

CONSTITUTION HILL

PART 8 PLANNING REPORT

11 NOVEMBER 2022

M & E REPORT

ARUP

CONHIL-ARUP-ZZ-XX-RP-Z-0002



Dublin City Council
Comhairle Cathrach Bhaile Átha Cliath

Dublin City Council

Constitution Hill Renewal

Part 8 MEP Engineering Design Report

Reference: CONHIL-ARUP-ZZ-XX-RP-Z-0002

C02 | 11 November 2022

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 281677-00

Ove Arup & Partners Ireland Limited

50 Ringsend Road

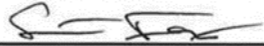


Dublin 4

Ireland

arup.com

Document Verification

Project title Constitution Hill Renewal
Document title Part 8 MEP Engineering Design Report
Job number 281677-00
Document ref CONHIL-ARUP-ZZ-XX-RP-Z-0002
File reference

Revision	Date	Filename	CONHIL-ARUP-ZZ-XX-RP-Z-0002 Part 8 MEP Engineering Design Report		
C01	29 June 2022	Description	Status A2 – Approved for Pre-Part 8 Circulation		
			Prepared by	Checked by	Approved by
		Name	Sean Fox / Abhin Jose	Luke Stewart / Paul Keville	Sean Barrett
		Signature			
C02	11 November 2022	Filename	CONHIL-ARUP-ZZ-XX-RP-Z-0002 Part 8 MEP Engineering Design Report		
		Description	Issued for Planning (Status S4)		
			Prepared by	Checked by	Approved by
		Name	Sean Fox / Abhin Jose	Luke Stewart / Paul Keville	Sean Barrett
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			

Issue Document Verification with Document

Contents

3.	Building services (MEP)	1
3.1	Introduction	1
3.2	Brief	1
3.3	Energy and Sustainability	1
3.4	MEP Design Criteria	2
3.5	Existing Incoming Utilities	3
3.6	Phasing & Construction Sequencing	3
3.7	MEP Services Summary	3
3.8	Mechanical Services	4
3.9	Public Health Services	5
3.10	Fire Suppression Services	5
3.11	Electrical Services - Infrastructure	5
3.12	Electrical Services - Landlord	6
3.13	Electrical Services - Dwellings	8

Figures

Figure 1: ESB Networks outdoor metering cabinet	6
Figure 2: ESB Networks cut-out	6
Figure 3: Typical apartment block main distribution board	6
Figure 4: Typical fire alarm panel	7
Figure 5: Access control exit buttons	7
Figure 6: External and internal intercom units	8
Figure 7: Disabled refuge panel and call point	8
Figure 8: Consumer Unit	8
Figure 9: Part M compliant twin switched socket outlet	9
Figure 10: Detectors and sounder	9
Figure 11: Telecommunications ETU box	9

3. Building services (MEP)

3.1 Introduction

This report outlines the Mechanical, Electrical and Public Health (MEP) engineering design proposals for the new residential development at Constitution Hill.

The purpose of this design report is to explain the holistically integrated engineering solutions for the scheme at part 8 circulation and to describe the approaches taken in delivering the proposed solution.

In conjunction with other part 8 project information, this report should be used to describe the principles and details of the engineering design to support the part 8 submission.

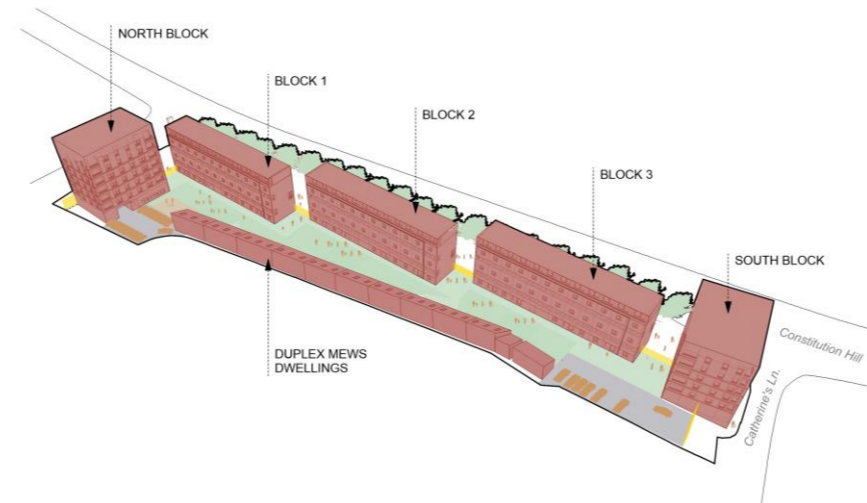
During the Pre-Part 8 circulation period, the Design Team received detailed comments from the Environment and Transportation Department and the Drainage Planning and Development Control Department. The team responded to each comment by means of a tracker and issued supplementary sketches where necessary. These comments and any updates relating to them have now been incorporated into our final Part 8 design proposal.

3.1.1 The Proposed Development

The regeneration and redevelopment is proposed for the existing Constitution Hill Estate bounded by Constitution Hill, Broadstone, Catherine's Lane North and Dublin Bus Phibsboro Depot, in Dublin 7. The existing 0.76 hectare site currently comprises of 3 no. five-storey housing blocks providing 89 homes and a crèche which form the Constitution Hill Flats social housing scheme. The proposed redevelopment, which will be managed by Dublin City Council, comprises of:

- Provision of 124 homes (42 no. 1 bed apartments, 54 no. 2 bed apartments, 18 no. 3 bed apartments, 10 no. 2 bed duplex mews dwellings)
- Building heights ranging from 2-7 storeys
- Communal & public open space 0.28ha / 37% of site area
- Deep retrofit and extension to 3 no. existing five-storey existing housing blocks to include an additional floor and side bay with modifications to all elevations
- Construction of a new seven-storey apartment block to the north of the site
- Construction of a new seven-storey apartment block to the south of the site
- Construction of ten no. two-storey duplex dwellings to the west of the site
- The provision of a multi-use childcare facility
- Construction of a new ESB substation

- Reconfiguration of pedestrian access to the site with new entrance path to the east of the site including a new stepped access to the footpath on Constitution Hill
- Level access to be provided across the site with secure lines to entrances and communal open space
- Revision to the existing entrance on Broadstone to include a gated pedestrian and vehicular entry
- Revision to the existing entrance on Catherine's Lane to include gated pedestrian and vehicular entry
- Revision to boundary treatments to Constitution Hill, Broadstone and Catherine's Lane North
- Associated car and cycle parking provision
- Demolition of the existing substation and pump house on site
- Provision of public and private open spaces; ancillary structures and associated site infrastructure works / supporting infrastructure, landscaping, public lighting, revision to access roads, pavements, boundary treatments and all other necessary enabling works, roads and services.



3.1.2 Pre-Part 8 Consultation with DCC Technical Teams

During the Pre-Part 8 circulation period, the Design Team received detailed comments from the Environment and Transportation Department and the Drainage Planning and Development Control Department. The team responded to each comment by means of a tracker and issued supplementary sketches where necessary. These comments and any updates relating to them have now been incorporated into our final Part 8 design proposal.

3.2 Brief

3.2.1 Client Briefing Documents

Below is a list of the MEP DCC specifications provided to inform the design

- DCC Domestic Heat Pump Retrofit Specification – Dated 17/02/21

- DCC Boiler Replacement Programme Specification – Dated 05/01/21
- DCC Performance Specification Guide for Mechanical Consultants MEES – Dated 04/03/21
- DCC General Electrical Specification for Electrical Installations in Residential Dwellings Dated:18/06/21
- DCC Electrical Performance Specification Guide for MEP Consultants – Dated 18/06/21

3.2.2 Design standards

The design will comply with the following codes and standards

- The Safety, Health, and Welfare Act, 2005
- All relevant Irish, British and European Standards and Codes of Practice
- I.S. 10101:2020 National Rules for Electrical Installations
- I.S. 3217:2013+A1:2017 Emergency Lighting and Amendment 1
- I.S. 3218:2013+A1:2019 Fire detection and alarm systems for buildings - System design, installation, commissioning, servicing and maintenance & Amendment 1
- Irish Water IW-CDS-5020-03 (Revision 2 – 2020)
- HPI – Home Performance Index.
- DCC Domestic Heat Pump Retrofit Specification – Dated 17/02/21
- DCC Boiler Replacement Programme Specification – Dated 05/01/21
- DCC Performance Specification Guide for Mechanical Consultants MEES – Dated 04/03/21
- DCC General Electrical Specification for Electrical Installations in Residential Dwellings Dated:18/06/21
- DCC Electrical Performance Specification Guide for MEP Consultants – Dated 18/06/21
- ESB Networks National Code of Practice
- Standard Specification for ESB MV/LV Networks Ducting
- ESB Networks Construction Standards for MV Substation Buildings
- I.S. EN 81-20:2020 Safety rules for the construction and installation of lifts - Lifts for the transport of persons and goods - Part 20: Passenger and goods passenger lifts
- I.S. EN 62305 Protection Against Lightning

3.3 Energy and Sustainability

An energy feasibility study was developed during stage 2A based on the most viable MEP solutions to comply with TGD Part L. This covered the most cost-optimal solutions, preliminary BER ratings and include capital costs and maintenance of the systems with a recommendation on the optimum solution for the development.

The proposals for the scheme have been developed in accordance with the desire to achieve an energy efficient and sustainable development that is in line with the HPI targets.

The following strategies will be adopted to assist in meeting the legislative requirements

- High performance fabric and glazing
- Low energy lighting
- Low energy ventilation
- Renewable technologies such as heat pumps
- No fossil fuels

3.4 MEP Design Criteria

3.4.1 Building Fabric Performance Targets

The key BER rating required to be achieved with the development are B2 for refurbished apartments and A2 for new build apartments.

For the new build, to achieve a BER rating of A2, the below U values are required to be achieved.

New build		
Element	U-value W/m2K	Result
Flat roof	0.12	BER A2
Walls	0.15	
Ground Floor	0.12	
External Windows	0.85	
External Doors	1.2	

For the renovated blocks, the below U values are required to achieve a BER rating of B2.

Renovated Blocks		
Element	U-value W/m2K	Result
Flat roof	0.25	BER B2
Walls	0.25	
Ground Floor-Existing Slab	0.45	
Ground Floor-New Slab	0.18	
External Windows	0.85	

Renovated Blocks		
Element	U-value W/m2K	Result
External Doors	1.2	

For the mews houses, the below U values are required to achieve a BER rating of A2.

Mews Duplex dwellings		
Element	U-value W/m2K	Result
Flat roof	0.12	BER A2
Walls	0.15	
Ground Floor	0.12	
External Windows	0.85	
External Doors	1.2	

For after school unit in the north block, the below U values are required to achieve a BER rating of A3,

After School Unit in the North Block		
Element	U-value W/m2K	Result
Flat roof	0.15	BER A3
Walls	0.18	
Ground Floor	0.15	
External Windows	1.4	
External Doors	1.4	

3.4.2 Air Tightness

New build dwellings will be designed to achieve an air tightness testing of below 3m³/hr/m² @ 50Pa in compliance with the HPI targets.

Renovated blocks will be designed to achieve an air tightness testing of below 5m³/hr/m² @ 50Pa, this however requires clarification under HPI as there is no guidance published for retrofit

3.4.3 Mechanical Services Design Criteria

External Ambient Design Criteria:

Season	Temperature
Summer	27°C db 100% RH
Summer (for heat rejection equipment)	32°C db 100% RH
Winter	-4°C db 100% RH

Internal Design temperatures (no humidity control provided):

Area	Winter	Summer
Residential Apartments	22°C db (+/- 2°C)	Uncontrolled naturally ventilated
External terrace/Corridors/Lobbies	Uncontrolled. Naturally ventilated.	
Main entrances	Uncontrolled. Naturally ventilated.	
Stairs	Uncontrolled. Naturally ventilated.	

Ventilation design criteria to TGD Part F requirements and CIBSE Guide A. In addition to the table below, the minimum whole dwelling supply ventilation rate as stated in TGD Part F shall be met, with a minimum of at least 0.3 l/s per m².

Area	Continuous Extract L/S
Kitchen	13 L/S
Utility Room	8 L/S
Bathroom	8 L/S
Residential Corridor and Stairwells	Natural via openable windows

Cold water storage has been provided as per Irish Water IW-CDS-5020-03 (Revision 2 – 2020).

Building	Minimum Cold-Water Storage for New Developments Using Low Flush and Dual Flush Wc's
1, 2 & 3 Bed	227 Litres
Additional water storage per shower en-suite in the above	90 Litres
Afterschool Unit	36 Litres per head

3.4.4 Electrical Design Criteria

Electrical Loads	
Unit Type	MIC
Dwellings	16kVA
Landlord Areas	49kVA
After School Unit	16kVA

Lighting Levels	
Space	Value
Circulation areas and corridors	100 lux
Stairs	100 lux
Lift (area in front of doors)	200 lux
Plantrooms / Switchroom	200 lux

3.4.5 Plant Resilience

Service	Resilience
Incoming water main	N
Incoming power supply	N
Incoming gas main	N/A – no gas in proposed scheme

3.5 Existing Incoming Utilities

This section describes the utilities serving the existing site.

3.5.1 Electrical

The development is currently served by an ESB Networks' MV substation located at the southern end of the site.

3.5.2 Telecommunications

The site is currently served by both Eir and Virgin Media. The existing incoming apartments' telecommunication cables are surface fixed to the buildings' façade.

Eir services enter via underground cable ducts at the northern end of the site and penetrate ground level at the side of each block. From this point the cables are fixed to the building façade where they distribute to each unit.

Virgin Media services enter from overhead lines at the southern end of the site and are surface fixed to the side of Block 3. From this point the cables distribute to each unit and cross overhead to serve Block 2. The process is repeated across Blocks 1 and 2.

3.5.3 Gas

There is an existing GNI gas main which feeds the existing site from North to South with gas meters located in each apartment connected to gas boilers

3.5.4 Water

The site is currently fed with water with one incoming main connected to a pump room from the North end of the site. There is one pump per existing block within the pump room which distributes water to the tanks on the roof of each block.

3.6 Phasing & Construction Sequencing

The following section provides a summary of the key points in relation to the current phasing proposals.

3.6.1 Gas

There is an existing gas main which feeds the site from North to South, which will need to be diverted to enable the development of Phase 1. The gas main will need to be reconnected from the South side of the site to enable the remaining two existing blocks to be kept live. The diversion will have to take place via Catherine's Lane and Prebend Street. These works will take place as part of the enabling works prior to the commencement of phase 1.

Initial discussions have taken place with GNI and an initial cost has been received to undertake this work. This work includes temporary disruption to tenant gas meters.

3.6.2 Water

The site is currently fed with water from one incoming main from the North end of the site. This is connected to a pump room and within the pump room there is a pump for each block which distributes water to the tanks on the roof of each block.

This pump room will need to be demolished to enable the current phasing strategy. A temporary pump room will need to be built and the Irish water main extended down the site to keep the two remaining blocks live which will come at an additional cost to be factored into the project. These works will take place as part of the enabling works prior to the commencement of phase 1.

3.6.3 Electrical

The existing ESB Networks' MV substation will need to be relocated in order to facilitate the construction of the South Block. The incoming and outgoing cables to the substation will also need to be diverted away from the South Block's footprint.

ESB Networks have indicated that a new double substation will need to be constructed to replace the existing substation.

The relocation and diversion works will require new trenching, laying of cable ducts, installation of cabling and the provision of cable jointing pits.

Any diversion works that occur external to the site will form part of the capital contributions. Works external to the site will be carried out by ESB Networks.

The construction of the new double substation, alterations to the existing ESB network, new trenching and laying of cable ducts should be carried out as part of the enabling works prior to the commencement of Phase 1.

There are existing ESB network cables serving the adjacent Dublin Bus depot traversing the site within the location of the proposed extension to Block 1 and several mews houses. These ESB cables will have to be diverted to enable the construction of these new buildings.

Initial discussions have taken place with both ESB Networks and Dublin Bus to discuss the proposed diversion works, during which Dublin Bus confirmed their plans to upgrade the electrical supply to the bus depot.

ESB Networks confirmed that the proposed new supply to the bus depot can be routed away from the Constitution Hill site.

Further information on the disconnection/diversion of the existing supply cables to the Dublin Bus depot will be available at the next design stage.

3.6.4 Telecommunications

The existing telecommunications services will require disconnection to facilitate the refurbishment works to the existing blocks.

New telecommunication service pillars will be installed throughout out the site to supply the new apartment buildings and houses.

The telecommunication diversion works will require trenching, laying of new cable ductwork, installation of cabling and the provision of on-street cabinets. Any diversion works that occur external to the site will form part of this contract.

The alterations to the existing telecommunications networks, new trenching and laying of cable ducts should be carried out as part of the enabling works prior to the commencement of Phase 1.

Initial discussions have taken place with both Eir and Virgin Media and a diversion strategy and a quotation will be developed at the next design stage.

3.6.5 Phasing

The decision has been made that north to south phasing approach is the way forward. There is insignificant disruption to the services to the two remaining blocks with a north to south proposal which will involve significant cost and enabling works that will need to be included in the project costs.

3.7 MEP Services Summary

The below summarises the services approach for each type of block and dwelling

3.7.1 Duplex mews dwellings

Services	Description
Electrical	ESB supply cable and meter in external cabinet located on the front of the dwelling Consumer unit in main entrance hall of each dwelling
Telecommunications	Incoming telecommunications supply cable terminates in external cabinet located on the front of the dwelling Internal cable to supply TV/internet point in living room from external cabinet
Cold water	Separate water feed separated to each dwelling with small tank and booster set in dwelling
Heating	Radiators via split heat pumps
Hot Water	Hot water cylinder per dwelling, incorporated within the split style heat pump indoor unit.
Ventilation	Mechanical ventilation with heat recovery (MVHR)

Services	Description
	Supply air to each bedroom & living area. Extract ventilation from bathroom and kitchen. Kitchen hood ducted to exterior

3.7.2 Renovated blocks

Services	Description
Electrical	ESB supply cable and meters located in Main Distribution Board in switchroom on ground floor Consumer unit in main entrance hall of each dwelling 1no. landlord connection per block
Telecommunications	Incoming telecommunications supply cables terminate in distribution boxes located in the electrical riser Communal UHF aerial and satellite system to be provided at roof level. Each dwelling to receive a dedicated supply from this system. Each dwelling to receive a dedicated telecommunications containment route for each provider to facilitate future tenant connection Internal cable to supply TV/internet point in living room from riser.
Cold water	Cold water storage and tanks at fifth floor in plantroom. Break tanks and booster at ground to boost to fifth Separate water feed separated to each dwelling (Unmetered)
Heating	Individual double-ducted exhaust air heat pump per dwelling DDEAHP Provides space heating via warm air but van have supplementary heating provided via panel heaters
Hot Water	Hot water cylinder per dwelling, incorporated within the double ducted exhaust air heat pump
Ventilation	Mechanical ventilation with heat recovery using double ducted exhaust air heat pump (DDEAHP) Supply air to each bedroom & living area. Extract ventilation from each bathroom and kitchen. Kitchen hood ducted to exterior

3.7.3 North and South blocks

Services	Description
Electrical	ESB supply cable and meters located in Main Distribution Board in switchroom on ground floor Consumer unit in main entrance hall of each dwelling 1no. landlord connection per block
Telecommunications	Incoming telecommunications supply cables terminate in distribution boxes located in the electrical riser

Services	Description
	Communal UHF aerial and satellite system to be provided at roof level. Each dwelling to receive a dedicated supply from this system. Each dwelling to receive a dedicated telecommunications containment route for each provider to facilitate future tenant connection Internal cable to supply TV/internet point in living room from riser.
Cold water	Cold water storage and tanks at ground level in plantroom Separate water feed separated to each dwelling (Unmetered)
Heating	DDEAHP Provides space heating via warm air but van have supplementary heating provided via panel heaters
Hot Water	Hot water cylinder per dwelling, incorporated within the double ducted exhaust air heat pump.
Ventilation	Mechanical ventilation with heat recovery using double ducted exhaust air heat pump. Supply air to each bedroom & living area. Extract ventilation from each bathroom and kitchen. Kitchen hood ducted to exterior

3.8 Mechanical Services

3.8.1 General

The Mechanical Services to this development will be designed and specified to meet industry norm standards of resilience and reliability. These systems will conform to the DCC documentation and specifications outlined within section 3.2.1. There may however be slight deviations required to the document based on issues with constructability and constraints imposed by the current structure of the building that will need to be discussed and agreed with DCC.

3.8.2 Infrastructure

The following description states the demarcation between the infrastructure elements and the fit-out elements of the development.

The infrastructure scope of works will include:

- All central plant and distribution
- Vertical risers and horizontal distribution through residential corridors, terminating at the mechanical utility cupboard (MUC),

The fit-out works will include:

- Multi-use childcare facility
- Apartments
- Duplex mews dwellings

3.8.3 Domestic Hot Water & LTHW

The Constitution Hill development will primarily use air source heat pump technology to provide space heating and generate hot water to all dwellings. The strategy to serve the buildings will vary between the residential apartment units and the mews buildings.

3.8.4 Residential apartments

The residential apartments will be served by a Double Ducted Exhaust Air Heat Pump (DDEAHP) system in each apartment.

The DDEAHP, located in the utility cupboard of each apartment, will utilise energy recovered from extracted air from bathrooms, kitchens and wet rooms, to generate hot water to a suitable temperature for Domestic Hot Water (DWH) which can be stored within a built-in storage tank.

The system provides primary space heating by the use of conditioned air through a ducted system and diffusers. The DDEAHP supplier recommends fitting standard electric heaters in the lounge and passage areas of the apartments for better control.

DDEAHP's do not require any central or external plant. They occupy less utility cupboard space and void space compared to the centralised option coupled with an MVHR. The units are fed directly from the apartment Distribution Board (DB) which simplifies metering.

Regular maintenance access will be required for the DDEAHP's compared to fairly limited internal access needed for the centralised option. This has been mitigated by providing access to the utility spaces from the external corridors.

3.8.5 Duplex mews dwellings

For the duplex mews dwellings, the systems would be proposed to be stand-alone rather than connected to a central system. A split air source heat pump system is proposed for each of the duplex mews dwellings.

The air source heat pump system will comprise of an outdoor and indoor unit connected by refrigerant pipework. The outdoor unit needs to be located in a well-ventilated outdoor area and will be located in the covered entry.

The indoor unit located in the utility cupboard, will transfer heat from the refrigerant fluid to the water circuit. This hot water will then serve the radiators, in addition to heating water within the built-in storage tank to a suitable temperature for DHW use.

3.8.6 Mechanical Utility Cupboard

It would be proposed that each residential unit will be provided with a mechanical utility cupboard (MUC), where most of the apartment plant and equipment will be located if feasible.

The utility cupboard provides a convenient, central location for plant items which will assist in routine maintenance and plant replacement when necessary. At this stage of the design access has been facilitated from the deck / corridors for ease of access for DCC staff where feasible.

3.8.7 Multi-use childcare facility

Heating and cooling shall be via VRF heat pumps with a condenser located externally

3.8.8 Ventilation

3.8.8.1 Residential Apartments

The ventilation in residential apartments in both renovated and new build is done by the exhaust air heat pump unit. The unit will be designed to extract air from kitchen and bathroom areas, removing the heat from the extract airstream, before exhausting the air to outdoors via a wall mounted weatherproof louvre.

The extract air is passed through a filter to prevent the accumulation of dust in the evaporator coils. Exhaust air ductwork between the heat pump and external wall will be insulated to prevent condensation and heat losses.

Double ducted Exhaust Air Heat pumps have the option of supply filtered supply air back into the apartment spaces. Certain models are able to heat or cool this supply air as required.

Whilst there are various ways to ventilate the apartments each with their own merits, the preferred method of ventilation for DCC will be to duct the air to avoid any passive inlets on the façade which can be blocked up and lead to other issues. However, this will require ductwork cross overs and bulkhead will have an impact on the space planning and potential undesirable head heights in some areas.

3.8.8.2 Duplex mews dwellings ventilation

The ventilation will be provided separately by a dedicated Mechanical Ventilation Heat Recovery (MVHR) system.

3.8.8.3 Purge Ventilation

The façade will provide sufficient window and balcony door openings to achieve the purge ventilation requirements of the building regulations and the HPI guidance.

3.8.8.4 Kitchen ventilation

As per DCC specification all kitchen cooker hoods shall be ventilated via rigid ducting which will be routed to the external of the building and connected to a louvre.

3.8.8.5 Multi-use childcare facility

Dedicated air handling plant in the ceiling void will be provided to serve the multi-use childcare facility area and a band of louvres will be required for future connection of an MVHR.

3.8.8.6 Transformer Room Ventilation

Transformers will be located at grade and naturally ventilated via louvred doors in accordance with ESB requirements

3.8.8.7 Façade Connection Requirements

Each apartment and mews dwelling will require three louvres which are indicatively shown on the drawings. The locations are subject to change depending on final spatial layouts and cupboard locations

3.9 Public Health Services

This section of the report covers the provision of the Public Health Engineering Services, which includes:

- Incoming Cold Water Mains
- Domestic Hot and Cold Water Services
- Soil and Waste Drainage
- Rainwater Disposal Drainage
- Fire Suppression Services

3.9.1 Incoming Cold-Water Main

The existing metered incoming cold-water main will be utilised to serve the new and existing residential blocks within Constitution Hill.

It is proposed that the duplex mews dwellings and the multi-use childcare facility area of the development would be provided with their own dedicated mains cold water supply.

3.9.2 Potable Boosted Cold Water Services

A centralised potable cold-water storage tank and multiple booster pump sets will be provided in each apartment block to serve boosted cold water service to the residential apartments.

The centralised potable cold water storage tank and booster pump sets will be located within a plantroom on the ground floor of each North and South apartment block, adjacent to the building core.

Due to space constraints the storage tank and booster sets for the three existing blocks will be located on the 5th floor of the apartment blocks. A break tank and booster set will be provided on the ground floor to boost water to the 5th floor plant room area. This will provide booster cold water and mains water to each apartment.

Each of the duplex mews dwellings will be provided with its own potable cold-water storage tank and booster pump set. These tanks will be housed below the stairs on the ground floor of the Mews houses

The potable cold water storage tanks in the apartment blocks and the Mews houses have been sized based on a full day period to ensure that the boosted cold water service will remain operational during the event of a mains failure.

There is no provision currently to meter the water to each apartment separately. If required, the meter would need to be provided at the high level on the deck on entry to each apartment.

3.9.3 Non-Potable Boosted Cold Water Services

A non-potable cold water service will be provided to serve the non-potable cold water draw off points from bin store wash downs and other wash down points.

In accordance with The Water Regulations, providing a separate non-potable cold water service will ensure that harmful bacteria will not contaminate the potable cold water system.

The non-potable cold water service will be provided via local packaged CAT 5 tank and booster pump set, likely wall mounted in bin stores.

3.9.4 Domestic Hot water services

Domestic Hot water shall be provided by heat pumps as described previously.

Thermostatic blending valves/taps will be provided to each wash hand basin and showers.

All showers will need to be fitted with low flow restrictors to achieve compliance with the DEAP requirements.

3.9.5 Soils and Wastes

Primary ventilated and stub stack drainage systems will be provided to take foul and wastewater discharge from sanitary fixtures, condensate drains and hot water plant safety valve discharges.

All above ground sanitary drainage systems will directly connect to the external drainage network and be ventilated to atmosphere at roof level.

The soil and waste drainage stacks will be coordinated with the Architect to ensure that there are no offsets are made within the apartments. It is imperative that the drainage stacks align throughout the residential floors to mitigate the risk of blockages and access into the apartments for rodding maintenance.

All soil and waste drainage stacks within the residential properties will be provided with acoustic insulation to prevent noise breakout.

Capped drainage and ventilation pipework connections will be provided within the aftercare facilities for future fit-out by the tenant.

3.9.6 Rainwater

Rainwater disposal drainage systems are led by Grafton architects

The rainwater harvesting and attenuation systems will be provided as part of the external drainage network (refer to the civil engineering section of this report).

3.10 Fire Suppression Services

The below is in line with the Afec Fire strategy

3.10.1 Dry Risers

Dedicated dry risers will be provided within each residential block core in line with the fire strategy

The dry risers will be located within the fire stairwells of the residential blocks and shall be exposed rather than concealed.

The dry risers will be routed up to roof level. Landing valves will be provided at all levels.

A landing valve at roof level will be provided to facilitate testing

3.11 Electrical Services - Infrastructure

3.11.1 ESB Substation

ESB Networks have indicated that a new double MV substation will need to be constructed to replace their existing MV substation, it is proposed that a new free-standing double MV substation is constructed adjacent to

the southernmost duplex mews dwelling. The new double MV substation will be constructed in accordance with the latest revision of "ESB Networks Construction Standards for MV Substation Buildings".

The new double MV substation will provide electrical supplies to all units within the site. The new double substation will also provide electrical supplies to the existing customers outside of the site that are currently served by the existing substation.

3.11.2 Electrical Intake Supply

The Electrical Services will be designed in accordance with I.S. 10101:2020 National Rules for Electrical Installations.

Electrical utilities will be distributed throughout the site via a network of underground ducts and minipillars. All ducting will be laid in trenches in accordance with the Standard Specification for ESB MV/LV Networks Ducting.

The apartment blocks will each receive a 400/230V, 50Hz three phase supply. Each unit within the apartment blocks will receive a 230V, 50Hz single phase supply.

The electrical utility supplies to the apartment blocks will be metered in a centralised location. The main distribution board will house the ESB Networks' meters and fuses.

The duplex mews dwellings will each receive a 230V, 50Hz single phase supply. The electrical utility supplies to the mews houses will be metered at an outdoor metering cabinet located at the front of the house.



Figure 1: ESB Networks outdoor metering cabinet

3.11.3 Telecommunications

New telecommunication ducting, chambers, and cabling will be installed throughout the site and will serve all apartments blocks and houses.

Initial discussions have taken place with Eir and Virgin Media and a design will be developed at the next design stage to provide telecommunication infrastructure from these providers.

3.11.4 Public Lighting

A full Public Lighting design will be developed for the site.

New lighting fixtures and columns located along the Esplanade will be taken-in-charge by DCC's Public Lighting Department. New lighting

fixtures and columns located in the communal residential space will be maintained by DCC's Housing Department.

All lighting to be taken-in-charge by DCC's Public Lighting Department will comply with DCC's General Specification for Public Lighting Design and Installation in the Dublin City Council Area.

The designs will be carried out in line with the requirements set out in BS 5489-1 Code of Practice for the Design of Road Lighting – Part 1: Lighting of Roads and Public Amenity Areas and BS 8300-1 Design of an Accessible and Inclusive Built Environment - External environment.

Four existing lights and columns located external to the site will be replaced to improve the visual appearance of the development. An application will be made to DCC's Public Lighting Department prior to the commencement of these works.

All existing public lighting mounted on apartment blocks will be disconnected and removed as part of the enabling works. Temporary or replacement lighting will be provided to ensure existing illumination levels are maintained.

New Public Lighting will generally consist of column mounted LED luminaires.

Control of the Public Lighting will be achieved by photocells mounted directly on the luminaires.

Provision for the future connection of a Central Management System will be provided.

Public Lighting circuits will be supplied from dedicated Public Lighting mini-pillars installed throughout the site.

Public Lighting will align with the requirements in the Disabled Access Certificate.

3.12 Electrical Services - Landlord

3.12.1 Electrical Distribution

ESB Networks supply cables to the apartment blocks will terminate in an ESB Networks cut-out beneath the main distribution board located in a switchroom or enclosure on the ground floor.



Figure 2: ESB Networks cut-out

The ESB Networks cut-out will serve as the Main Supply Point to the building. The Main Supply Point will be located less than 2m inside the building.

The main distribution board will consist of a main isolator, ESB Networks fuses, ESB Networks whole current meters, ESB Networks CTs and CT meters, switch fuses and the landlord's distribution board.

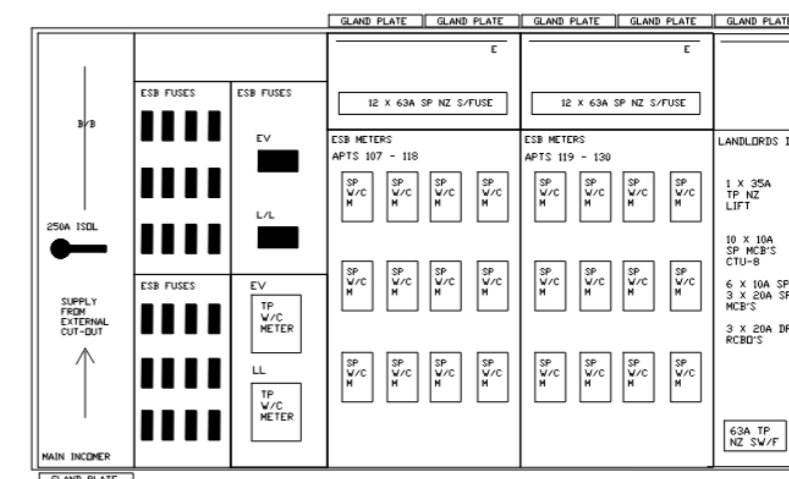


Figure 3: Typical apartment block main distribution board

From the main distribution board, sub-main distribution will generally be in LSOH/SWA/LSOH cables, on galvanised cable tray, via appropriate risers to consumer units in the apartments. For ground floor units, sub-main distribution will be in LSOH/SWA/LSOH cables, in underground ducts to consumer units.

The landlord distribution board will be incorporated into the main distribution board. Electrical supplies to mechanical plant, lifts, communal area lighting and small power will be fed directly from the landlord distribution board.

All final circuits will be in single insulated cables in trunking or conduit, or double insulated cables on tray.

3.12.2 Electrical Risers

Each apartment block will have an electrical riser running from the ground floor to roof level. These shall be for Landlord services, apartment supplies and telecommunications.

Holes will be cast into the floor slab for electrical services to pass through and the slab will be fire stopped at each floor level.

A 230V maintenance socket outlet will be provided in the electrical risers at each floor level.

3.12.3 Standby Power

Standby power supplies will be provided to the following life safety plant:

Emergency lighting (integral batteries)

3.12.4 Small Power

Cleaners' socket outlets will be provided in all common areas.

TPN isolators will be provided to all lifts.

The common areas' small power design will be developed further at the next design stage.

3.12.5 Lighting

3.12.5.1 General Lighting

The lighting installation will be designed in compliance with the “Code for Interior Lighting” as issued by the Chartered Institute of Building Services Engineers (CIBSE) and “Lighting Guide LG9 – Lighting for Communal Residential Buildings” also issued by CIBSE. Illumination will be provided by means of high-efficiency LED lighting throughout dwellings.

Within common areas, lighting will be provided by means of LED down lighters, controlled via by PIR movement sensors.

3.12.5.2 Emergency Lighting

A full addressable Emergency Lighting System will be provided in accordance with I.S. 3217 within all landlord areas.

Emergency lighting will consist of separate dedicated emergency LED light fittings as follows:

- Non-maintained recessed/surface LED downlights
- Maintained exit signs on escape routes
- Non-maintained LED wall mounted lights outside final exits

Emergency lighting in accordance with I.S. 3217 will be provided for the after school unit.

3.12.6 Information and Communication Technology (ICT)

The apartment blocks will receive a main incoming telecommunications supply from multiple Internet Service Providers (ISP) providers. The incoming service will terminate in a central frame located on the ground floor.

A landlord telecommunication connection will be provided in each apartment block. Services connected to the landlord LAN will include:

- Fire Alarm
- CCTV
- Access Control
- Disabled Refuge System
- A communal UHF aerial and satellite system will be provided at roof level of the apartment blocks. The system will connect to each dwelling via a coaxial cabling system. The purpose of this system is to allow each apartment to receive terrestrial and satellite TV/FM as required.

3.12.7 Fire Detection and Alarm System

A complete Fire Alarm and Detection System (FDAS) will be provided throughout the apartment blocks. The fire alarm system will be in accordance with I.S. 3218 and the Fire Safety Certificate.

The landlord areas will be protected by a fully automatic, analogue addressable, open protocol FDAS comprising of:

- A main fire alarm panel in the main entrance lobby

- A main fire alarm panel in the entrance to the after school unit
- Repeater panels at the secondary exits
- Smoke detectors, heat detectors, manual call points and sounders throughout the landlord areas
- Aspirating smoke detection system in lift shafts
- Interfaces with other services (lifts, access control system, mechanical services, etc.)
- Combined sounder beacons outside the main entrance to the blocks and on apartment balconies
- Heat detectors inside the entrance door to each apartment
- Remote indicator units outside the main entrance of each apartment
- Sounders in each apartment



Figure 4: Typical fire alarm panel

FDAS cabling will be Enhanced Fire Resistant PH30 with PH120 in areas as required by IS 3218.

Sounders in apartments will achieve a minimum of 75db(A) at the bedhead.

3.12.8 Security Systems

3.12.8.1 Access Control System

An Access Control System (ACS) will be provided to each apartment block.

The ACS will comprise of an integrated, scalable, keypad system with split level access control.

Access control will be provided at the main entrances to the apartment blocks.

The security system will be fully integrated and present on a common software interface.



Figure 5: Access control exit buttons

3.12.8.2 CCTV System

A CCTV system will be provided to each apartment block. The CCTV system will comprise of:

- Internal fixed colour dome cameras (POE+)
- Digital video management server and recorders

The system and components will be grade 3 (medium to high risk) in accordance with I.S. EN 50132-1.

Cameras will be IP type and will generally be recessed mounted, fixed, colour dome cameras.

Cameras will be provided at:

- all entrances/exits to the apartment blocks
- lift lobbies
- bike stores
- bin stores

All cameras will be continuously recorded with capacity to store images for 31-days.

All CCTV control equipment will be located in a secure location on the ground floor.

3.12.9 Intercom

An audio-visual intercom system will be provided to each apartment block. The audio-visual intercom system will comprise of:

- an external vandal-resistant, flush-mounted, stainless steel entry keypad panel
- an internal audio-visual unit within the lobby of each apartment



Figure 6: External and internal intercom units

An access control interface will be provided to allow remote operation of the main entrance doors from the apartments.

3.12.10 Disabled Refuge System

A Disabled Refuge System (DRS) will be provided to each apartment block.

The DRS will comprise of:

- a master control panel located in the main entrance lobby.
- call points located within disabled refuge areas.
- DRS cabling will be Enhanced Fire Resistant PH120.



Figure 7: Disabled refuge panel and call point

3.12.11 Earthing and Bonding

A complete earthing and bonding system will be installed in compliance with I.S. 10101 National Rules for Electrical Installations.

The entire installation will be properly and effectively earthed and bonded, with protective earthing and main and supplementary equipotential bonding provided throughout.

Earthing for the apartments will be derived from a Main Earthing Terminal (MET) provided at the main distribution board.

Within the apartments and houses, the earth provided by the incoming supply will be connected to the earth bar in the consumer unit and will be the main earthing terminal for the dwelling. The outgoing CPC's to the

sub-circuits will be connected to the earth bar and the exposed services, pipework etc. will be bonded to the earth bar.

3.12.12 Lightning and Surge Protection

A lightning protection system in accordance with IS EN 62305 will be provided for the protection of the apartment blocks and contents in the event of a lightning strike.

The lightning protection system will be fully coordinated with the surge protection system.

The lightning protection system will generally comprise of:

- Roof level air termination network
- Down conductors
- Earth electrodes
- Equipotential bonding
- Test points

A risk assessment will be undertaken at detailed design stage to determine the classification of lightning protection system required.

3.12.13 Vertical Transportation Systems

Residential lifts will be provided to all apartment blocks

The renovated blocks will be served by a Part M compliant lift with minimum car dimensions of 1100mm (W) x 1400mm (D).

The new blocks will be served by a UD design compliant lift with minimum car dimensions of 1600mm (W) x 2100mm (D).

Three phase power supplies from the landlord distribution boards will be provided at the highest floor served by the lifts.

A Fire Detection and Alarm System interface unit will be provided to each lift.

All lifts will incorporate GSM auto diallers.

3.12.14 Electric Vehicle Charging Points

Provision for Electric Vehicle Charging infrastructure will be made for the site. It is expected to supply the Charge Points from a dedicated mini-pillar in the future.

3.12.15 Wiring of Mechanical Plant

The cabling and connecting of items of mechanical plant and automatic controls shall be included under the scope of the Electrical Installations.

Automatic controls shall be provided by an established and recognised supplier, capable of maintaining the system on a regular basis.

3.13 Electrical Services - Dwellings

3.13.1 Residential Metering

Metering for the apartments will be provided by a whole current meter located in the main distribution board.

Metering for the houses will be provided by a whole current meter located in an electrical meter cabinet located on the front of the building.

During the next stage of design consideration will be given to how the electricity consumption is indicated within the dwellings: either via a smart meter communicating with the ESB meter or via separate current transformers incorporated in the apartment consumer unit.

This metering will be owned and managed by the ESB and is outside the scope of the landlord.

3.13.2 Electrical Distribution

A consumer unit will be provided in the entrance hall to serve all the dwelling electrical installations. Electrical circuits will be protected with AFDD RCBOs in accordance with I.S. 10101 National Rules for Electrical Installations.



Figure 8: Consumer Unit

3.13.3 Wiring Systems

Wiring will generally be LSZH 3-core flat cables throughout the dwellings. Wiring will, as far as reasonably possible, be concealed. However, in situations where this is not possible, wiring will be surface mounted in PVC conduit.

3.13.4 Lighting

Lighting within the apartments will generally comprise of ceiling mounted pendant fitting, to accept a low wattage or LED bulb.

Kitchens will be fitted with a proprietary ceiling mounted fitting to receive three low energy spotlights, and under cupboard lighting should be provided for a 2m length under the main overhead cupboard

Bathrooms, WCs, and wet area lights will be provided with suitable ceiling mounted non-pendant types to receive LED or low wattage bulbs.

Bathrooms will be provided with an over sink light with a shaving socket.

Private balconies will be provided with an IP65 wall mounted light.

Lighting will be controlled via a single rocker type switch appropriately located just inside the entrance to the room (or outside in the case of a bathroom/WC).

All stair/landings will be fitted with a two way switch, as should all rooms with two access doors.

3.13.5 General Services

Power will be distributed within each dwelling to general-purpose socket outlets, fused spurs and isolators throughout.

General 230V switched twin socket outlets will be provided at low level and above kitchen counters for appliances to be plugged in.

Socket outlets that are not readily accessible, e.g., behind or under kitchen furniture or stationary appliances, will be provided with double pole isolating switches rated 20A located in accessible positions, e.g., on the wall above the kitchen worktop. These switches will be labelled to indicate the appliance they serve.

The table below indicates the quantity and location of socket outlets to be provided in each room depending on the number of bedrooms in the dwelling.

Dwelling Type	Kitchen Worktop	Kitchen Low Level	Lounge	Dining Room	Double Bedroom	Single Bedroom
1 Bed	4	4	4	2	6	4
2 Bed	6	4	4	4	6	4
3 Bed	6	6	6	4	6	4

In addition to the quantities given in the above table, twin switched socket outlets will be provided in the entrance hall and the upstairs landing.



Figure 9: Part M compliant twin switched socket outlet

A dedicated power circuit will be provided to the cooker appliance within each apartment. The kitchen will be provided with a cooker outlet and a double pole isolating switch rated 45A.

3.13.6 Fire detection and Alarm System

Each dwelling will be protected by an LD2 fire alarm system consisting of mains powered combined smoke / heat detectors and sounders complete with battery backup installed in an approved manner as per IS 3218.

A heat detector and sounder connected to the landlord fire alarm system will be installed inside the final exit from each apartment. A remote lamp unit from this detector will be installed outside the final exit door of each apartment.

In order to comply with minimum dBA levels at bed-heads, sounders connected to the landlord fire alarm system will be installed in each bedroom and the living room.

A combined sounder/beacon connected to the landlord fire alarm system will be installed on each apartment's private balcony.



Figure 10: Detectors and sounder

FDAS cabling will be Enhanced Fire Resistant PH30 with PH120 in areas as required by IS 3218.

All fire alarm devices on the LD2 system in a dwelling will be interlinked so as to ensure the activation of one device triggers the operation of all sounders.

Sounders will achieve a minimum of 75db(A) at the bedhead.

3.13.7 Mechanical Power Supplies

13A fused connection units and 20A double pole isolators will be provided in the utility cupboard for connecting the mechanical plant.

3.13.8 Information and Communication Technology

Each dwelling will be provided with a TV/Internet point in the living room.

Each duplex mews dwelling will be provided with an incoming telecommunications line from an External Termination Unit (ETU) box located on the front of the building to the TV/Internet point in the living room.



Figure 11: Telecommunications ETU box

Each apartment will be provided with a dedicated containment route per telecommunications provider between the electrical riser and the living room TV/Internet point to facilitate future tenant connections.

3.13.9 Earthing

Within the apartments, the earth provided by the main distribution board will be connected to the earth bar in the consumer unit and will be the Main Earthing Terminal (MET) for the apartment. The outgoing CPC's to the sub-circuits will be connected to the earth bar and the exposed services, pipework etc. will be bonded to the earth bar.

Within the houses, the earth is provided by an earth electrode driven into the ground in front of the house. The earth electrode is connected to the earth bar in the consumer unit and will be the Main Earthing Terminal (MET) for the house. The outgoing CPC's to the sub-circuits will be connected to the earth bar and the exposed services, pipework etc. will be bonded to the earth bar.