

Part L Planning Compliance
For the
Mechanical and Electrical Services Installations
At
Raven Rock Road in Sandyford
For
Ravensbrook Co. Limited

Date of Issue: 03/03/22

Revision: 1



professional projects. professional engineering.

Document History

Revision No.	Description	Prepared By	Reviewed By	Date
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1. Planning Overview

The development will consist of the demolition of the existing 2 no. storey building (c.717sqm) and hard surface parking area on the site and construction of a Build to Rent residential development comprising 101 no. residential apartments as follows:

- 101 no. build to rent apartments within a part 5, part 6 to part 11 no. storey building over partial basement comprising 65 no. 1 bedroom apartments and 36 no. 2 bedroom apartments (balconies on all elevations);
- 734sqm of external communal amenity space provided in the form of a podium courtyard at first floor level and a series of rooftop terraces at fifth, sixth and tenth floor levels, c. 514sqm of public open space provided fronting Carmanhall Road;
- 511 sqm of resident support facilities/ services and amenities space provided at ground and first floor levels;
- Vehicular access to the development will be from the upgraded existing access from Ravens Rock Road;
- Provision of 10 no. car parking spaces [1 no. accessible] at surface level, 2 no. motorcycle spaces; and 234 no. cycle parking spaces;
- Provision of 4 no. Ø0.3m Microwave link dishes to be mounted on 2 No. steel support pole affixed to lift shaft overrun, all enclosed in radio friendly GRP shrouds, together with associated equipment at roof level;
- Provision of an ESB substation, switch room and plant room at ground floor level, hard and soft landscaped areas, public lighting, attenuation, service connections and all ancillary site development works.

2. Executive Summary

The purpose of this document is to detail in broad terms how the development incorporates sustainability and energy efficiency into the development with the focus being on TGD L.

The initial design proposals as set out in this document has considered the EU Energy Performance of Buildings Directive (EPBD), the Building Regulations Technical Guidance Document Part L (NZEB), the Local Authorities strategy for sustainable design generally reducing energy usage and carbon emissions.

Nearly Zero Energy Buildings (NZEB) means a building that is designed to achieve nearly zero energy or a very low amount of energy which can be largely sourced from renewable energy produced on-site or nearby.

On this basis the building services design strategy in the proposed development is to utilise sustainable design options and energy efficient systems that are technically, environmentally, and economically feasible for a project of this kind.

The report demonstrates the proposed strategy will meet the energy and sustainability targets for this development.

3. Introduction

Axiseng was commissioned by Ravensbrook Limited to carry out Part L assessment on the proposed development at Ravenrocks Road, Sandyford, Dublin 18.

The purpose of this report is to detail the energy efficient elements incorporated onto the design of the new residential units and demonstrate compliance with the 2019 Part L, Conservative of Fuel and Energy – Dwellings.

The development is compliant with Part L 2019 (NZEB) and the project is targeting an A3 BER (Building Energy Rating).

4. Strategy - Part L Conservation of Fuel & Energy - Dwellings

The design approach is to firstly address the passive measures associated with the building fabric, then implement active measures through and efficient services design and finally implementation of renewables to supply the energy.

The building includes the following energy conservation measure to achieve the best energy performance possible

- Passive
 - High-performance construction envelope including low u-value and g-value
 - Air tightness in construction
 - Minimise Thermal Bridging
- Active
 - Exhaust Air Heat Pumps for heating and hot water
 - Low Energy LED Lighting
 - Efficient Controls
- Renewable
 - Exhaust Air Heat Pumps

The design has been developed and the analysis carried out using the current Part L version of the Dwelling Energy Assessment Procedure (DEAP) software v4. The inputs used to perform the analysis are summarised in the following section together with an overview of the proposed design solution.

5. Design Inputs and Analysis

The sustainable design of the Apartment Block presents an opportunity for each dwelling to perform in an energy efficient manner and meet the NZEB challenges.

The following table outlines each element which has been designed to reduce energy, carbon emission, and cost through buildings lifecycle.

Different apartment units within the development have been chosen as a representative sample of the dwellings. For the purpose of this exercise, more than 10 apartment units have been identified and used in the Part L assessment.

Measures	Description	Outcome												
Sample Apt Unit tested	Ten apartment units selected from development, ground, 1 st floor, 3 rd floor and 8 th floor.	A representative sample of apartment units were selected for testing.												
High Performance Construction Fabric	<p>The construction u-values set out for dwelling building is lower than u-values requirement set out in the building regulation 2019.</p> <table border="1" data-bbox="402 927 1142 1128"> <thead> <tr> <th>Element</th> <th>U-value (W/m2k)</th> </tr> </thead> <tbody> <tr> <td>Window</td> <td>1.3 (g-value 0.6)</td> </tr> <tr> <td>Door</td> <td>1.3</td> </tr> <tr> <td>External Wall</td> <td>0.18</td> </tr> <tr> <td>Roof</td> <td>0.15</td> </tr> <tr> <td>Floor</td> <td>0.15</td> </tr> </tbody> </table> <p>The window design has been considered to maximising daylight and solar heat gains during winter which will reduce the artificial lighting and space heating load.</p> <p>The high-performance wall, roof, and glazing is being considered and selected to minimise heat loss from the space. Aside from the reduction in heating energy consumption and carbon emissions, the reduction in loads results in reduced plant capacity and size. This has a net effect of reducing embodied energy consumption with a reduction plant, as well as the reduced input from the national electricity grid for heating.</p>	Element	U-value (W/m2k)	Window	1.3 (g-value 0.6)	Door	1.3	External Wall	0.18	Roof	0.15	Floor	0.15	This minimises heat loss and gain which impacts on the heating requirement, thus lowering energy and carbon footprint.
Element	U-value (W/m2k)													
Window	1.3 (g-value 0.6)													
Door	1.3													
External Wall	0.18													
Roof	0.15													
Floor	0.15													
Air Tightness Construction	The building will be designed to ensure it is in compliant with the building regulation and achieving air tightness between 3 m ³ /(h.m ²) or 0.15 ach infiltration.	This minimises heat losses through the building fabric thus lowering heating load.												
Thermal Bridging	The limitation of thermal bridging will be achieved in accordance with section 1.3.3 within technical guidance Part L regulation.	This minimises heat losses at junctions between construction element, thus lowering energy consumption and carbon emission.												
Daylight & Lighting	Provision of natural daylight in buildings creates a positive environment by providing connectivity with the outside world and assisting in the well-being of the building inhabitants. Daylight also represents an energy source - reducing the reliance on artificial lighting.	This will reduce the lighting electricity energy consumption, thus reducing												

	<p>All lamps will be LED type. This will deliver a reduction of 30-35% reduction in electrical energy usage when compared to fluorescent lighting. It is assumed each LED type lamp will achieve minimum efficiency value of 66.9 lumen/watt per bulb.</p>	<p>carbon emission footprint overall.</p> <p>This will result in a healthier environment through the use of natural daylight.</p> <p>This will also provide free heating from solar load, reducing heating load.</p>
<p>HVAC system</p>	<p>Ventilation System An exhaust ventilation system will operate as part of Exhaust Air Heat Pump system (EAHP) in each dwelling. This will extract air via ventilation ducts in the wet rooms of the dwellings. Extracted air is passed through ducting into the heat pump. Fresh air will be drawn through passive vent into bedroom and living room.</p> <p>The specific fan power of mechanical ventilation box is to be selection upon based on rating of less than 0.29 (w/(l/s)).</p>	<p>Heat recovery via warm air from wet rooms and kitchen will allow for heat transfer to incoming air thus reduce the heating load requirement in the apartment.</p>
	<p>Heating System Exhaust Air Source Heat Pump (EAHP) will be used for heating and hot water generation for all apartment units. This system also provides the ventilation required within the unit as noted above.</p> <div data-bbox="405 1084 995 1464" style="text-align: center;"> <p>An example of Joule Victorium A4 system built-in</p> </div> <p>The efficiencies of EAHP system shall be between 439-473%</p>	<p>The use of a heat pump is a highly efficient system and solution and allows end users control their bills. This promotes energy reduction by the end user.</p>
	<p>Hot Water System & Appliances All hot water taps including the shower in the proposed development will be fitted with flow regulators to allow for the conservation of water usage as well as energy used to heat hot water.</p> <p>The overall efficiency of the main hot water system in EAHP design should be at least over 290%</p>	<p>This minimises hot water usage, thus reducing heating energy load and increasing heating plant operating performance and reducing the cost.</p>
<p>Building Energy Management System</p>	<p>No central control will be provided, however local time clocks and temperature stats will regulate temperature and demand within the space.</p>	<p>Continuous energy monitoring allows for further energy savings to be quantified through building lifecycle thus lowering overall cost and carbon footprint.</p>

<p>Result</p>	<p>Energy Performance Coefficient (EPC) = - 0.246 – 0.271 Carbon Performance Coefficient (CPC) = 0.240 – 0.265 Renewable Energy Ratio (RER) = 0.28 – 0.39 (28% - 39%) Building Energy Rating = A2</p>	<p>Part L/NZEB compliant</p>
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5.1 Design Forecasting

The current design model is based on an initial envelope performance and using a heat pump system to achieve Part L and NZEB compliance.

When the design moves into further detail stages these will continue to be reviewed and refined whilst adhering to planning conditions & building regulations.

6. Results and Conclusions

In conclusion the development complies with the Part L and NZEB requirements and is achieving an A2 BER. The following output of sample dwellings from DEAP software can be found under *Appendix A – DEAP Part L report* in this report.

The results show that the apartment units analysed have an Energy Performance Coefficient (EPC) between 0.246 and 0.271 which is less than the maximum permitted energy performance coefficient (MPEPC) of 0.3.

The results also show that the apartment units analysed has a Carbon Performance Coefficient (CPC) between 0.24 and 0.265 which is less than the maximum permitted energy performance coefficient (MPEPC) of 0.35.

The result also shows the renewable energy ratio target is achieved with results ranging between 0.28 to 0.39 (28% - 39%) for the apartments analysed.

7. Appendix A – DEAP Part L report

seai SUSTAINABLE ENERGY AUTHORITY OF IRELAND		Part L Report	
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Part L Specification			
BER IS NOT PUBLISHED			
Property Details			
Dwelling Type	Mid-floor apartment	Type of BER rating	New Dwelling - Provisional
Address line 1	L1	Year of Construction	2019
Address line 2	Apt L1.06	Date of Assessment	05/05/2021
Address line 3	Sandyford Residential Planning	Date of Plans	
County	Dublin 18	Planning Reference	
Eircode		Building Regulations	2019 TGD L
BER Number	20119	MPRN No.	0
Purpose of Rating	New dwelling for owner occupation	Is MPRN shared with another dwelling?	N/A
Assessor Name			
Comment		BER number assigned to shared dwelling	N/A
Dimension Details			
	Area [m ²]	Height [m]	Volume [m ³]
Ground Floor	52.45	2.80	146.86
First Floor	0.00	0.00	0.00
Second Floor	0.00	0.00	0.00
Third and other floors	0.00	0.00	0.00
Room in roof	0.00	0.00	0.00
Total Floor Area	52.45		146.86
Living Area [m ²]	13.38		
No of Storeys	1		
			Living area percentage [%] 25.51
Ventilation Details			
	Number		
Chimneys	0	Has permeability test been carried out?	Yes
Open Flues	0	Structure type	N/A
Fans & Vents	2	Is there a suspended wooden ground floor?	No
Number of flueless combustion room heaters	0	Percentage windows/doors draught stripped [%]	N/A
Is there a draught lobby on main entrance?	No	Number of sides sheltered	3
Ventilation method	Exhaust Air Heat Pump	Mechanical Ventilation Manufacturer	N/A
Specific fan power [W/(L/s)]	0.290	Mechanical Ventilation Model Name	N/A
Heat exchanger efficiency [%]	N/A	How many wetrooms (incl. kitchen)?	N/A

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Building Elements - Floor Details				
Type	Description	Underfloor heating	U-Value [W/m ² K]	Area [m ²]
Exposed / Semi Exposed		No	0.15	52.45
Building Elements - Roof Details				
Type	Description		U-Value [W/m ² K]	Area [m ²]
Building Elements - Wall Details				
Type	Description	Type	U-Value [W/m ² K]	Area [m ²]
Solid Mass Concrete			0.18	7.56
Building Elements - Door Details				
Description		Number of Doors	U-Value [W/m ² K]	Area [m ²]

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Building Elements - Window Details

Glazing type	User defined u-value	U-Value [W/m ² K]	Area [m ²]
Double-glazed, argon filled	Yes	1.300	4.340
Double-glazed, argon filled	Yes	1.300	6.650

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Other Details					
Thermal bridging factor [W/m ² k]	0.0800	Thermal mass category of dwelling	Medium		
Heating System - Solar Water Heating					
Solar Water Heating Present?	No	Aperture area of solar collector [m ²]	N/A		
Type, manufacturer, model	N/A	Collector heat loss coefficient, a1 [W/m ² >K]	N/A		
Zero loss collector efficiency, n0	N/A	Overshading factor	N/A		
Annual Solar Radiation [kWh/m ²] (Refer to Appendix H in DEAP)	N/A	Combined Cylinder	N/A		
Dedicated storage volume [Litres]	N/A				
Solar fraction [%]	0.000				
Heating System - Hot Water System					
Distribution Losses	229.73	Combi boiler present?	No		
Supplementary electric water heating	No	Water Storage Volume [L]	200		
Hot water storage manufacturer and model name	JOLE	Declared loss factor [kWh/d]	2.06		
Temperature factor unadjusted	0	Temperature Factor Multiplier	1		
Primary Circuit loss type	None	Insulation type	None		
Is hot water storage indoors or in group heating system?	Yes				
Insulation thickness [mm]	0				
Heating System - Dist. system losses and gains					
Temperature adjustment [°C]	0	Control Category	1	Responsiveness category	1
Central heating pumps	1	Oil Boiler Pump	0	Oil boiler pump inside dwelling	No
Gas boiler flue fan	0	Warm air heating or fan coil radiators present	No		

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Heating System - Energy Requirements (Individual)					
Main space heating system efficiency [%]	667.96	Space heating efficiency adjustment factor	1.0000	Main space heating fuel	Electricity
Main water heating system efficiency [%]	296.86	Water heating efficiency adjustment factor	1.0000	Main water heating fuel	Electricity
Secondary heating system efficiency [%]	N/A	Fraction of heating from secondary heating system	N/A	Secondary space heating system fuel	None
Fraction of main space and water heat from CHP		Electrical efficiency of CHP		Heat efficiency of CHP	
CHP Fuel type	N/A				
Summary for Part L Conformance (Applies to TGD L 2008/2011/2019 for new dwellings only)					
BER Number	20119	Building Regulations		2019 TGD L	
BER Result	A2	Energy Value kWh/m ² /yr		43.71	
CO ₂ emissions [kg/m ² /yr]	8.6				
EPC	0.249	EPC Pass/Fail		Pass	
CPC	0.244	CPC Pass/Fail		Pass	
Part L Conformance - Fabric					
Conformity with Maximum avg U-value requirements	U-value [W/m ² K]	Pass/Fail	Conformity with Maximum U-value requirements	U-Value [W/m ² K]	Pass/Fail
Pitched roof insulated on ceiling	0.00	Pass	Roofs	0	Pass
Pitched roof insulated on slope	0	Pass	Walls	0.18	Pass
Fiat Roof	0	Pass	Floors	0.15	Pass
Floors with no underfloor heat	0.15	Pass	External doors / windows / rooflights	1.30	Pass
Floors with underfloor heat	0.00	Pass			
Walls	0.18	Pass			
Percentage of opening areas [%]	20.95				
Average U value of openings	1.30	Pass			
Permeability test carried out and meets guidelines in TGD L				0.15 Pass	

Part L Conformance - Renewables (applies to TGD L 2019)

	Source	Renewables Primary Energy	Total Primary Energy	RER
+ Delivered energy	PV/Wind	0.00	0.00	
+ Delivered energy	Other	0.00	0.00	
+ Delivered energy	Solar	0.00	0.00	
+ Delivered energy	Biomass	0.00	0.00	
+ Delivered energy	Biodiesel	0.00	0.00	
+ Delivered energy	Bioethanol	0.00	0.00	
+ Environmental energy	HP	1467.33	1467.33	
+ Saved energy	CHP	0.00	0.00	
+ District heating	District Heating	0.00	0.00	
+ Delivered energy	Grid	0.00	2292.75	
+ Delivered energy	Thermal	0.00	0.00	
SUBTOTAL		1467.33	3760.08	0.39 - Pass
Energy not used in Regulated Loads	PV/Wind/CHP	0.00	0.00	
TOTAL		1467.33	3760.08	0.39

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