Ware Court Sergeants Lane
O'Connell Street Waterford City
T 051874675
E info@jotenergy.ie
W jotenergy.ie

OCTOBER 08, 2024

# Whitebox Student Campus

## Sustainable Energy Assessment

## PROPOSED STUDENT ACCOMODATION

## GROODY ROAD, NEWCASTLE, CO. LIMERICK

## FOR GROODY DEVELOPMENTS LTD

**Issue 2**
**January 15th 2025**

# Contents

# 1. Introduction

This report outlines the energy performance and sustainability considerations for the proposed development consisting of 196 no. apartments, distributed across five separate blocks with a total of 1,400 student bedspaces and associated amenities at Groody Road Newcastle Co Limerick.

The Report outlines how the construction and performance of the proposed development will meet or exceed legislative and planning requirements, with particular emphasis on meeting the current Nearly Zero Energy Buildings standards.

## 1.1 Compliance Standards

The report will review the proposed development in terms of:

- The Building Regulations 1997-2022, specifically Part L (Conservation of Fuel and Energy – Dwellings) in terms of Technical Guidance Document L;
- The changes to Part L, to include the Nearly Zero Energy Buildings standards; and
- Building Energy Rating in terms of the Sustainable Energy Authority of Ireland requirements and the Dwelling Energy Assessment Procedure methodology.
- Also the Introduction of the requirements for charging facilities for Electric Vehicles

The assessments herein are based on the drawings and design information current at the date of this report and are subject to change pending Planning outcomes and detailed design. Please refer to the drawings and documents accompanying the Large-Scale Residential Development (LRD) Application.

### 1.1.1 Abbreviations and Terms Used in this Report

| | |
|---|---|
| TGD L | Technical Guidance Document L |
| NZEB | Nearly Zero Energy Buildings |
| BER | Building Energy Rating |
| DEAP | Dwelling Energy Assessment Procedure |
| CPC | Carbon Performance Coefficient |
| MPCPC | Maximum Permitted Carbon Performance Coefficient |
| EPC | Energy Performance Coefficient |
| MPEPC | Maximum Permitted Energy Performance Coefficient |
| RER | Renewable Energy Ratio |

## 1.2 Development Summary

The proposed accommodation schedule comprises:

| Accommodation Schedule | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 4BED APT | | 5BED APT | | 6BED APT | | 7BED APT | | 8BED APT | | TOTAL APT NO. | TOTAL APT BEDROOM NO. |
| | APT No. | No. Beds | APT No. | No. Beds | APT No. | No. Beds | APT No. | No. Beds | APT No. | No. Beds | | |
| BLOCK A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 28 | 224 | 28 | 224 |
| BLOCK B | 0 | 0 | 0 | 0 | 1 | 6 | 14 | 98 | 37 | 296 | 52 | 400 |
| BLOCK C | 12 | 48 | 0 | 0 | 0 | 0 | 5 | 35 | 34 | 272 | 51 | 355 |
| BLOCK D | 10 | 40 | 0 | 0 | 0 | 0 | 5 | 35 | 17 | 136 | 32 | 211 |
| BLOCK E | 10 | 40 | 0 | 0 | 4 | 24 | 6 | 42 | 13 | 104 | 33 | 210 |
| TOTAL | 32 | 128 | 0 | 0 | 5 | 30 | 30 | 210 | 129 | 1032 | 196 | 1400 |

| Student Service Schedule | | | | |
|---|---|---|---|---|
| Block | GIA | NIA RESIDENTIAL | ANCILLARY (PLANT, BIMS, BIKES, STORE) | STUDENT FACILITIES |
| BLOCK A | 7011m² | 4084m² | 219m² | 480m² |
| BLOCK B | 11836m² | 7372m² | 277m² | 398m² |
| BLOCK C | 10291m² | 6454m² | 261m² | 191m² |
| BLOCK D | 6461m² | 3878m² | 162m² | 328m² |
| BLOCK E | 6468m² | 3948m² | 143m² | 169m² |
| TOTAL | 42066m² | 25736m² | 1060m² | 1567m² |

Please refer to the drawings and documents accompanying the Strategic Housing Development Application for further details, e.g. the area schedule and residential quality audit.

# 2. Legislative and Planning Requirements

## 2.1 Part L

In this document, Part L of the Building Regulations will be referred to in terms of TGD L. TGD L stipulates the requirements on:

- Building geometry factors;
- Building fabric performance;
- Air permeability;
- External environment factors;
- Primary energy use;
- Carbon dioxide emissions; and
- The use of renewable energy.

The method for assessing the building's performance in relation to these standards for domestic accommodation is DEAP, the national standard for domestic Building Energy Rating.

The method for assessing the building's performance in relation to these standards for Non-domestic buildings is NEAP, the national standard for non- domestic Building Energy Rating.

### 2.1.1 Limits for $CO_2$ Emissions and Primary Energy Use

Under Part L currently, the limits for CO2 emissions (MPCPC) and Primary Energy Use (MPEPC) are:

| **Non Domestic Buiuldings** | | **Domestic Buildings** | |
|---|---|---|---|
| MPCPC | < 1.15 | MPCPC | < 0.35 |
| MPEPC | <1.0 | MPEPC | < 0.30 |

Due to the expected timeframe for the proposed construction, and in the interest of sustainability, this report will assess compliance with NZEB requirements.

### 2.1.2 Building Fabric

The Non Domestic maximum area-weighted elemental U-values in TGD L are:

| **Element** | **U-value ($W/m^2.K$)** |
|---|---|
| Pitched Roof (insulated on slope or ceiling) | 0.16 |
| Flat Roof | 0.20 |
| Walls | 0.21 |
| Ground Floor | 0.21 |
| Ground Floor with Underfloor Heating | 0.15 |
| Exposed Floor | 0.21 |
| External doors, windows and roof windows | 1.60 |

The Domestic maximum area-weighted elemental U-values in TGD L are:

| **Element** | **U-value (W/m².K)** |
|---|---|
| Pitched Roof (insulated on slope or ceiling) | 0.16 |
| Flat Roof | 0.20 |
| Walls | 0.18 |
| Ground Floor | 0.21 |
| Ground Floor with Underfloor Heating | 0.15 |
| Exposed Floor | 0.21 |
| External doors, windows and roof windows | 1.60 |

In order to achieve the NZEB standards, in most cases the above standards will be exceeded in the proposed development.

Careful consideration has been given to window areas in the proposed scheme in order to avoid excessive heat loss and excessive solar gain, with the associated glare and comfort issues.

### 2.1.3 Building Fabric – Air Permeability

The current requirement under TGD L 2022 is a maximum air permeability of $5m^3/hr.m^2$.

Please note, if the air permeability is less than 3 m3/hr/m2 mechanical ventilation will be required as Per TGD F 2019

### 2.1.4 Renewable Energy Contribution

Under TGD L currently, the required contributions by renewable energy technologies are:

- A minimum of 20% of a dwelling's primary energy use shall come from renewable sources.

# 3. Test Cases

## 3.1 Methodology

The method of case-testing was as follows:

- A number of typical unit types and scenarios were selected, with best-case scenarios deliberately omitted to avoid misleading results;
- Taking viability and buildability into account, various configurations of fabric and systems were input and assessed through DEAP; and
- Reports were produced summarising optimal configurations.

## 3.2 Test Case Inputs

### 3.2.1 Geometry and External Environment

To avoid misleading outputs and ensure compliance throughout, the typical unit types and Configurations were selected avoiding "ideal" conditions, whether they were conditions of the external environment or interior configuration.

The units were designed to allow variation in aspect and orientation, with the apartments for example being predominantly dual-aspect, allowing flexibility in the proportions of glazing.

### 3.2.2 Ventilation

Considering flexibility for potential occupants, the option of natural ventilation was used in the calculations. Mechanical ventilation, for example, would therefore be an improvement option for an already compliant dwelling.

Mechanical extract fans in the kitchens, utility rooms and sanitary spaces are proposed.

There are no open chimneys proposed.

PLEASE NOTE: if air tightness test results of less than $3m^3/hr/m^2$ mechanical ventilation

will be required under TGD F 2019

### 3.2.3 Air Permeability

An input of $3m^3/hr.m^2$ was used as per the maximum value in NZEB.

### 3.2.4 Building elements

A summary of the typical build-ups and U-values used:

| **Element** | **U-value (W/m².K)** | |
|---|---|---|
| Ground Floor | 0.14 | (NZEB 0.18) |
| Roof (Flat) | 0.14 | (NZEB 0.16) |
| Walls | 0.18 | (NZEB 0.18) |
| External Doors | 1.40 | (NZEB 1.40) |
| External Windows | 1.40 | (NZEB 1.40) |

U-value ranges are shown in some instances – please refer to individual reports for specific U-values.

#### *3.2.4.1 Thermal Bridging Factor*

The default Thermal Bridging Factor of 0.08 for Acceptable Construction Details under the current TGD L is used. If a lower factor or thermal modelling is required by forthcoming changes, the rating will improve – the results of this assessment would therefore remain valid.

### 3.2.5 Space and Water Heating

Space heating and hot water services will be generated by a combination of air-to-water heat pumps and high efficiency natural gas fired boilers. The Heat pumps will do 60% of the load with 40% load backed up by the gas boilers.

Heat pumps will be located in screened external plant areas at roof level above each apartment block. Boilers, pumps and pressurization equipment will be located in rooftop plantrooms. LPHW heating and hot water services will be distributed to all apartment units with Heat Interface Units (HIUs) at the point of connection.

Energy meters can be included at the HIUs as required as the optimal balance of practicality, efficiency and contribution of renewable energy. Each heat pump system shall be tested to IS EN14825, IS EN 16147 or Eco Design test certificates (or otherwise as required by changes to the Regulations).

The hot water storage will form part of the composite heat-pump systems, with certified loss factors. The Season Performance for Hot Water generation must not be less than 250%

Space heat distribution will be via low-temperature radiators generally, and the space and hot water system will have full time and temperature controls. The seasonal performance of the heat pump must not be less than 500%

### 3.2.6 Renewable Energy

The Renewable energy requirements for the houses is satisfied primarily by the Coefficient of Performance (COP) of the heat pumps and is supplemented by Photovoltaic (PV) panels. The number of PV Panels for each block will be determined based on the Primary Energy Required for each apartment and the balance required once the COP of the heat pumps is accounted for. The total Renewable Energy Ratio (RER) will not be less that 20% of the primary energy for each unit

### 3.2.7 Low Energy Lighting

Each dwelling shall have 100% dedicated low-energy fittings or low-energy bulbs.

### 3.2.8 Thermal Mass

The construction – block/concrete with some timber or metal stud partitions – is expected to have a medium-high thermal mass. Low mass loses heat quickly, but high mass is not best suited to the temperate Irish climate with its relatively low variation of day to night temperatures. Therefore, the range of medium-low to medium-high is the most appropriate for this climate.

### 3.2.9 Provision for Charging for Electric Vehicles

Ducting infrastructure, consisting of conduits for electrical cables, for each car parking space must be provided to enable the subsequent installation of recharging points for electric vehicles

## 3.3 Case Study Inputs and Outputs Summaries

### 3.3.1 Inputs Summary (BLOCK E 4 bed)

| | | | |
|---|---|---|---|
| **Ventilation** | | DCV - Vent Axia Sentinel Multivent (Include Kitchen 5 wet rooms) | |
| **Air Permeability** | | $3m^3/hr.m^2$ | |
| **U-values** | Ground Floor | 0.12 | EPS SILVER 160mm insulation @ 0.031 W/mK |
| | Walls | 0.18 | Backstop U value |
| **Thermal Bridging Factor** | | 0.08 | Medium |
| **Heating System Category** | | | Group or District heating system (group heat source) |
| **Heating System Control** | | | Time and temperature control |
| **Heat Sources** | Gas<br>Electricity | 40%<br>60% | Gas Boiler for Space heating (20%) + Water (20%)<br>Heat Pump for Space heating(30%) + Water (30%)<br>No Secondary heating |
| **Lighting** | | | 100% low-energy |
| **Renewable** | PV 400W X2 | | 650 kWh/y (Part L Contribution) |

### 3.3.2 Inputs Summary (BLOCK E 6 bed)

| | | | |
|---|---|---|---|
| **Ventilation** | | DCV - Vent Axia Sentinel Multivent (Include Kitchen 7 wet rooms) | |
| **Air Permeability** | | $3m^3/hr.m^2$ | |
| **U-values** | $1^{st}$ Floor | 0.18 | Partially heated below |
| | Walls | 0.18 | Backstop U value |
| | Roof (Flat) | 0.14 | 150mm PIR @0.022 W/mK |
| **Thermal Bridging Factor** | | 0.08 | Medium |
| **Heating System Category** | | | Group or District heating system (group heat source) |
| **Heating System Control** | | | Time and temperature control |
| **Heat Sources** | Gas<br>Electricity | 40%<br>60% | For Space heating (Gas 20% + Electricity 20%)<br>Heat Pump for Space(30%) + Water (30%)<br>No Secondary heating |
| **Lighting** | | | 100% low-energy |
| **Renewable** | PV 400W X3 | | 950 kWh/y (Part L Contribution) |

### 3.3.3 Inputs Summary (BLOCK E 8 bed)

| | | | |
|---|---|---|---|
| **Ventilation** | | | DCV - Vent Axia Sentinel Multivent (Include Kitchen 9 wet rooms **2 Units**) |
| **Air Permeability** | | | $3m^3/hr.m^2$ |
| **U-values** | 1st Floor | 0.18 | Partially heated Below |
| | Roof (Flat) | 0.14 | 150mm PIR @0.022 W/mK |
| | Walls | 0.18 | Backstop U vaue |
| **Thermal Bridging Factor** | | 0.08 | Medium |
| **Heating System Category** | | | Group or District heating system (group heat source) |
| **Heating System Control** | | | Time and temperature control |
| **Heat Sources** | Gas | 40% | For Space heating (Gas 20% + Electricity 20%) |
| | Electricity | 60% | Heat Pump for Space(30%) + Water (30%) |
| | | | No Secondary heating |
| **Lighting** | | | 100% low-energy |
| **Renewable** | PV 400W X3 | | 950 kWh/y (Part L Contribution) |

### 3.3.4 Outputs Summary

#### *3.3.1.1 Example 1*

| Apartment | Energy Rating | CPC | EPC | Renewables % |
|---|---|---|---|---|
| BLOCK E 4 BED | A2 38.92 kWh/m2/yr | 0.264 | 0.225 | 38% |

- Meets Part L/NZEB U-value standards
- Meets Part L/NZEB MPCPC and MPEPC standards
- Meets Part L/NZEB renewables standards

#### *3.3.1.2 Example 2*

| Apartment | Energy Rating | CPC | EPC | Renewables % |
|---|---|---|---|---|
| BLOCK E 6 BED | A2 44.21 kWh/m2/yr | 0.286 | 0.234 | 44% |

- Meets Part L/NZEB U-value standards
- Meets Part L/NZEB MPCPC and MPEPC standards
- Meets Part L/NZEB renewables standards

#### *3.3.1.3 Example 3*

| House | Energy Rating | CPC | EPC | Renewables % |
|---|---|---|---|---|
| BLOCK E 8 BED | A2 36.24 kWh/m2/yr | 0.261 | 0.215 | 45% |

- Meets anticipated revised Part L/NZEB U-value standards
- Meets anticipated revised Part L/NZEB MPCPC and MPEPC standards
- Meets anticipated revised Part L/NZEB renewables standards

# 4. Conclusions

The proposed complex will comply with the existing requirements of Part L 2022/ NZEB with sufficient leeway to accommodate changes not detailed at this time, and with opportunities for individual owners to add further energy-saving or renewable- energy measures, e.g. heat-recovery systems and additional photovoltaic or solar thermal panels.

# 5. Appendix – Case Study Reports

# Part L Specification

**BER IS NOT PUBLISHED**

## Property Details

| | | | |
|---|---|---|---|
| **Dwelling Type** | Top-floor apartment | **Type of BER rating** | New Dwelling - Provisional |
| **Address line 1** | BLOCK E (8 BED) | **Year of Construction** | 2024 |
| **Address line 2** | CASTLETROY | **Date of Assessment** | 03/10/2024 |
| **Address line 3** | GROODY VALLEY | **Date of Plans** | |
| **County** | Co. Limerick | **Planning Reference** | |
| **Eircode** | | **Building Regulations** | 2019 TGD L |
| **BER Number** | | **MPRN No.** | 0 |
| **Purpose of Rating** | New dwelling for owner occupation | **Is MPRN shared with another dwelling?** | No |
| **Assessor Name** | Joongwook Seol | **Assessor Number** | 107437 |
| **Comment** | | **BER number assigned to shared dwelling** | N/A |

## Dimension Details

| | Area [$m^2$] | Height [m] | Volume [$m^3$] |
|---|---|---|---|
| Ground Floor | 174.98 | 2.50 | 437.45 |
| 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 | 174.98 | | 437.45 |

| | | | |
|---|---|---|---|
| **Living Area [$m^2$]** | 27.32 | **Living area percentage [%]** | 15.61 |
| **No of Storeys** | 1 | | |

## Ventilation Details

| | Number | | |
|---|---|---|---|
| **Chimneys** | 0 | **Has permeability test been carried out?** | Yes |
| **Open Flues** | 0 | **Structure type** | N/A |
| **Fans & Vents** | 1 | **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** | 2 |
| **Ventilation method** | Whole-house extract ventilation | **Mechanical Ventilation Manufacturer** | N/A |
| **Specific fan power [W/(L/s)]** | 0.270 | **Mechanical Ventilation Model Name** | N/A |
| **Heat exchanger efficiency [%]** | N/A | **How many wetrooms (incl. kitchen)?** | N/A |

## Building Elements - Floor Details

| Type | Description | Underfloor heating | U-Value [W/m$^2$K] | Area [m$^2$] |
|---|---|---|---|---|
| Partially Heated Below | | No | 0.18 | 174.98 |

## Building Elements - Roof Details

| Type | Description | U-Value [W/m$^2$K] | Area [m$^2$] |
|---|---|---|---|
| Flat Roof | | 0.14 | 174 |

## Building Elements - Wall Details

| Type | Description | U-Value [W/m$^2$K] | Area [m$^2$] |
|---|---|---|---|
| 300mm Cavity | BACKSTOP U VALUE | 0.18 | 32.15 |

## Building Elements - Door Details

| Description | Number of Doors | U-Value [W/m$^2$K] | Area [m$^2$] |
|---|---|---|---|

## Building Elements - Window Details

| Glazing type | User defined u-value | U-Value [W/m$^2$K] | Area [m$^2$] |
|---|---|---|---|
| Double-glazed, air filled (low-E, en = 0.05, soft coat) | Yes | 1.400 | 15.350 |
| Double-glazed, air filled (low-E, en = 0.05, soft coat) | Yes | 1.400 | 15.900 |

## Other Details

| | | | |
|---|---|---|---|
| **Thermal bridging factor [W/m²k]** | 0.0800 | **Thermal mass category of dwelling** | Medium |

## Heating System - Solar Water Heating

| | | | |
|---|---|---|---|
| **Solar Water Heating Present?** | No | **Aperture area of solar collector [m²]** | N/A |
| **Type, manufacturer, model** | N/A | | |
| **Zero loss collector efficiency, n0** | N/A | **Collector heat loss coefficient, a1 [W/m²>K]** | N/A |
| **Annual Solar Radiation [kWh/m²] (Refer to Appendix H in DEAP)** | N/A | **Overshading factor** | N/A |
| **Dedicated storage volume [Litres]** | N/A | **Combined Cylinder** | N/A |
| **Solar fraction [%]** | 0.000 | | |

## Heating System - Hot Water System

| | | | |
|---|---|---|---|
| **Distribution Losses** | 256.86 | **Combi boiler present?** | No |
| **Supplementary electric water heating** | N/A | **Water Storage Volume [L]** | 110 |
| **Hot water storage manufacturer and model name** | HIU | **Declared loss factor [kWh/d]** | 2.10 |
| **Temperature factor unadjusted** | 1 | **Temperature Factor Multiplier** | 1 |
| **Primary Circuit loss type** | Community / group / district heating | | |
| **Is hot water storage indoors or in group heating system?** | Yes | **Insulation type** | N/A |
| **Insulation thickness [mm]** | N/A | | |

## Heating System - Dist. system losses and gains

| | | | | | |
|---|---|---|---|---|---|
| **Temperature adjustment [°C]** | 0.000 | **Control Category** | | **Responsiveness category** | |
| **Central heating pumps** | 0 | **Oil Boiler Pump** | 0 | **Oil boiler pump inside dwelling** | No |
| **Gas boiler flue fan** | 0 | **Warm air heating or fan coil radiators present** | No | | |

## Heating System - Energy Requirements (Group)

| | | | | | |
|---|---|---|---|---|---|
| **Charging based on heat consumed?** | Yes | **Distribution loss factor** | 1.05 | **Fraction of heat from waste heat/CHP** | 0 |
| **% of heat from secondary heating** | | **Efficiency of secondary heating [%]** | | **Secondary heating fuel type** | N/A |
| **Heating System 1 percentage of heat [%]** | 30 | **Heating System 1 efficency [%]** | 500 | **Heating System 1 fuel type** | Electricity |
| **Heating System 2 percentage of heat [%]** | 30 | **Heating System 2 efficency [%]** | 250 | **Heating System 2 fuel type** | Electricity |
| **Heating System 3 percentage of heat [%]** | 40 | **Heating System 3 efficency [%]** | 91 | **Heating System 3 fuel type** | Mains Gas |
| **Solar space heating percentage of heat [%]** | | | | | |
| **CHP electrical efficiency** | | **CHP thermal efficiency** | | **CHP Fuel type** | N/A |

## Summary for Part L Conformance (Applies to TGD L 2008/2011/2019 for new dwellings only)

| | | | |
|---|---|---|---|
| **BER Number** | | **Building Regulations** | **2019 TGD L** |
| **BER Result** | A2 | **Energy Value kWh/m$^2$/yr** | **36.24** |
| **$CO_2$ emissions [kg/m$^2$/yr]** | 6.03 | | |
| **EPC** | 0.261 | **EPC Pass/Fail** | **Pass** |
| **CPC** | 0.215 | **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** | 0.14 | Pass |
| **Pitched roof insulated on slope** | 0 | Pass | **Walls** | 0.18 | Pass |
| **Flat Roof** | 0.14 | Pass | **Floors** | 0 | Pass |
| **Floors with no underfloor heat** | 0.00 | Pass | **External doors / windows / rooflights** | 1.40 | Pass |
| **Floors with underfloor heat** | 0.00 | Pass | | | |
| **Walls** | 0.18 | Pass | | | |
| **Percentage of opening areas [%]** | 17.86 | | | | |
| **Average U value of openings** | 1.40 | Pass | | | |
| **Permeability test carried out and meets guidelines in TGD L** | | | | 0.25 \| Pass | |

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

| | Source | Renewables Primary Energy | Total Primary Energy | RER |
|---|---|---|---|---|
| + Delivered energy | PV/Wind | 1715.00 | 1715.00 | |
| + 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 | 3554.09 | 3554.09 | |
| + Saved energy | CHP | 0.00 | 0.00 | |
| + District heating | District Heating | 0.00 | 0.00 | |
| + Delivered energy | Grid | 0.00 | 2045.26 | |
| + Delivered energy | Thermal | 0.00 | 4296.15 | |
| SUBTOTAL | | 5269.09 | 11610.50 | 0.45 - Pass |
| Energy not used in Regulated Loads | PV/Wind/CHP | 0.00 | 0.00 | |
| TOTAL | | 5269.09 | 11610.50 | 0.45 |

## Energy Requirements: Renewables

| | Type | Part L Total Contribution [kWh/y] | Delivered Energy [kWh/y] | Primary energy conversion factor | $CO_2$ emission factor [kg/kWh] |
|---|---|---|---|---|---|
| **Energy produced or saved 1** | Electrical (Solar PV/Wind) | 980.000 | 980.000 | 1.75 | 0.224 |
| **Energy consumed by the technology 1** | | | 0.000 | 0.00 | 0.000 |
| **Energy produced or saved 2** | N/A | 0.000 | 0.000 | 0.00 | 0.000 |
| **Energy consumed by the technology 2** | | | 0.000 | 0.00 | 0.000 |
| **Energy produced or saved 3** | N/A | 0.000 | 0.000 | 0.00 | 0.000 |
| **Energy consumed by the technology 3** | | | 0.000 | 0.00 | 0.000 |

## Energy Requirements: Group or District Heating System

| | Fuel Type | Electricity Fuel Factors Date | Primary energy conversion factor | $CO_2$ emission factor |
|---|---|---|---|---|
| **Main space heating system** | Group or District Heating System | Current | 0.84 | 0.14 |
| **Secondary space heating system** | None | Current | 0.00 | 0.00 |
| **Main water heating system** | Group or District Heating System | Current | 0.84 | 0.14 |
| **Supplementary water heating system** | | Current | 0.00 | 0.00 |
| **Pumps, fans** | | Current | 1.75 | 0.22 |
| **Energy for lighting** | | Current | 1.75 | 0.22 |

# Part L Specification

**BER IS NOT PUBLISHED**

## Property Details

| | | | |
|---|---|---|---|
| **Dwelling Type** | Top-floor apartment | **Type of BER rating** | New Dwelling - Provisional |
| **Address line 1** | BLOCK E (6 BED) | **Year of Construction** | 2024 |
| **Address line 2** | CASTLETROY | **Date of Assessment** | 03/10/2024 |
| **Address line 3** | GROODY VALLEY | **Date of Plans** | |
| **County** | Co. Limerick | **Planning Reference** | |
| **Eircode** | | **Building Regulations** | 2019 TGD L |
| **BER Number** | | **MPRN No.** | 0 |
| **Purpose of Rating** | New dwelling for owner occupation | **Is MPRN shared with another dwelling?** | No |
| **Assessor Name** | Joongwook Seol | **Assessor Number** | 107437 |
| **Comment** | | **BER number assigned to shared dwelling** | N/A |

## Dimension Details

| | Area [$m^2$] | Height [m] | Volume [$m^3$] |
|---|---|---|---|
| Ground Floor | 147.57 | 2.50 | 368.93 |
| 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 | 147.57 | | 368.93 |

| | | | |
|---|---|---|---|
| **Living Area [$m^2$]** | 27.32 | **Living area percentage [%]** | 18.51 |
| **No of Storeys** | 1 | | |

## Ventilation Details

| | Number | | |
|---|---|---|---|
| **Chimneys** | 0 | **Has permeability test been carried out?** | Yes |
| **Open Flues** | 0 | **Structure type** | N/A |
| **Fans & Vents** | 1 | **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** | 2 |
| **Ventilation method** | Whole-house extract ventilation | **Mechanical Ventilation Manufacturer** | N/A |
| **Specific fan power [W/(L/s)]** | 0.380 | **Mechanical Ventilation Model Name** | N/A |
| **Heat exchanger efficiency [%]** | N/A | **How many wetrooms (incl. kitchen)?** | N/A |

## Building Elements - Floor Details

| Type | Description | Underfloor heating | U-Value [W/m$^2$K] | Area [m$^2$] |
|---|---|---|---|---|
| Partially Heated Below | | No | 0.18 | 147.57 |

## Building Elements - Roof Details

| Type | Description | U-Value [W/m$^2$K] | Area [m$^2$] |
|---|---|---|---|
| Flat Roof | 150mm WARM DECK | 0.14 | 147.57 |

## Building Elements - Wall Details

| Type | Description | U-Value [W/m$^2$K] | Area [m$^2$] |
|---|---|---|---|
| 300mm Cavity | BACKSTOP U VALUE | 0.18 | 65.82 |

## Building Elements - Door Details

| Description | Number of Doors | U-Value [W/m$^2$K] | Area [m$^2$] |
|---|---|---|---|

## Building Elements - Window Details

| Glazing type | User defined u-value | U-Value [W/m$^2$K] | Area [m$^2$] |
|---|---|---|---|
| Double-glazed, air filled (low-E, en = 0.05, soft coat) | Yes | 1.400 | 14.690 |
| Double-glazed, air filled (low-E, en = 0.05, soft coat) | Yes | 1.400 | 12.280 |
| Double-glazed, air filled (low-E, en = 0.05, soft coat) | Yes | 1.400 | 9.760 |

## Other Details

| | | | |
|---|---|---|---|
| **Thermal bridging factor [W/m²k]** | 0.0800 | **Thermal mass category of dwelling** | Medium |

## Heating System - Solar Water Heating

| | | | |
|---|---|---|---|
| **Solar Water Heating Present?** | No | **Aperture area of solar collector [m²]** | N/A |
| **Type, manufacturer, model** | N/A | | |
| **Zero loss collector efficiency, n0** | N/A | **Collector heat loss coefficient, a1 [W/m²>K]** | N/A |
| **Annual Solar Radiation [kWh/m²] (Refer to Appendix H in DEAP)** | N/A | **Overshading factor** | N/A |
| **Dedicated storage volume [Litres]** | N/A | **Combined Cylinder** | N/A |
| **Solar fraction [%]** | 0.000 | | |

## Heating System - Hot Water System

| | | | |
|---|---|---|---|
| **Distribution Losses** | 254.59 | **Combi boiler present?** | No |
| **Supplementary electric water heating** | N/A | **Water Storage Volume [L]** | 110 |
| **Hot water storage manufacturer and model name** | HIU | **Declared loss factor [kWh/d]** | 2.10 |
| **Temperature factor unadjusted** | 1 | **Temperature Factor Multiplier** | 1 |
| **Primary Circuit loss type** | Community / group / district heating | | |
| **Is hot water storage indoors or in group heating system?** | Yes | **Insulation type** | N/A |
| **Insulation thickness [mm]** | N/A | | |

## Heating System - Dist. system losses and gains

| | | | | | |
|---|---|---|---|---|---|
| **Temperature adjustment [°C]** | 0.000 | **Control Category** | | **Responsiveness category** | |
| **Central heating pumps** | 0 | **Oil Boiler Pump** | 0 | **Oil boiler pump inside dwelling** | No |
| **Gas boiler flue fan** | 0 | **Warm air heating or fan coil radiators present** | No | | |

## Heating System - Energy Requirements (Group)

| | | | | | |
|---|---|---|---|---|---|
| **Charging based on heat consumed?** | Yes | **Distribution loss factor** | 1.05 | **Fraction of heat from waste heat/CHP** | 0 |
| **% of heat from secondary heating** | | **Efficiency of secondary heating [%]** | | **Secondary heating fuel type** | N/A |
| **Heating System 1 percentage of heat [%]** | 30 | **Heating System 1 efficency [%]** | 500 | **Heating System 1 fuel type** | Electricity |
| **Heating System 2 percentage of heat [%]** | 30 | **Heating System 2 efficency [%]** | 217 | **Heating System 2 fuel type** | Electricity |
| **Heating System 3 percentage of heat [%]** | 40 | **Heating System 3 efficency [%]** | 91 | **Heating System 3 fuel type** | Mains Gas |
| **Solar space heating percentage of heat [%]** | | | | | |
| **CHP electrical efficiency** | | **CHP thermal efficiency** | | **CHP Fuel type** | N/A |

## Summary for Part L Conformance (Applies to TGD L 2008/2011/2019 for new dwellings only)

| | | | |
|---|---|---|---|
| **BER Number** | | **Building Regulations** | **2019 TGD L** |
| **BER Result** | A2 | **Energy Value kWh/m$^2$/yr** | **44.21** |
| **$CO_2$ emissions [kg/m$^2$/yr]** | 7.28 | | |
| **EPC** | 0.286 | **EPC Pass/Fail** | **Pass** |
| **CPC** | 0.234 | **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** | 0.14 | Pass |
| **Pitched roof insulated on slope** | 0 | Pass | **Walls** | 0.18 | Pass |
| **Flat Roof** | 0.14 | Pass | **Floors** | 0 | Pass |
| **Floors with no underfloor heat** | 0.00 | Pass | **External doors / windows / rooflights** | 1.40 | Pass |
| **Floors with underfloor heat** | 0.00 | Pass | | | |
| **Walls** | 0.18 | Pass | | | |
| **Percentage of opening areas [%]** | 24.89 | | | | |
| **Average U value of openings** | 1.40 | Pass | | | |
| **Permeability test carried out and meets guidelines in TGD L** | | | | 0.25 \| Pass | |

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

| | Source | Renewables Primary Energy | Total Primary Energy | RER |
|---|---|---|---|---|
| + Delivered energy | PV/Wind | 1715.00 | 1715.00 | |
| + 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 | 3358.69 | 3358.69 | |
| + Saved energy | CHP | 0.00 | 0.00 | |
| + District heating | District Heating | 0.00 | 0.00 | |
| + Delivered energy | Grid | 0.00 | 2279.30 | |
| + Delivered energy | Thermal | 0.00 | 4244.37 | |
| SUBTOTAL | | 5073.69 | 11597.35 | 0.44 - Pass |
| Energy not used in Regulated Loads | PV/Wind/CHP | 0.00 | 0.00 | |
| TOTAL | | 5073.69 | 11597.35 | 0.44 |

## Energy Requirements: Renewables

| | Type | Part L Total Contribution [kWh/y] | Delivered Energy [kWh/y] | Primary energy conversion factor | $CO_2$ emission factor [kg/kWh] |
|---|---|---|---|---|---|
| **Energy produced or saved 1** | Electrical (Solar PV/Wind) | 980.000 | 980.000 | 1.75 | 0.224 |
| **Energy consumed by the technology 1** | | | 0.000 | 0.00 | 0.000 |
| **Energy produced or saved 2** | N/A | 0.000 | 0.000 | 0.00 | 0.000 |
| **Energy consumed by the technology 2** | | | 0.000 | 0.00 | 0.000 |
| **Energy produced or saved 3** | N/A | 0.000 | 0.000 | 0.00 | 0.000 |
| **Energy consumed by the technology 3** | | | 0.000 | 0.00 | 0.000 |

## Energy Requirements: Group or District Heating System

| | Fuel Type | Electricity Fuel Factors Date | Primary energy conversion factor | $CO_2$ emission factor |
|---|---|---|---|---|
| **Main space heating system** | Group or District Heating System | Current | 0.87 | 0.14 |
| **Secondary space heating system** | None | Current | 0.00 | 0.00 |
| **Main water heating system** | Group or District Heating System | Current | 0.87 | 0.14 |
| **Supplementary water heating system** | | Current | 0.00 | 0.00 |
| **Pumps, fans** | | Current | 1.75 | 0.22 |
| **Energy for lighting** | | Current | 1.75 | 0.22 |

# Part L Specification

**BER IS NOT PUBLISHED**

## Property Details

| | | | |
|---|---|---|---|
| **Dwelling Type** | Ground-floor apartment | **Type of BER rating** | New Dwelling - Provisional |
| **Address line 1** | BLOCK E (4BED) | **Year of Construction** | 2024 |
| **Address line 2** | CASTLETROY | **Date of Assessment** | 03/10/2024 |
| **Address line 3** | GROODY VALLEY | **Date of Plans** | |
| **County** | Co. Limerick | **Planning Reference** | |
| **Eircode** | | **Building Regulations** | 2019 TGD L |
| **BER Number** | | **MPRN No.** | 0 |
| **Purpose of Rating** | New dwelling for owner occupation | **Is MPRN shared with another dwelling?** | No |
| **Assessor Name** | Joongwook Seol | **Assessor Number** | 107437 |
| **Comment** | | **BER number assigned to shared dwelling** | N/A |

## Dimension Details

| | Area [$m^2$] | Height [m] | Volume [$m^3$] |
|---|---|---|---|
| Ground Floor | 98.20 | 2.50 | 245.50 |
| 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 | 98.20 | | 245.50 |

| | | | |
|---|---|---|---|
| **Living Area [$m^2$]** | 22.11 | **Living area percentage [%]** | 22.52 |
| **No of Storeys** | 1 | | |

## Ventilation Details

| | Number | | |
|---|---|---|---|
| **Chimneys** | 0 | **Has permeability test been carried out?** | Yes |
| **Open Flues** | 0 | **Structure type** | N/A |
| **Fans & Vents** | 1 | **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** | 2 |
| **Ventilation method** | Whole-house extract ventilation | **Mechanical Ventilation Manufacturer** | N/A |
| **Specific fan power [W/(L/s)]** | 0.270 | **Mechanical Ventilation Model Name** | N/A |
| **Heat exchanger efficiency [%]** | N/A | **How many wetrooms (incl. kitchen)?** | N/A |

## Building Elements - Floor Details

| Type | Description | Underfloor heating | U-Value [W/m$^2$K] | Area [m$^2$] |
|---|---|---|---|---|
| Ground Floor - Solid | EPS70 SILVER 160mm @0.031 | No | 0.12 | 98.2 |

## Building Elements - Roof Details

| Type | Description | U-Value [W/m$^2$K] | Area [m$^2$] |
|---|---|---|---|

## Building Elements - Wall Details

| Type | Description | U-Value [W/m$^2$K] | Area [m$^2$] |
|---|---|---|---|
| 300mm Cavity | BACKSTOP U VALUE | 0.18 | 35.51 |

## Building Elements - Door Details

| Description | Number of Doors | U-Value [W/m$^2$K] | Area [m$^2$] |
|---|---|---|---|

## Building Elements - Window Details

| Glazing type | User defined u-value | U-Value [W/m$^2$K] | Area [m$^2$] |
|---|---|---|---|
| Double-glazed, air filled (low-E, en = 0.05, soft coat) | Yes | 1.400 | 15.620 |
| Double-glazed, air filled (low-E, en = 0.05, soft coat) | Yes | 1.400 | 6.700 |

## Other Details

| | | | |
|---|---|---|---|
| **Thermal bridging factor [W/m²k]** | 0.0800 | **Thermal mass category of dwelling** | Medium |

## Heating System - Solar Water Heating

| | | | |
|---|---|---|---|
| **Solar Water Heating Present?** | No | **Aperture area of solar collector [m²]** | N/A |
| **Type, manufacturer, model** | N/A | | |
| **Zero loss collector efficiency, n0** | N/A | **Collector heat loss coefficient, a1 [W/m²>K]** | N/A |
| **Annual Solar Radiation [kWh/m²] (Refer to Appendix H in DEAP)** | N/A | **Overshading factor** | N/A |
| **Dedicated storage volume [Litres]** | N/A | **Combined Cylinder** | N/A |
| **Solar fraction [%]** | 0.000 | | |

## Heating System - Hot Water System

| | | | |
|---|---|---|---|
| **Distribution Losses** | 242.44 | **Combi boiler present?** | No |
| **Supplementary electric water heating** | N/A | **Water Storage Volume [L]** | 110 |
| **Hot water storage manufacturer and model name** | HIU | **Declared loss factor [kWh/d]** | 2.10 |
| **Temperature factor unadjusted** | 1 | **Temperature Factor Multiplier** | 1 |
| **Primary Circuit loss type** | Community / group / district heating | | |
| **Is hot water storage indoors or in group heating system?** | Yes | **Insulation type** | N/A |
| **Insulation thickness [mm]** | N/A | | |

## Heating System - Dist. system losses and gains

| | | | | | |
|---|---|---|---|---|---|
| **Temperature adjustment [°C]** | 0.000 | **Control Category** | | **Responsiveness category** | |
| **Central heating pumps** | 0 | **Oil Boiler Pump** | 0 | **Oil boiler pump inside dwelling** | No |
| **Gas boiler flue fan** | 0 | **Warm air heating or fan coil radiators present** | No | | |

## Heating System - Energy Requirements (Group)

| | | | | | |
|---|---|---|---|---|---|
| **Charging based on heat consumed?** | Yes | **Distribution loss factor** | 1.05 | **Fraction of heat from waste heat/CHP** | 0 |
| **% of heat from secondary heating** | | **Efficiency of secondary heating [%]** | | **Secondary heating fuel type** | N/A |
| **Heating System 1 percentage of heat [%]** | 30 | **Heating System 1 efficency [%]** | 500 | **Heating System 1 fuel type** | Electricity |
| **Heating System 2 percentage of heat [%]** | 40 | **Heating System 2 efficency [%]** | 91 | **Heating System 2 fuel type** | Mains Gas |
| **Heating System 3 percentage of heat [%]** | 30 | **Heating System 3 efficency [%]** | 217 | **Heating System 3 fuel type** | Electricity |
| **Solar space heating percentage of heat [%]** | | | | | |
| **CHP electrical efficiency** | | **CHP thermal efficiency** | | **CHP Fuel type** | N/A |

## Summary for Part L Conformance (Applies to TGD L 2008/2011/2019 for new dwellings only)

| | | | |
|---|---|---|---|
| **BER Number** | | **Building Regulations** | **2019 TGD L** |
| **BER Result** | A2 | **Energy Value kWh/m$^2$/yr** | **38.92** |
| **$CO_2$ emissions [kg/m$^2$/yr]** | 6.43 | | |
| **EPC** | 0.264 | **EPC Pass/Fail** | **Pass** |
| **CPC** | 0.225 | **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 |
| **Flat Roof** | 0 | Pass | **Floors** | 0.12 | Pass |
| **Floors with no underfloor heat** | 0.12 | Pass | **External doors / windows / rooflights** | 1.40 | Pass |
| **Floors with underfloor heat** | 0.00 | Pass | | | |
| **Walls** | 0.18 | Pass | | | |
| **Percentage of opening areas [%]** | 22.73 | | | | |
| **Average U value of openings** | 1.40 | Pass | | | |
| **Permeability test carried out and meets guidelines in TGD L** | | | | 0.25 \| Pass | |

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

| | Source | Renewables Primary Energy | Total Primary Energy | RER |
|---|---|---|---|---|
| + Delivered energy | PV/Wind | 1137.50 | 1137.50 | |
| + 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 | 1191.64 | 1191.64 | |
| + Saved energy | CHP | 0.00 | 0.00 | |
| + District heating | District Heating | 0.00 | 0.00 | |
| + Delivered energy | Grid | 0.00 | 1300.79 | |
| + Delivered energy | Thermal | 0.00 | 2520.78 | |
| SUBTOTAL | | 2329.14 | 6150.71 | 0.38 - Pass |
| Energy not used in Regulated Loads | PV/Wind/CHP | 0.00 | 0.00 | |
| TOTAL | | 2329.14 | 6150.71 | 0.38 |

## Energy Requirements: Renewables

| | Type | Part L Total Contribution [kWh/y] | Delivered Energy [kWh/y] | Primary energy conversion factor | $CO_2$ emission factor [kg/kWh] |
|---|---|---|---|---|---|
| **Energy produced or saved 1** | Electrical (Solar PV/Wind) | 650.000 | 650.000 | 1.75 | 0.224 |
| **Energy consumed by the technology 1** | | | 0.000 | 0.00 | 0.000 |
| **Energy produced or saved 2** | N/A | 0.000 | 0.000 | 0.00 | 0.000 |
| **Energy consumed by the technology 2** | | | 0.000 | 0.00 | 0.000 |
| **Energy produced or saved 3** | N/A | 0.000 | 0.000 | 0.00 | 0.000 |
| **Energy consumed by the technology 3** | | | 0.000 | 0.00 | 0.000 |

## Energy Requirements: Group or District Heating System

| | Fuel Type | Electricity Fuel Factors Date | Primary energy conversion factor | $CO_2$ emission factor |
|---|---|---|---|---|
| **Main space heating system** | Group or District Heating System | Current | 0.87 | 0.14 |
| **Secondary space heating system** | None | Current | 0.00 | 0.00 |
| **Main water heating system** | Group or District Heating System | Current | 0.87 | 0.14 |
| **Supplementary water heating system** | | Current | 0.00 | 0.00 |
| **Pumps, fans** | | Current | 1.75 | 0.22 |
| **Energy for lighting** | | Current | 1.75 | 0.22 |