCRIPTION

6.1 Heating

Heating will be provided within the apartments via direct electric panel heaters, which provide convected and radiant heat. A digital thermostat will be provided on each electric panel heater and can be controlled individually. The thermostats are to enable remote control of the heating system via a digital hub and mobile app.

Traditional wet radiators, connected to a LPHW system, fed by a Exhaust Air Heat Pump, is an alternative option which may be examined at detail design stage.



Figure 7 - Electric Panel Heater

Heating will be provided in the common landlord areas by programmable electric panel heaters.

6.2 Domestic Water Services

Mains water storage tanks will be located inside a dedicated plant room designated to each block or set of blocks. The tank is to provide 24 hour storage in line with Irish Water (IW) guidelines. The storage tank will be manufactured using glass reinforced plastic (GRP) to format 30 standard and will incorporate a maintenance section.

A duty/assist/standby booster pump will be installed adjacent to the tank and is to distribute boosted mains water to the apartments to serve the kitchens and bathrooms.

A pressure reducing valve and manifold will be installed within the riser on each level to serve the apartments. The isolation valve for each apartment will also be located in the riser. Water meters will not be installed for apartments however a spool piece will be installed to allow these to be retrofitted at a later date should domestic water charges be introduced.

A separate boosted harvested water supply and water storage tank will be installed to serve irrigation systems and a tap within the bin store.

Hot water will be provided within the apartments via the air source heat pump (ASHP). The units typically provide 200 (l) of storage.

The water services pipework installation at the basement level and within the risers will be completed using insulated copper pipework. Pre-insulated PEX pipework will be installed within the apartments.



Figure 8 Booster Pump

6.3 Above Ground Drainage

Soil vent pipes (SVP's) will be installed throughout the development to convey foul water from sanitaryware and appliances to the below ground drainage system. The soil vent pipes will be insulated to prevent nuisance noise within the apartments.

The soil vent pipes are to offset at high level in the basement car park (slung drainage) and connect to the external drainage network (by civils).

HDPE Fusion Welded pipework will be installed at high level in the car park. uPVC pipework will be installed within the risers and apartments on the upper floors.

A rodding eye and access door will be installed on the vertical stacks every three levels in accordance with building regulations. Rodding eyes are also to be installed on the SVP's where there is a change in direction. Condensate pipework from the EAHPs will connect to the SVP's via a dry running trap.

Fire collars will be installed on all plastic pipework 40(mm) and above that penetrates a fire compartment line.

Trapped floor gullies will be provided within the plant rooms and bin stores at basement level.

6.4 Mechanical Ventilation

Continuous Mechanical Ventilation will be provided within the apartments via a Heat Recovery Unit/ MVHR. The unit shall have a high efficiency counterflow heat exchanger, supply and extract filters and automatic summer bypass.

Air will be exhausted from the bathrooms, utility, and kitchen area by circular disc grilles. A manifold ducting system with semi flexible ducts will be installed above ceiling level to transfer air from the grilles to the MVHR.

Supply air to each individual bedroom and living space shall also be provided via a manifold ducting system, with semi flexible ducts that will be installed above ceiling level to transfer air from the MVHR to the supply valves.

Intake & Exhaust ductwork section, connected to the façade, will be insulated.



Figure 9 Apartment Ducting System

Cooker hoods will be hard ducted to outside via a separate vent in the facade.

A mechanical extract system will be installed to serve the bin store located at designated areas.

6.5 Controls

A control system using DDC (Direct Digital Control) technology shall be provided. The system shall be freely programmable and capable of undertaking extensive measurement, control optimisation and monitoring functions of mechanical and electrical systems.

The hardware and software shall constitute a complete system development originating from one manufacturer and guaranteeing long-term system support. The controls system shall be one that is supported from more than one 'systems house' and operate an Open Protocol system

6.6 Fire Protection Systems

Dry Riser System:

A internal firefighting mains (dry riser) will be provided in each core in accordance with the fire safety compliance report. The installations will comprise breaching inlets and landing valves, interconnecting pipe work (galvanized steel), drain valve and automatic air vent, with access hatch at top level.

Fire Extinguishers:

Fire extinguishers will be provided throughout the development in accordance with IS 291 and the fire safety compliance report.

Ventilated Lobbies:

Fire rated ducting as per EN 1366-1 will be installed within the car park area terminating at the ventilated lobbies in accordance with the fire safety certificate. The fire rated ducts are to terminate within vents to be formed in the podium slab.

Apartments:

In the tenant areas, dedicated sprinkler systems, compliant with BS 9251:2021, will be installed on Blocks B1 & B2, B3 & B4, C1, C2, C3

On blocks A1 and A2, a protected corridor strategy will be used.

Car Parks / Basements

For blocks B1 & B2, B3 & B4, C1, C2 & C3, which are sprinklered protected, a commercial sprinkler system as per I.S. EN 12845:2015+A1:2019 to protect the Basement/Car park will also be installed.

6.7 Smoke Shafts

Stairwell Smoke Ventilation:

Natural & Mechanical smoke shaft systems will be installed in each core in accordance with the fire safety compliance report to ensure the fire fighting stairwells are kept free of smoke. The systems will be designed, installed and certified by a specialist sub-contractor. The system will be complete with the following components:

- Duty/standby extract fan (roof level);
- AOV at head of stairwell;
- AOV at head of smoke shaft;
- Fireman's override switches;
- MCC panel;
- Control panel;
- Pressure switches;
- Builders shaft (1.5m²) – Natural;
- Builders shaft (0.8m²) – Mechanical;
- Motorised damper at each level;

Note: Where double door protection to stairwell, AOV at top of stairs cannot be used. Make up air required via additional shaft or openable/louvred window.

The design of the smoke shaft systems will be verified by a CFD analysis. The systems will be designed, installed, and certified by a specialist sub-contractor.

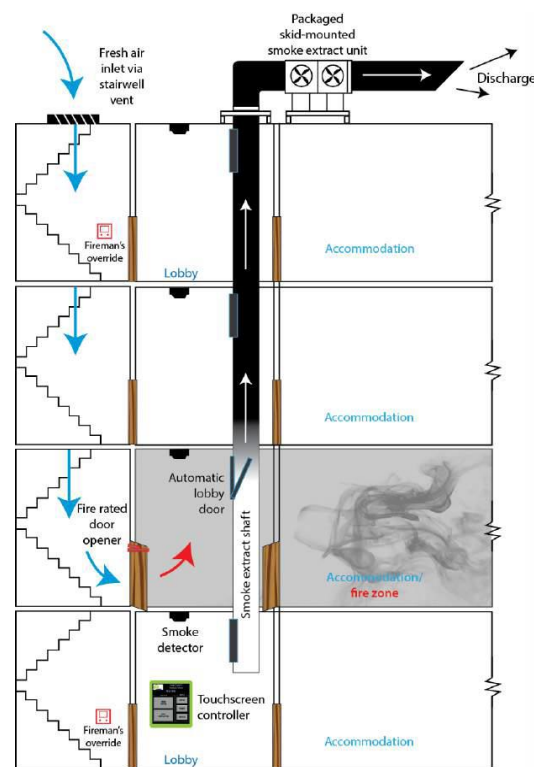


Figure 10 Smoke Shaft System

Car Park Ventilation:

For all blocks, except B3 and B4 (where a fully mechanical solution will be implemented), natural ventilated solution will be provided to all car park to provide general day to day ventilation and smoke clearance in accordance with TGD Part F. In this instance, openings will be provided, achieving 5% of the floor area ventilation, with minimum 2.5% split equally between opposing walls.

For the common basement, located on Level -1, serving Blocks B3 and B4, a full mechanically ventilated solution will be provided. In this instance, dedicated plantrooms will be required for the mechanical ventilation system. Additionally, jet fans will be installed at high level throughout the car park to provide 3 – 6 air changes per hour which is required to expel vehicle exhaust fumes. Carbon monoxide and nitrogen dioxide will be installed throughout the car park to control the operation of the jet fans. The system will be designed, installed, and certified by a specialist sub-contractor.

The design of the smoke shaft systems will be verified by a CFD analysis carried out by specialist.

7. ELECTRICAL SYSTEM DESCRIPTION

7.1 Low Voltage Power Distribution

The main distribution and life safety boards for the development will be located in switch rooms adjacent to the ESB substations.

Unmetered cables are to run from the main board to ESB meter boards which will be housed in a dedicated meter room.

A sub-main cable will run from each ESB meter to the apartments terminating within a consumer unit (located at entrance to apartment or within utility room).

Services to the apartment consumer units are to run on vertical cable tray in the electrical risers.



Figure 11 Form 4 Main Distribution Board

Sub main cables shall consist of multicore copper XLPE/SWA/LSF mounted on galvanized steel cable tray containment concealed within ceiling voids and risers.

Surface mounted MCB/RCBO consumer units will be installed to serve each apartment.

Earthing & bonding shall be in accordance with the requirements of IS10101:2020 for electrical installations

7.2 Standby Generation

A life safety standby diesel generator will be located within a dedicated room within the car park area associated with Blocks C1, C2 & C3 and also in Blocks B1, B2, B3, B4 to provide emergency power to the firefighting lifts, AOVs, smoke shaft systems and sprinkler system. The generator will be sized to operate for a period of 8 hours and is to incorporate an integral oil tank. Oil replacement will be provided directly via the car park as opposed to a dedicated oil line.

Intake and exhaust louvres to atmosphere will be provided to ventilate the room during operation. A flue is to run from the generator room and terminate at roof level.

7.3 Small Power and General Service Outlets

Power and general services outlets will be provided in each apartment and in the communal areas. All general service outlets within the common areas will be Part M compliant.

Refer to the typical apartment layout included within the appendix of this report for quantities.

7.4 Lighting and Emergency Lighting

Lighting is to be installed to meet the requirements and recommendations contained within the CIBSE code for interior lighting.

Illuminances levels will be provided as indicated below.

1. Apartments:

- a. Bedroom – 200 Lux
- b. Living Area – 250 Lux
- c. Kitchen – 300 Lux
- d. Store – 200 Lux
- e. Hallway – 100 Lux
- f. Bathroom – 250 Lux

2. Communal Areas:

- a. Main Entrance – 250 Lux
- b. Corridors – 75 Lux
- c. Stairs – 100 Lux
- d. Car Park – 100 Lux

Apartments

Lighting within the apartments is to consist of a combination of recessed LED downlights and pendants controlled from wall mounted light switches.

Bathroom and ensuite lighting will be provided by IP rated LED fittings.

An IP rated surface mounted LED luminaire will be installed on balconies where applicable.

Carpark / Plantrooms

Luminaires within carpark and plantroom area to be IP54 rated.

These luminaires will be controlled by occupancy sensors.

Emergency Lighting

A standalone emergency lighting system will be installed throughout the common areas to include recessed spots and emergency exit signage. Bulkhead type fittings will be provided within the car park area and twin spots within plant rooms. The installation will be designed in accordance with IS 3217.

External Lighting

External lighting will be provided by way of column mounted LED luminaires. Lighting design shall take into account native Bat populations and shall take on board the recommendations of the Ecologists report subject to DLRCC Public Lighting approval.

7.5 Fire Alarm System

A fire detection and alarm system will be installed within the apartments and communal areas in compliance with TGD Part B and IS 3218.

The fire alarm system will be network based with the central panel located at the entrance to each core.

A Grade D, LD1 system in accordance with BS 5839 Part 6 will be provided in apartments. The LD1 installation shall comprise mains powered smoke detectors with integral sounders installed within the bedrooms, hall and living areas. A heat detector will be installed within the kitchen.

The landlord system shall be extended to each apartment entrance hall. As a minimum a heat detector combined sounder shall be located in the apartment hallway and a landlord sounder base shall be located in each bedroom.

An L3X fire detection and alarm system will be provided in the landlord areas in compliance with IS 3218 and an L2/L3 system in basement and ancillary areas.

7.6 TV System

The TV system shall be installed to meet the requirements and recommendations contained within the following guidance documents:

- CENELEC BS EN 501117 for coaxial cabling
- CAI codes of practice
- Virgin Media Installation Guidelines
- Open Eir installation Guidelines

2 No. alternative TV/internet providers will be brought to each apartment (Virgin Media & Eir). No decoding equipment, set top boxes, TVs or customer accounts will be provided as part of the contract works.

7.7 Telephone Installation

Each apartment will be provided with fibre optic broadband. The associated router/switch box will be located within the utility cupboard within each apartment.

CAT 6A cabling will be provided from the switch box to each RJ45 point.

7.8 Security / Access Control / Intercom Systems

An IP based audio door entry phone system will be installed within each apartment. The system is to incorporate the following features:

- External vandal proof audio/video entry phone panel complete with speaker unit and push button located adjacent to the main entrance door.
- The audio/video entry phone system within the apartment shall be located within the entrance lobby/corridor and shall open the main entrance door.
- A proximity card reader shall be installed at the main entrance door for tenants' access into the building.

7.9 CCTV System

An internet protocol (IP) based CCTV system will be installed to secure the development in accordance with BS EN 50132.

Cameras will be distributed throughout the development as necessary to meet operational requirements. The CCTV system is to consist of fixed cameras at the entrances to each core and within the car park area and car park ramp.

The system will be monitored via a dedicated security/concierge control room.



Figure 12 Dome Camera

7.10 Disabled Refuge System

A disabled refuge communications system will be provided within each core.

A call point will be located within the designated disabled refuge area on each level and will blink back to a main panel located on the ground floor adjacent to the core entrance.

7.11 Intruder Alarm System

It is proposed that intruder alarm systems are installed to protect ground floor apartments only.

A central landlord intruder alarm system will be installed to protect the LV switch rooms, comms room, generator room, plant rooms and the residential amenity spaces.

7.12 Transport Services

Vertical transport throughout the development will be provided by a number of 13 person & 10 person passenger lifts. The lifts are to operate at a speed of 1.6m/s. A number of these lifts will also act as firefighting lifts in accordance with the fire safety certificate.

The lift shaft sizes have been sized to cater for different lift suppliers including Kone, Otis & Schindler.

7.13 Power Supplies and Containment Associated with Mechanical Services

All circuit wiring associated with the mechanical services installation will be fed from a mechanical control centre board (MCCB).

This is to include the following:

- Smoke shaft systems
- Car park ventilation system
- Water booster pumps
- Residential amenity plant

7.14 Lightning Protection System

A lightning protection system will be installed to meet the requirements of BS EN 62305. A lightning protection risk assessment will be completed to determine the level of protection required. A risk assessment will be carried out by the lightning protection specialist.

8. RESIDENTIAL AMENITIES / CRECHE

A separate cold water storage tank and booster set will be installed to serve the creche and amenities areas. These will be metered separately from the main scheme.

Mechanical ventilation, including CO₂ sensors, will be provided to internal spaces in accordance with CIBSE best practice guidelines in the form of local heat recovery units located above ceiling level.



Figure 13 Local Heat Recovery Unit

Heating and cooling will be provided by a VRF air conditioning system. Conditioned air will be delivered to the spaces by swirl diffusers.

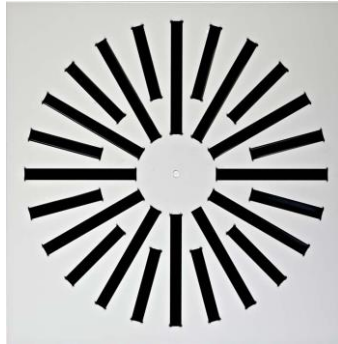


Figure 14 Swirl Diffuser

Natural ventilation will be provided to rooms where appropriate and available. This will be the default design solution.

The residential amenity spaces will be served from a local distribution board which will be fed from the Landlord ESB meter.

The creche and amenities areas will be completed to grey box standard. Dedicated connections (upstands) and a metered water connections should be provided to the creche and amenities areas as part of the civil engineering works.

A separate ESB metered supply will be provided to serve the units.

9. TYPICAL APARTMENT LAYOUTS

Typical apartment layouts will be provided at detailed design stage. The general configuration of the accommodation blocks together with internal apartment layouts are indicated on the Architectural general arrangement drawings.