Varming
Consulting Engineers Ltd.

ENERGY AND SUSTAINABILITY REPORT/ CLIMATE ACTION ENERGY STATEMENT

GLOVER COURT

Rev: 00

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GLOVER COURT

ENERGY & COMPLIANCE REPORT

1. Executive Summary

This Report outlines the nature, scope and configuration of the design solutions to be provided for the proposed Gloves Court residential development and verifies how the proposals can meet or exceed statutory requirements.

All dwellings and landlord areas have been designed to be energy efficient and flexible in use in order to minimise both energy consumption and associated CO_2 production. The design team recognise the need for the development to be designed and operated in a manner that reduces the environmental impact of each building.

We confirm that the development complies with, or exceeds, the requirements stipulated within both TGD Part L: 2022 (dwellings) and (buildings other than dwellings) in regard to renewable allowance, U-values, air tightness, energy performance and carbon performance.

2. Introduction

The purpose of this report is to set out the proposed mechanical/electrical and building fabric strategy for the proposed Glover Court project.

The report will outline the target U-values, air permeability and details for the space heating, hot water, ventilation and lighting in order to demonstrate compliance with Building Regulations Part L: 2022 “dwellings” and “buildings other than dwellings”.

The design philosophy for the development is to use sustainable options, energy efficient materials/equipment and to employ a holistic approach to the integration of the building fabric, its systems and its users. This will benefit the occupants by providing a healthy living environment with comfortable thermal and visual conditions and good indoor air quality. In addition, this philosophy ensures an energy efficient development, with reduced whole life operational costs and CO_2 emissions, which in turn delivers a positive local and global environmental impact.

3. Project Description

The development was built in 1976, Glover Court comprises two blocks with currently 38 dwellings. This project is a proposed estate renewal of housing and public realm of an existing housing complex. The brief comprises the retrofit and amalgamation of the existing blocks, with the addition of new bays, an additional floor, a new core, new access decks and balconies, to provide a total of 53No. dwellings.

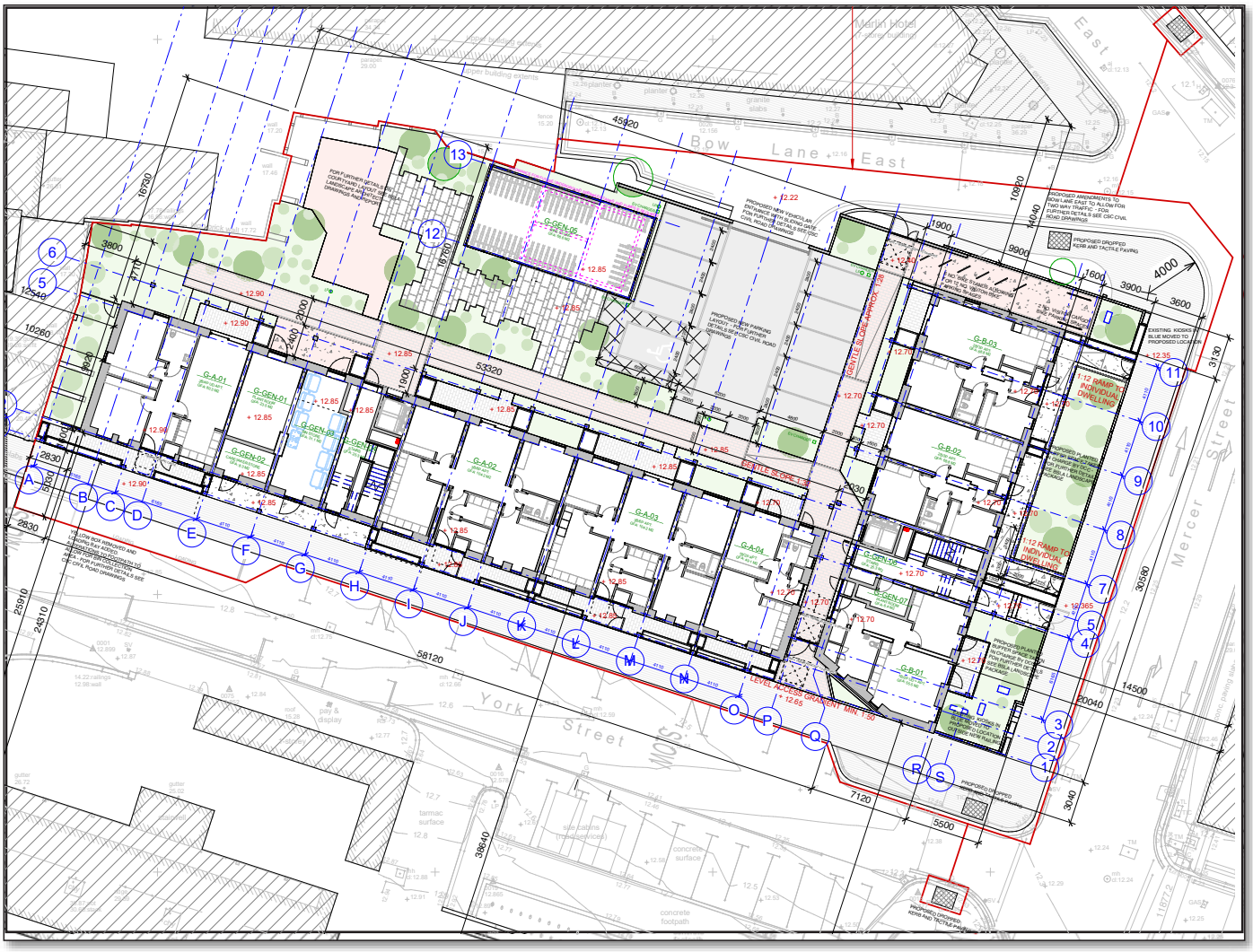

Figure 1: Proposed Site Plan.

The overall energy efficiency objective for this project is to deliver minimum A2 rated dwellings and landlord areas which comply with TGD Part L: 2022.

4. Building Regulations Requirement

The majority of this project falls under the remit of the requirements set out in L2 of the Building Regulations Part L 2022 Conservation of fuel and energy - dwellings, with guidance provided in Section 2. Part L2 applies to all works to existing dwellings.

Part L 2022 (dwellings) L2 requirements:

For existing dwellings, the requirements of this regulation shall be met by:

- limiting heat loss and, where appropriate, maximising heat gain through the fabric of the building;
- controlling, as appropriate, the output of the space heating and hot water systems;
- limiting the heat loss from pipes, ducts and vessels used for the transport or storage of heated water or air;
- providing that all oil and gas fired boilers installed as replacements in existing dwellings shall meet a minimum seasonal efficiency of 90 % where practicable.

The non-domestic areas in this project fall under the remit of the requirements set out in L4 of the Building Regulations Part L 2022 Conservation of fuel and energy - buildings other than dwellings, with guidance provided in Section 2. Part L4 applies to all works to new buildings other than dwellings.

Part L 2022 (buildings other than dwellings) L4 requirements:

For existing buildings other than dwellings, the requirements of L4 shall be met by: –

- limiting the heat loss and, where appropriate, availing of the heat gains through the fabric of the building.
- providing energy efficient space heating and cooling systems, heating and cooling equipment, water heating systems, and ventilation systems, with effective controls;
- ensuring that the building is appropriately designed to limit need for cooling and, where air-conditioning or mechanical ventilation is installed, that installed systems are energy efficient, appropriately sized and adequately controlled.
- limiting the heat loss from pipes, ducts and vessels used for the transport or storage of heated water or air;
- limiting the heat gains by chilled water and refrigerant vessels, and by pipes and ducts that serve air conditioning systems.
- providing energy efficient artificial lighting systems and adequate control of these systems; and
- providing to the building owner sufficient information about the building fabric, the fixed building services, controls and their maintenance requirements when replaced so that the building can be operated in such a manner as to use no more fuel and energy than is reasonable.
- when a building undergoes major renovation, the minimum energy performance requirement of the building or the renovated part thereof is upgraded in order to meet the cost optimal level of energy performance insofar as this is technically, functionally and economically feasible.

5. Climate Action Energy Statement

In compliance with “Dublin City Council Development plan”, the development is designed with high efficient heat pumps installed in each of the units. Details of the heat pumps are included in the preliminary energy model and show that renewable contributions are being met. Amenity spaces will be provided with a roof mounted PV array, which will meet the renewable requirements of Part L compliance.

Connection to a District Heating Network was not considered as the number of apartments in the development falls below the viable threshold. Generally, district heating becomes commercially viable in high density schemes within excess of 200 apartments. This scheme includes 53 apartments which are split between 2 blocks and the distance between 2 of the blocks is approximately 200m. The relatively low density of the site and the capital costs associated with the central plant and below ground heating pipework would render a district heating network unviable for this site.

6. Design Strategy

The design approach is a to firstly address the passive measures associated with the building fabric, then implement active measures through an efficient services design and finally implementation of renewables to supply the energy. The development will include the following energy conservation measures 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
- Electric vehicle charging points will be provided inline with planning

Renewable:

- Exhaust Air Heat Pumps
- Photovoltaic Array

7. Proposed Building Fabric

The proposed construction method for the development shall be in accordance with the engineer's drawings and building fabric as detailed by the Architectural specification. The following shall outline the minimum thermal performance achieved as part of the detailed design stage in accordance with the current Part L requirements.

Building Fabric U-Values

In order to minimise the heating load of the development and provide improved comfort for the occupants the following construction fabric data is proposed:

Element	U-value (W/m^2.K)
External Wall	0.18
Internal Wall Adjacent to Unheated Spaces	0.60
Ground / Exposed Floor	0.12
Roof	0.12
Door	1.30

Table 1 – Thermal Properties of Building Fabric

Glazing Description	U-value (W/m^2.K)	Frame Factor	g-value
External Glazing Vertical (Including Frame)	1.30	0.70	0.55

Table 2 – Glazing Properties

Air tightness

An airtight building envelope has two main advantages; it reduces infiltration of external cold air which increases the heating demand and related energy consumption. It also prevents the exfiltration of warm humid air into the building fabric which can lead to moisture build-up. Careful planning and coordination are required to ensure an airtight envelope is achieved. It is critical therefore to ensure the following.

- The continuous airtight envelope is clearly indicated on drawings.
- All mechanical and electrical services are carefully coordinated to minimise service penetrations though the envelope.
- All services and equipment are to be neatly installed and clearly marked.
- Clearly communicate this to contractors through drawings.
- Ensure that any unavoidable penetrations are correctly sealed using approved tapes and gaskets.

The target air permeability rate is 3.0 m3/(h.m2).

Thermal Bridging

The reduction of linear thermal bridging is an important aspect of achieving NZEB along with eliminating the risk of condensation and mould growth. It is proposed that the dwelling details will conform to "Limiting Thermal Bridging and Air Infiltration – Acceptable Construction Details"

(https://www.housing.gov.ie) as referenced in Building Regulations 2008, 2011 and 2019 TGD L. The relevant construction drawings will be signed off by the developer, builder, site engineer & project architect in compliance with the requirements of B(C)AR.

8. Proposed Mechanical Services

Heating Systems

It is proposed that low temperature hot water will be provided heat emitters by an Air Source Heat pump in each apartment. The Heat Pump will also contribute to the generation of domestic hot water with a contribution from immersion heaters. This solution offers instant and controllable space heating and hot water, it is also cost effective, clean, efficient, and user-friendly.

The heating system will be split into two individually controlled zones space heating and a hot water heating circuit allowing separate and independent automatic time control of space heating and hot water cylinder in line with Section 1.4.3.1 of TGD Part L: 2022.

Heating within the landlord spaces will be provided by electric radiators.

Ventilation

The ventilation for the apartments shall be provided with a dedicated Mechanical Ventilation with Heat Recovery (MVHR). The central extract shall operate on the principle of mechanical extract ventilation and be commissioned on handover to achieve the required flow rates in Part F of the building regulations.

MVHR will be commissioned with two dedicated extract flow rates for the unit, one for background ventilation and one for boost ventilation.

- The background ventilation rate will be maintained 24/7 in order to ventilate the unit and maintain the heat pump operation volume flow rate.
- The boost ventilation will be activated boost switch located in the
- Passive wall inlet vents are required in all habitual rooms to make-up the air extracted by the EAHP.

9. Proposed Electrical Services

Mains Distribution

A new ESB electrical supply will be brought to each apartment in accordance with ETCI and ESB standards. A centrally located meter enclosure shall be provided with direct access from the public road.

Low Energy Lighting

Low energy LED lighting shall be designed and specified in accordance the BER requirements in each unit and in the landlord areas in accordance with Part L, reduced electrical costs, and also a long life so that replacement and maintenance costs are minimised.

10. Renewable Energy Technologies

An important factor in NZEB compliance is renewable energy. TGD Part L: 2022 state:

"Providing that, the nearly zero or very low amount of energy required is covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby;"

Results in Section 11 demonstrate that all of the renewable requirement within the apartments can be provided by the air source heat pump.

All of the renewable requirement within the landlord spaces will be provided by a roof mounted PV array.

11. Energy Assessment Methodology

The apartment types listed in the results tables were chosen for the analysis in this report, as these are deemed to represent the worst case. It is predicted that achieving compliance for the selected apartments will result in all of the remaining apartments achieving compliance.

Building Type	Rating	EPC	CPC	RER	Compliant
Apartments	BER A2	< 0.3	< 0.35	✓	✓
Landlord / Common Areas	BER A3	< 1.0	< 1.15	✓	✓

Table 3: Target Building Energy Rating Results

DEAP Version 4.2.0 in conjunction with the DEAP 4.2.5 Manual was used for the domestic calculations.

As well as achieving the minimum targets regarding U-Values, Heating System efficiency and Renewable Energy Technologies etc. as set out in this document, the building must demonstrate (in DEAP – Dwelling Energy Assessment Procedure) that the building has a Carbon Performance Coefficient (CPC) of < 0.35, an Energy Performance Coefficient (EPC) of <0.30 and a Renewable Energy Ratio (RER) of 0.20.

The Dwelling Energy Assessment Procedure (DEAP) is the official Irish methodology for calculating the energy performance and associated carbon dioxide emissions for the provision of space heating, ventilation, water heating and lighting in dwellings. DEAP consists of a software tool and an associated guidance manual is a key component of the Irish Building Energy Rating (BER) scheme. DEAP is also the compliance tool specified in Part L of the Irish Building Regulations.

12. BER Assessment Inputs

Inputs		Value
Ventilation	Intermittent fans/passive vents	1
	Ventilation method	MHVR
	Specific fan power [W/(l/s)]	0.80
	Heat Exchanger Efficiency [%]	84
	Airtightness (Q50 as per EN13829)	3
Building Elements	External Wall U-Value (W/m²K)	0.18
	Door U-Value (W/m²K)	1.30
	Roof U-Value (W/m²K)	0.12
	Floor U-Value (W/m²K)	0.12
	Glazing U-Value (W/m²K)	1.30
	Glazing Solar Transmittance	0.55
	Glazing Frame Factor	0.70
	Thermal Bridging Factor	0.08
Water Heating	Distribution losses	Yes
	Storage losses	Yes
	Hot water storage volume (l)	180
	Temperature factor unadjusted	0.89
	Temperature factor multiplier	0.89
	Declared Loss Factor (kWh/day)	1.17
Lighting	% of low energy fixed lighting outlets	100
Internal Heat Capacity	Thermal mass category of dwelling	Medium
Distribution System Losses & Gains	Heating system control category	1
	Heating system responsiveness category	1
Pumps	Central heating pump qty.	1
	Pump electric consumption (kWh/yr)	52
	Heating system controlled by thermostat	Yes
Space Heating & Water Heating	Primary Space heating type	Air Source Heat Pump
	Efficiency of space heating system (%)	558
	Efficiency of water heating system (%)	220
	Efficiency adjustment factor	1
	Design Flow Temperature of Heat Pump [ºC]	50
	Daily Operation Hours [h]	24
Fuel Data	Main space & water heating system	Electricity
Renewable & Energy Saving Technologies	Renewable system	Heat Pump
	Renewables Primary Energy – Heat Pump	1681

Table 4 – DEAP Inputs

13. Results and Conclusion

The following results are achieved.

Dwelling Type	Energy Rating	Energy Value	CO2 Emissions	EPC	CPC	RER	Part L Complaint
Apt Type 1B - Ground Floor	A2	48.18	6.17	0.259	0.171	0.408	Yes
Apt Type 3B- Top Floor	A2	37.02	4.74	0.263	0.172	0.413	Yes

Table 5 – DEAP Results

As previously noted in this report, to demonstrate that an acceptable primary energy consumption rate has been achieved, the calculated EPC of a building should be no greater than the Maximum Permitted Energy Performance Coefficient (MPEPC). To demonstrate that an acceptable CO2 emission rate has been achieved, the calculated CPC should be no greater than the Maximum Permitted Carbon Performance Coefficient (MPCPC).

Results in Table 5 demonstrate compliance with the requirements stipulated within TGD Part L: 2022 when using parameters described within this report in regard to U-values, air tightness M&E services and renewable allowance. The dwellings also achieve an A2 energy rating.

Note that the results in this report are directly affected by the inputs and any deviation from these will output different results.

Appendix A – DEAP Part L Report

Part L Specification

BER IS NOT PUBLISHED

Property Details

Dwelling Type	Ground-floor apartment	**Type of BER rating**	New Dwelling - Provisional
Address line 1	Apt Type 02 1B GF	**Year of Construction**	2024
Address line 2	Glovers Court	**Date of Assessment**	01/05/2024
Address line 3		**Date of Plans**	
County	Dublin 2	**Planning Reference**	
Eircode		**Building Regulations**	2019 TGD L
BER Number		**MPRN No.**	0
Purpose of Rating	Social housing letting	**Is MPRN shared with another dwelling?**	No
Assessor Name	Revathi Muthu Sasthrigal	**Assessor Number**	107144
Comment		**BER number assigned to shared dwelling**	N/A

Dimension Details

	Area [m^2]	Height [m]	Volume [m^3]
Ground Floor	50.73	2.70	136.97
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	50.73		136.97

Living Area [m^2]	24.10	**Living area percentage [%]**	47.51
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?	Yes	**Number of sides sheltered**	2
Ventilation method	Exhaust Air Heat Pump	**Mechanical Ventilation Manufacturer**	N/A
Specific fan power [W/(L/s)]	0.260	**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		No	0.12	50.73

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		0.18	15.49

Building Elements - Door Details

Description	Number of Doors	U-Value [W/m^{2}K]	Area [m^2]
	1	1.3	2.410

Building Elements - Window Details

Glazing type	User defined u-value	U-Value [W/m^{2}K]	Area [m^2]
Double-glazed, air filled	Yes	1.300	7.620
Double-glazed, air filled	Yes	1.300	6.030

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	211.68	**Combi boiler present?**	No
Supplementary electric water heating	N/A	**Water Storage Volume [L]**	200
Hot water storage manufacturer and model name	TBC	**Declared loss factor [kWh/d]**	1.91
Temperature factor unadjusted	0.6	**Temperature Factor Multiplier**	0.9
Primary Circuit loss type	Boiler / heat pump with insulated primary pipework and with cylinder thermostat		
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	**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		

Heating System - Energy Requirements (Individual)

Main space heating system efficiency [%]	397	**Space heating efficiency adjustment factor**	1.0000	**Main space heating fuel**	Electricity
Main water heating system efficiency [%]	407.96	**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	N/A	**Electrical efficiency of CHP**	N/A	**Heat efficiency of CHP**	N/A
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**	**47.73**
CO_2 emissions [kg/m^2/yr]	6.11		
EPC	0.256	**EPC Pass/Fail**	**Pass**
CPC	0.170	**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**	1.30	Pass
Floors with underfloor heat	0.00	Pass			
Walls	0.18	Pass			
Percentage of opening areas [%]	31.66				
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	720.25	720.25	
+ Saved energy	CHP	0.00	0.00	
+ District heating	District Heating	0.00	0.00	
+ Delivered energy	Grid	0.00	2421.43	
+ Delivered energy	Thermal	0.00	0.00	
SUBTOTAL		720.25	3141.69	0.23 - Pass
Energy not used in Regulated Loads	PV/Wind/CHP	0.00	0.00	
TOTAL		720.25	3141.69	0.23

Energy Requirements: Individual Heating Systems

	Fuel Type	Electricity Fuel Factors Date	Primary energy conversion factor	CO_2 emission factor
Main space heating system	Electricity	Current	1.75	0.224
Secondary space heating system	None	Current	0.00	0.000
Main water heating system	Electricity	Current	1.75	0.224
Cooling System	None	Current	0.00	0.000
Pumps, fans	Electricity	Current	1.75	0.224
Energy for lighting	Electricity	Current	1.75	0.224

Part L Specification

BER IS NOT PUBLISHED

Property Details

Dwelling Type	Top-floor apartment	**Type of BER rating**	New Dwelling - Provisional
Address line 1	Apt Type 01 3B TF	**Year of Construction**	2024
Address line 2	Glovers Court	**Date of Assessment**	01/05/2024
Address line 3		**Date of Plans**	
County	Dublin 2	**Planning Reference**	
Eircode		**Building Regulations**	2019 TGD L
BER Number		**MPRN No.**	0
Purpose of Rating	Social housing letting	**Is MPRN shared with another dwelling?**	No
Assessor Name	Revathi Muthu Sasthrigal	**Assessor Number**	107144
Comment		**BER number assigned to shared dwelling**	N/A

Dimension Details

	Area [m^2]	Height [m]	Volume [m^3]
Ground Floor	104.74	2.70	282.80
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	104.74		282.80

Living Area [m^2]	34.52	**Living area percentage [%]**	32.96
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?	Yes	**Number of sides sheltered**	2
Ventilation method	Exhaust Air Heat Pump	**Mechanical Ventilation Manufacturer**	N/A
Specific fan power [W/(L/s)]	0.260	**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]
Non-Heat Loss Floor		N/A	0	104.74

Building Elements - Roof Details

Type	Description	U-Value [W/m^{2}K]	Area [m^2]
Pitched Roof - Insulated on Ceiling		0.12	104.74

Building Elements - Wall Details

Type	Description	U-Value [W/m^{2}K]	Area [m^2]
300mm Cavity		0.18	36.86

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	Yes	1.300	15.910
Double-glazed, air filled	Yes	1.300	12.440

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	399.11	**Combi boiler present?**	No
Supplementary electric water heating	N/A	**Water Storage Volume [L]**	200
Hot water storage manufacturer and model name	TBC	**Declared loss factor [kWh/d]**	1.91
Temperature factor unadjusted	0.6	**Temperature Factor Multiplier**	0.9
Primary Circuit loss type	Boiler / heat pump with insulated primary pipework and with cylinder thermostat		
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	**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		

Heating System - Energy Requirements (Individual)

Main space heating system efficiency [%]	373.61	**Space heating efficiency adjustment factor**	1.0000	**Main space heating fuel**	Electricity
Main water heating system efficiency [%]	407.96	**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	N/A	**Electrical efficiency of CHP**	N/A	**Heat efficiency of CHP**	N/A
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**	**34.47**
CO_2 emissions [kg/m^2/yr]	4.41		
EPC	0.245	**EPC Pass/Fail**	**Pass**
CPC	0.160	**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	0.12	Pass	**Roofs**	0.12	Pass
Pitched roof insulated on slope	0	Pass	**Walls**	0.18	Pass
Flat Roof	0	Pass	**Floors**	0	Pass
Floors with no underfloor heat	0.00	Pass	**External doors / windows / rooflights**	1.30	Pass
Floors with underfloor heat	0.00	Pass			
Walls	0.18	Pass			
Percentage of opening areas [%]	27.07				
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	1529.07	1529.07	
+ Saved energy	CHP	0.00	0.00	
+ District heating	District Heating	0.00	0.00	
+ Delivered energy	Grid	0.00	3610.50	
+ Delivered energy	Thermal	0.00	0.00	
SUBTOTAL		1529.07	5139.57	0.30 - Pass
Energy not used in Regulated Loads	PV/Wind/CHP	0.00	0.00	
TOTAL		1529.07	5139.57	0.30

Energy Requirements: Individual Heating Systems

	Fuel Type	Electricity Fuel Factors Date	Primary energy conversion factor	CO_2 emission factor
Main space heating system	Electricity	Current	1.75	0.224
Secondary space heating system	None	Current	0.00	0.000
Main water heating system	Electricity	Current	1.75	0.224
Cooling System	None	Current	0.00	0.000
Pumps, fans	Electricity	Current	1.75	0.224
Energy for lighting	Electricity	Current	1.75	0.224