

**PART 8 - ST. PATRICK'S PARK, RATHANGAN,
CO. KILDARE.**

PLANNING REF NO. P82022.14.



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1809	SUSTAINABILITY REPORT (new and existing dwelling)	P1	RJ	2/11/22	SOB

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1. INTRODUCTION

This report outlines building regulation compliance criteria for the residential development of new and existing dwellings of St. Patrick's Park, Co. Kildare.

This report has been prepared as a compliance requirement for planning applications made in accordance with Kildare County Council guidelines.

The Residential units will achieve Building Regulations TGD L 2021 dwelling Compliance.

The new units will comply with Regulation 8 and L1 as defined in TGD L 2021.

The Existing\Refurbished units will comply with Regulation 7 and L2 as defined in TGD L 2021.

1.1. Development Description:

The proposed development comprises of the demolition of 15 no. dwellings, Refurbishment of 25 no. dwellings, construction of 7 no. dwellings and extensive site development works to create a new landscaped public open space. These works will consist of:

- Construction of 1 no. 4-Bed 1-storey dwelling, 3 no. 3-Bed 2-storey dwellings and 3 no. 2-bed single-storey dwellings.
- Refurbishment of 17 no. vacant units and 8 no. occupied units.
- Demolition of 15 no. units to allow the development of a new landscaped public open space.
- Removal of existing hardscaped play area and replacement with a new landscaped public open space and car parking.
- The provision of new car park area on Kildare County Council lands to the north-west.
- Proposed new gate access to adjacent Kildare County Council lands.
- The removal of existing back lane and extension of existing gardens to the rear of units 657 to 662.
- Associated site development and civil works; including works to existing site and dwelling boundaries, boundaries to new dwellings; drainage, utilities, public lighting; upgrade of paths and roads, new paths and roads and hard landscaping, ancillary site services and site development works above and below ground; Extensive Site Development Works to create New Landscaped Public Open Space

1.2. Key Energy Reduction and Sustainable Design Features include:

1. BER minimum of A-3 (New Houses)
2. BER minimum of B-2 or Cost Optimal (Occupied/Vacant Houses)
3. Reduction in Primary Energy compared to a Building Regulation Compliant Residential Building
4. Reduction in CO2 Emissions compared to a Building Regulation Compliant Residential Building to Part L 2021

[A] For New Dwelling

Element	Building Regulation (w/m ² °k)	St. Patrick Park (w/m ² °k)	Comment
Walls	0.18	0.18	Compliant
Floors	0.18	0.15	17% improvement
Windows and Door	1.4	1.4	Compliant
Roofs	0.2	0.15	25% improvement

[B] For Existing Dwelling

Element	Building Regulation (w/m ² °k)	St. Patrick Park (w/m ² °k)	Comment
Walls	0.35	0.2	43% improvement
Floors	0.45	0.25	45% improvement
Windows and Door	1.4	1.4	Compliant
Roofs	0.25	0.15	40% improvement

Part L 2021 is applicable to the material alteration or material change to the existing dwelling.

5. Air Tightness Test to achieve 3m³/m²/hr a 40% improvement on the Building Regulations advised upper limit figure. (New Houses)
6. Air Tightness Test to achieve 5m³/m²/hr (Occupied/Vacant Houses)
7. Thermal Bridging Factor 0.15 (for Existing Houses) and 0.08 (for New Houses)
8. Use of LED Lights in the residences.

2. PART L & NZEB COMPLIANCE

This section sets out to review the method of compliance with building regulations to the residences in this project. It is important to note that the input data currently used is preliminary, and the design will develop as the project progresses.

[A] New Dwelling:

Six types of new build dwelling have been analysed in this report:

- Type A- 4 bed
- Type B1- 2 bed
- Type B2- 2 bed
- Type C- 3 bed
- Type D1- 3 bed
- Type D2- 3 bed

[B] Existing Dwelling:

Two existing dwellings are analysed using improved U values in this report:

- Type A- 2 bed
- Type D 1 bed

The dwellings have been analysed for compliance with the 2021 TGD for Part L.

There are five main criteria that this report aims to demonstrate compliance with

- Building Energy Rating
- Energy Performance Coefficient (EPC)
- Carbon Performance Coefficient (CPC)
- Renewable contribution (NZEB)
- Maximum elemental U-Values

2.1. Building Energy Rating (BER)

There is no specific BER rating that is required to comply with Part L. However, dwellings compliant with NZEB will usually achieve a BER of A2-A3.

2.2. Energy Performance Coefficient (EPC) & Carbon Performance Coefficient (CPC)

The EPC and CPC are the two figures that are used to determine whether the dwelling complies with Part L on an overall basis.

The EPC is the calculated primary energy consumption of the proposed dwelling, divided by that of a reference building of the same size. To comply with Part L and NZEB requirements, the EPC must be better than the Maximum Energy Performance Coefficient (MPEPC) which is 0.30.

The CPC is the calculated carbon dioxide emissions of the proposed dwelling, divided by that of a reference building of the same size. To comply with Part L and NZEB requirements, the CPC must be better than the Maximum Carbon Performance Coefficient (MPCPC) which is 0.35. Part L 2021 is applicable to the material alteration or material change to the existing dwelling.

2.3. Renewable Contribution

To satisfy part L, 20% of the building energy must be provided via renewable technologies. This is measured in the form of a renewable energy ratio (RER).

This applies to new buildings only.

2.4. Maximum Elemental U-Values

Technical Guidance Document Part L 2021 sets out maximum U-Values which may not be exceeded for each construction type:

For new dwellings:

Table 1 Maximum elemental U-value (W/m²K)^{1, 2}		
Column 1 Fabric Elements	Column 2 Area-weighted Average Elemental U-value (Um)	Column 3 Average Elemental U-value – individual element or section of element
Roofs		
Pitched roof		
- Insulation at ceiling	0.16	0.3
- Insulation on slope	0.16	
Flat roof	0.20	
Walls	0.18	0.6
Ground floors ³	0.18	0.6
Other exposed floors	0.18	0.6
External doors, windows and rooflights	1.4 ^{4,5}	3.0

TGD Part L 2021

For existing dwelling:

Table 5 Maximum elemental U-value (W/m²K)^{1, 2, 6} for Material Alterations or Material Change of Use		
Column 1 Fabric Elements	Column 2 Area-weighted Average Elemental U-value (Um)	Column 3 Average Elemental U-value – individual element or section of element
Roofs		
Pitched roof		
- Insulation at ceiling	0.16	0.35
- Insulation on slope	0.25	
Flat roof	0.25	
Walls		
Cavity walls ⁴	0.55	0.6
Other walls	0.35	
Ground floors ³	- 0.45 ⁵	-
Other exposed floors ³	0.25	0.6
External doors, windows and rooflights and curtain walling	1.40	3.0

TGD Part L 2021

2.5. INPUT DATA

[A] New Dwellings

Fabric performance

U- Value thermal properties:

- External wall 0.18 W/m²k
- Roof 0.15 W/m²k
- Ground 0.15 W/m²k
- Windows 1.2 W/m²k (Double glazing)
- Thermal Bridging 0.08 W/m².K

Air tightness test according to CIBSE TM 23 best practice standards to achieve **3 m³/m²/hr at 50 Pa** or **0.15 air changes per hour**.

[B] Existing Dwellings:

Fabric performance

U- Value thermal properties:

- External wall 0.20 W/m²k
- Roof 0.15 W/m²k
- Ground 0.25 W/m²k
- Windows 1.4 W/m²k (Double glazing)
- Door 1.4 W/m²k
- Thermal Bridging 0.15 W/m².K

Air tightness test according to CIBSE TM 23 best practice standards to achieve **5 m³/m²/hr at 50 Pa** or **0.26 air changes per hour**.

The thermal mass of each house varies between low-medium.

The following are the systems as analysed and their results.

System:

Ventilation:

- Demand controlled ventilation system – whole house extract

Performance

- SFP of 0.79
- Heat Exchanger efficiency 88%
- Flow restrictor present in shower

Air to water Heat Pump

Performance

- Heat Pump capacity: 4kW, DHW storage volume: 181 Litre
- Space Heating Efficiency: 127% (Seasonal)
- Water Heating efficiency: 125% (Seasonal)
- Control category: Time and Temperature zone control

Secondary Heating (Applicable for existing dwellings only where required).

As installing air to water, insulating attics and cavity fill walls expect to achieve B2 without requirement for stoves, probably will block off chimneys and fill flues.

Lighting:

- 100% low-energy fittings (i.e. LEDs)

Renewables:

- PV: Neon Peak power: 320 W, Orientation: South 30° only required if B2 is necessary.

3. RESULTS

[A] New Dwellings

These results are based on the input data stated. As the design progresses, the model will be refined to keep the results up to date. The results displayed in the following table relate to a typical Type A, B1, B2, C, D1, D2 house.

House Type	EPC	CPC	Rating	Number of PV required
A	0.264	0.249	A2	0
B1	0.237	0.227	A2	0
B2	0.236	0.226	A2	0
C	0.255	0.243	A2	0
D1	0.264	0.252	A2	0
D2	0.264	0.253	A2	0

[B] Existing Dwellings

These results are based on the input data stated. As the design progresses, the model will be refined to keep the results up to date. The results displayed in the following table relate to a typical Type A, D, house.

Primary Heat Source (Air to Water unit only) results

House Type	EPC	CPC	Rating	Number of PV required
A	-	13.16	B2	0
D	-	15.94	B2	0