Mayeston Residential,

Proposed Residential Development,

Mayeston, Poppintree, Dublin

Title : ''Mayeston Residential Development''

MECHANICAL & ELECTRICAL SERVICES PLANNING SUSTAINABILITY REPORT

Revision:	P01 (PLANNING STAGE)
Approved:	SHANE BELTON (Director)
Date:	30/11/2022
Rev. History	*P03 Nov* 2022

MURPHY BELTON CONSULTING ENGINEERS
B17 Ballymount Corporate Park,
Ballymount Avenue,
Dublin 12.
Phone: 01 - 4295774
E-Mail: info@murphybelton.ie

MB PROJECT NO.: 2201

1 INTRODUCTION

This energy and sustainability statement has been prepared in support of the planning application for the proposed Residential development located at Mayeston, Poppintee in Co Dublin. This development is planned to contain 121 residential apartment units & creche arranged in five blocks of buildings. The buildings vary in height from 3 storeys to 6 storeys (Block A – 16 no. 1-bedroom units, 12 no. 2-bedroom units, 6 no. 3-bedroom units; Block B – 9 no. 1 bed units, 30 no. 2 bed units; Block C – 6 no. 3 bed units and creche; Block D – 8 no. 1 bed units, 15 no. 2 bed units; Block E – 3 no. 1 bed units, 16 no. 2 bed units), all associated carparking and bicycle parking including an external covered bike store, hard and soft landscaping, acoustic screen to northern boundary and between Blocks D, A and B, connections to existing services and all ancillary/enabling site development works.

Block designation:	***A***	***B***	***C***	***D***	***E***
Residential unit [qty]	34	39	6	23	19
Creche [Area,m^2]			426		
Car parking [spaces]	90				
Bike parking [spaces]	306				

The report outlines how the proposed development will meet or exceed the legislative and planning requirements for energy conservation and sustainability, in accordance with the following:

a. Part L of the Building Regulations – Conservation of Fuel and Energy for Dwellings

Our approach to the task of energy conservation for the development is based upon the design philosophy ''Be Lean, Be Clean, Be Green'' philosophy, which aims to lower the demand for energy, to maximise the efficiency of energy transfer, and to use low-energy technologies.

Key design features for energy and sustainability includes enhanced building fabric insulation and air tightness levels, provision for passive solar heating, decentralised air to water heat pumps, mechanical ventilation with heat recovery or decentralised extract, low energy lighting with occupancy and daylight control where appropriate, supplementary photovoltaics and low flow fixtures and fittings.

The proposed development will comply with the national building regulations for energy conservation and renewable energy requirements. All dwellings will achieve an energy performance rating of A2, i.e. BER A2 standard.

The report is structured as follows:

a. Local and national planning requirements
b. Approach to energy strategy
c. Proposed measures for energy and sustainability

2 LEGISLATIVE AND PLANNING REQUIREMENTS

The proposed scheme is subject to the requirements of national and local planning policy and the strategy is dictated and developed in accordance with these policies.

2.1 EU ENERGY POLICY: ENERGY PERFORMANCE OF BUILDINGS DIRECTIVE (EPBD)

The EPBD requires countries to gradually increase energy efficiency requirements for buildings, leading to requirements for near zero energy buildings in 2020. These requirements are introduced in national building codes in the EU countries including Ireland. The Directive was adopted in 2010 and was revised in 2018.

The main elements of the EPBD, Directive 2010/31/EU, are as follows**:**

- Energy efficiency requirements should be set to cost-optimal levels.
- Energy efficiency requirements shall be gradually increased to reach " near zero energy houses" for all new buildings in 2020 and for public buildings in 2018.
- Countries shall set energy efficiency requirements for technical building systems, such as heating systems, ventilation, windows, and other building envelope parts, condensing boilers, high-efficiency heat pumps, low-energy windows, and energy efficient ventilation
- With major renovations of buildings, the renovated parts of the building shall be energy efficient, also when renovating small buildings
- Renewable energy and district heating shall be used when it is cost-effective.
- Buildings shall be certified regarding energy efficiency when sold, and for larger buildings at regular intervals.

2.2 IMPLEMENTATION OF THE REVISED EPBD (2018/844/EU)

Amendments to Part L of the Building Regulations (relating to the conservation of fuel and energy in dwellings) give effect to the *European Union (Energy Performance of Buildings) Regulations 2019*, published on 03 May 2019 (S.I. 183 of 2019). The regulations came into effect on 01 November 2019. The regulations transpose Directive 2010/31/EU of the European Parliament and of the Council on the energy performance of buildings (recast) as amended by Directive (EU) 2018/844 of the European Parliament and of the Council of 30 May 2018.

The Directive sets requirements for Member States to improve the energy performance of buildings and make an important contribution to the reduction of greenhouse gas emissions. A revised Technical Guidance Document, L (Conservation of Fuel and Energy) Dwellings has been published to accompany the Regulations.

The Directive defines a Nearly Zero Energy Building (NZEB) as a building that has a very high energy performance. It states that 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.

Article 9(1) of the Directive requires Member States to ensure that by 31 December 2020, all new buildings are nearly zero energy buildings. Under the previous 2011 regulations, a typical new dwelling is built to an A3 Building Energy Rating (BER). The current NZEB requirements will equate to an A2 BER. This represents a 70% improvement in energy efficiency and a 70% reduction in CO2 emissions compared to 2005. It also introduces 20% renewables as a percentage of the total building energy use.

2.3 CURRENT BUILDING REGULATIONS

The Building Regulations set out requirements for specific aspects of building design and construction. The requirements concerning conservation of fuel and energy are laid out in Technical Guidance Document Part L.

2.4 TECHNICAL GUIDANCE DOCUMENT PART L 2019 (DWELLINGS)

The aim of Part L is to limit the use of fossil fuel energy and related CO2 emissions arising from the operation of buildings, while ensuring that occupants can achieve adequate levels of lighting and thermal comfort. The key issues to be addressed to ensure compliance are as follows.

1. Limitation of primary energy use and CO2 emissions
2. Building fabric standards
3. Building services standards

4. The use of renewable energy sources

2.4.1 Limitation of Primary Energy Use and CO_2 Emissions

Primary energy use and the associated carbon dioxide emissions are calculated using the Dwelling Energy Assessment Procedure (DEAP) and these parameters must not exceed specified target values.

To achieve compliance with primary energy use rate for NZEB the energy performance coefficient (EPC) of a dwelling must be no greater than the Maximum Permitted Energy Performance Coefficient (MPEPC), which is 0.30.

An acceptable carbon dioxide emissions rate for NZEB is achieved if the calculated carbon performance coefficient (CPC) is no greater than the Maximum Permitted Carbon Performance Coefficient (MPCPC), which is 0.35.

Where a building contains more than one dwelling, every individual dwelling or alternative, the average of the dwellings within the development's Energy and Carbon performance coefficients should not exceed the maximum permitted coefficients.

2.4.2 Renewable Energy Technologies

New dwellings are required to install renewable energy systems to comply with the Renewable Energy Provision. Renewable energy technologies are solar thermal systems, solar photovoltaic systems, biomass systems, biofuel systems, heat pumps, wind power generators and other similar small-scale systems.

Where the EPC ≤ 0.30 and the CPC ≤ 0.35 the ratio of primary energy from renewable energy technologies to total primary energy use (known as the Renewable Energy Ratio, or RER) should be at least 0.20. An RER of 0.2 represents a 'significant level of energy provision from renewable energy technologies' in NZEB.

2.4.3 Building fabric

Building Regulations Part L outlines the acceptable levels of provisions necessary to ensure that heat loss through the fabric of a building is minimised. The technical document discusses various aspects, including:

Insulation levels to be achieved by the plane fabric elements.

- Thermal bridging.
- Limitations of air permeability.

The maximum permitted are-weighted U-values in Part L 2019 are as follows:

- Flat Roof 0.20
- External Walls 0.18
- Ground Floors 0.18
- Other Exposed Floors 0.18
- External Doors, Windows & Rooflights 1.4

The maximum area-weighted U-Values in Table 1 may be relaxed for individual elements where necessary for design or construction reasons, (e.g., dormer cheek) but the maximum elemental U-Values still applies. Additional insulation will be required in the same elements to ensure that the maximum area-weighted averages are met. Heat losses due to thermal bridging are considered in the DEAP calculation and thus in the calculation of the EPC, CPC and RER.

Part L requires an air permeability level no greater than 5m3/h/m2 at 50 Pascals.

2.4.4 Building Services

Part L sets out minimum requirements for space heating, water heating, and ventilation services and associated controls in new dwellings.

3 ENERGY STRATEGY APPROACH

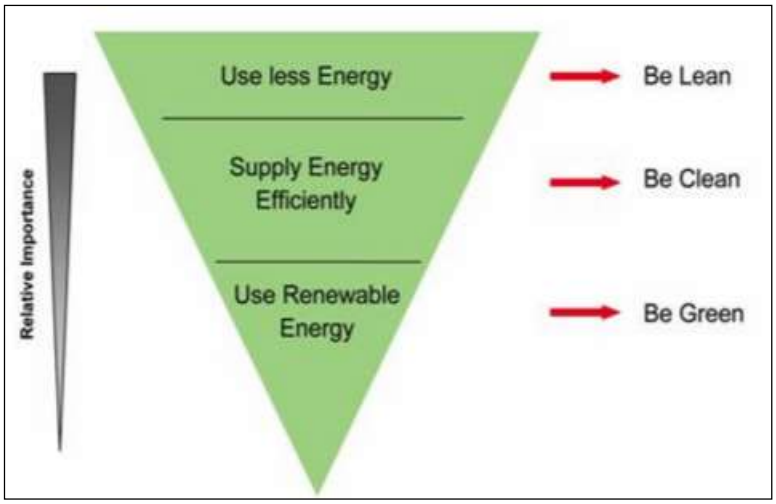
The energy strategy for the development has been established by using the hierarchy of design considerations for reducing energy use.

The first step in the energy hierarchy is 'Be Lean', which looks to achieve high levels of energy performance through the design of the building fabric.

The second stage is 'Be Clean', which involves investigation of alternative energy supply and energy efficient building services systems.

The third stage is 'Be Green', which looks at the integration of low and zero carbon technologies as a means of further reducing emissions associated with the development.

This approach is illustrated in the following diagram:



4 ENERGY AND CARBON REDUCTION MEASURES

4.1 LIMITING OF HEAT LOSS

Best practice fabric U-values and air tightness standards will be implemented to minimise heat flow/loss through the building envelope. Detailed calculations will be undertaken to assist in determining the appropriate envelope build-up, including the type, thickness, and location of thermal insulation. The amount, type and location of glazing will be optimised to achieve an optimal balance between daylight quality and heat gains and losses.

4.2 PASSIVE SOLAR SHADING

To ensure that the building does not overheat, particularly in areas where there are higher levels of glazing and internal gains, adequate means of limiting summertime temperatures will be implemented. External shading in the form of window reveals and overhangs, and solar performance glazing will be incorporated into the façade design to assist in the reduction of overheating.

4.3 PASSIVE SOLAR HEAT GAIN

Sunlight will be used where possible to reduce the need for heating on cold days. This resource will be harnessed by allowing sunlight to enter the buildings to areas with high thermal mass such as exposed concrete.

4.4 NATURAL DAYLIGHT

The design will seek to maximise the use of natural daylight through the development in order to reduce energy consumption from artificial lighting. This will be achieved through an integrated approach utilising a combination of building form, light wells, glazing systems and day-light responsive control systems.

4.5 SPACE HEATING

Space heating via decentralised air to water heat pumps or exhaust air heat pumps within each dwelling subject to detail design is currently being proposed for the dwellings. To meet compliance with the renewable energy requirements set out in Part L, a heat pump with the appropriate seasonal efficiency for space and water heating will be selected.

4.6 DOMESTIC HOT WATER

Domestic hot water is currently proposed by the local heat pump unit within the dwelling.

4.7 MECHANICAL VENTILATION

The following mechanical ventilation systems shall be considered for the development to maintain indoor air quality specifically for the tenant areas such as apartments/units/houses.

- Whole-house mechanical ventilation with heat recovery
- A centralized mechanical extract system that continuously extracts

4.8 ARTIFICIAL LIGHTING (INTERIOR AND EXTERIOR)

Energy-efficient lighting will be implemented throughout the development to achieve the appropriate light levels, as recommended by CIBSE. The design of lighting systems shall ensure that lighting is only used when required, and that only the specific area where lighting is needed.

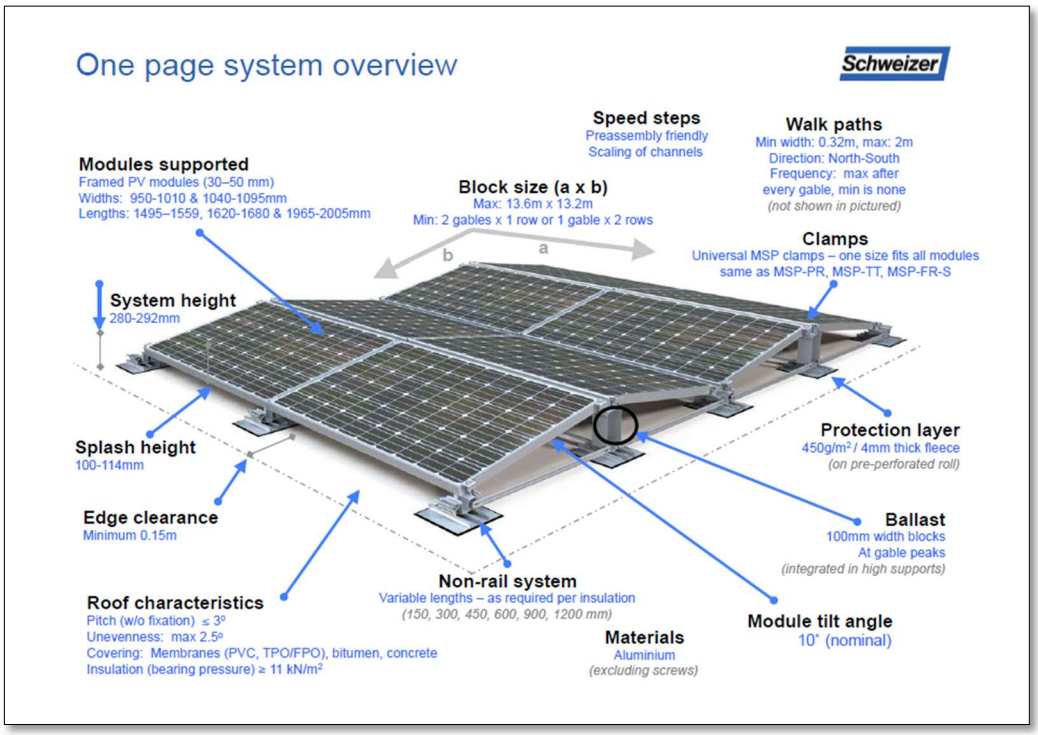
4.9 RENEWABLE ENERGY REQUIREMENTS

The following LZC technologies have been considered for this development, as listed below:

- Individual Air to Water heat pumps.
- Individual Exhaust Air Heat Pumps
- Photo voltaic, PV system for on–site electricity use

Air to Water heat pumps, Exhaust Air Heat Pumps and PV panels are classified as renewables under Part L. These LZC technologies will be analysed in the detail design phase to ensure that the required renewable energy targets can be achieved within proposed development.

Below is a diagram to illustrate details of typical PV panel arrays.



Also attached below is a sample installation of PV panels array on roof tops.

The energy balance for this mixed-use scheme means that a decentralised heat pump scheme with supplementary photovoltaic would be the most practical option for meeting the renewable energy requirements.

4.10 BUILDING MODELLING AND DYNAMIC SIMULATIONS

Detailed modelling and dynamic simulations will be carried out during the development to inform, optimise, and validate the proposed building designs.

Simulations will be used to perform a detailed analysis on the areas listed below, to determine the suitability and effectiveness of appropriate systems:

- Regulatory Compliance Assessments for Part L
- Building energy use
- MEP Plant and Equipment Selections
- Avoidance of overheating risk

5 SUSTAINABILITY DESIGN MEASURES

The proposed development will meet the highest standards of sustainable design and construction in line with all applicable regulations and planning requirements. In line with the Dublin City Development Plan 2016-2022 the following sustainability considerations will be incorporated into the design and construction to ensure the overall development:

- Makes most efficient use of land and existing buildings
- Reduces carbon dioxide and other emissions that contribute to climate change
- Is designed for flexible use throughout its lifetime
- Minimises energy use,
- Supplies energy efficiently and integrates renewable energy
- Manages flood risk, including application of sustainable drainage systems (SuDS) and flood resilient design for infrastructure and property
- Minimises indoor water use through water efficient sanitary fixtures and fittings
- Reduces air and water pollution
- Is comfortable and secure for its users
- Promotes sustainable waste behaviour
- Reduces adverse noise impacts internally and externally