FEBRUARY 12, 2019

PROPOSED CREAGH STRATEGIC HOUSING RESIDENTIAL DEVELOPMENT AT BALLOWEN/RAMSFORTPARK, GOREY, CO. WEXFORD FOR AMIL PROPERTIES LIMITED

RESIDENTIAL ENERGY STATEMENT

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1. Introduction

The purpose of this Energy Statement is to provide a report on the energy performance and sustainability of a proposed residential development at Ballyowen/Ramsfortpark, Gorey, Co. Wexford. It outlines how the construction and performance of the proposed development will meet or exceed legislative and planning requirements, with particular emphasis on meeting the upcoming Nearly Zero Energy Buildings standards. The report is intended as part of the Strategic Housing Development Application to An Bord Pleanála (Pre-Application Reference ABP-301472-1) for the above development.

1.1 Compliance Standards

The report will review the proposed development in terms of:

- The Building Regulations 1997-2017, specifically Part L (Conservation of Fuel and Energy – Dwelllings) in terms of Technical Guidance Document L;
- The upcoming 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.

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 Strategic Housing Development 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

1.2 Development Summary

The proposed residential development comprises:

5-bed houses	4 no.	100% detached
4-bed houses	77 no.	69% detached 31% semi-detached
3-bed houses	125 no.	74% primarily semi-detached 26% primarily terraced
3-bed houses	26 no.	100% primarily terraced
2- and 3-bedroom apartments	65 no.	In 2- and 3-unit blocks
Total Units	**297 no.**	

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 is DEAP, the national standard for 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:

Current Part L		**For NZEB**	
MPCPC	0.46	MPCPC	0.35
MPEPC	0.40	MPEPC	0.30

Due to the expected timeframe for the proposed construction, and in the interest of sustainability, this report will assess compliance with the anticipated NZEB requirements rather then the current standards for MPCPC and MPEPC.

2.1.2 Building Fabric

The current 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*

* Applies where the combined area equals 25% of the building floor area. Variations up and down are permissible under 1.3.2.4 and Table 2 of TGD L.

New maximum area-weighted elemental U-values anticipated in the upcoming Part L changes are:

Element	**U-value (W/m^2.K)**
Walls	0.18
Ground Floor	0.18
External doors, windows and roof windows	1.40

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

New limits for overheating via glazing are anticipated in the upcoming Part L, the details of which are to be ascertained. However, very large glazed areas are avoided 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 is a maximum air permeability of 7m^3/hr.m^2. The expected maximum in the upcoming changes for NZEB is 5m^3/hr.m^2.

In this report, the dwellings will be assessed in relation to a lower rate of 3m^3/hr.m^2, exceeding the NZEB requirement and being a realistic target.

2.1.4 Renewable Energy Contribution

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

- 10 kWh/m^2/annum contributing to energy use for domestic hot water heating, space heating or cooling; or
- 4 kWh/m^2/annum of electrical energy; or
- A combination of these which would have equivalent effect.

The level anticipated in the upcoming TGD L is:

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

Due to the expected timeframe for the proposed construction, and in the interest of sustainability, this report will assess compliance with the anticipated NZEB requirement of 20% in addition to compliance with the current standards.

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 with heat recovery, 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.

3.2.3 Air Permeability

An input of $5m^3/hr.m^2$ was used in anticipation of 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	0.12	(NZEB 0.18)
Roof (insulated on slope or ceiling)	0.12	(NZEB 0.16)
Walls	0.15	(NZEB 0.18)
External Doors	0.90	(NZEB 1.40)
External Windows	0.90	(NZEB 1.40)
Roof Windows	1.30	(NZEB 1.40)

These U-values are in anticipation of the upcoming Part L changes and NZEB.

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

An air-to-water heat pump system is proposed for each dwelling as the optimal balance of practicality, efficiency and contribution of renewable energy. Each heat pump system shall be listed on the HARP database or have IS EN14511-2, IS EN 255-2 or EN 15879 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.

Space heat distribution will be via low-temperature radiators generally, and the space and hot water system will have full time and temperature controls.

No secondary heating system, e.g. fireplace or stove, is proposed.

3.2.6 Low Energy Lighting

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

3.2.7 Thermal Mass

The construction – block/concrete with some timber or metal stud partitions – is expected to have a medium average 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.

3.3 Case Study Inputs and Outputs Summaries

3.3.1 Inputs Summary

Ventilation		Natural	
Air Permeability		$3m^3/hr.m^2$	
U-values	Ground Floor	0.12	150mm insulation at 0.022 W/mK
	Pitched Roof	0.12	400mm insulation at 0.044 W/mK
	Walls	0.15	110mm part-fill insulation at 0.020 W/mK
	Exposed Floor	0.17	400mm insulation at 0.044 W/mK + 25mm insulation at 0.022 W/mK
	External Doors	0.9	
	External Windows	0.9	
	Roof Windows	1.3	
Thermal Bridging Factor		0.08	
Space and Water Heating		Air-to-water heat pump with low-temperature radiators	
		No secondary heating	
Lighting		100% low-energy	

3.3.2 Outputs Summary

3.3.2.1 Example 1

Apartment	Energy Rating	CPC	EPC	Renewables %
Unit No. 1 – Block 9	A3 51.46 kWh/m2/yr	0.281	0.296	26%

- 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

3.3.2.2 Example 2

House	Energy Rating	CPC	EPC	Renewables %
No. 14 Type D Semi-detached	A2 44.38 kWh/m2/yr	0.282	0.295	40%

- 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

3.3.2.3 Example 3

House	Energy Rating	CPC	EPC	Renewables %
No. 133 Type J Detached	A2 41.25 kWh/m2/yr	0.280	0.295	25%

- 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

3.3.2.4 Example 4

House	Energy Rating	CPC	EPC	Renewables %
No. 168 Type H End of Terrace	A2 49.62 kWh/m2/yr	0.280	0.293	22%

- 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 dwellings will comply with the existing requirements of Part L and the envisaged changes to Part L including 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

5.1 Example 1

Property Details			
Dwelling Type	Ground-floor apartment	**Type Of BER Rating**	New Dwelling - Provisional
Address line 1	Apt. Block 9 Unit 1 Ground Floor	**Year of Construction**	2018
Address line 2	Ballowen/Ramsfortpark	**Date of Assessment**	02/10/2018
Address line 3	Gorey	**Date of Plans**	02/10/2018
County	Co. Wexford	**Planning Reference**	
Post Code		**Building Regulations**	2011 TGD L
Has a rating been previously submitted?	No	**Is MPRN shared with another dwelling?**	No
BER Number		**MPRN No.**	
Purpose of rating	Sale		
Comment	Air-to-water heat pump with low-temp radiators throughout. Natural ventilation. Closable wall vents generally plus mechanical extract to wet rooms and kitchen. No secondary heating system. Window U-value 0.9. Assumptions: Details to comply with Part L 2011 ACDs. Air permeability set at 3m3/h.m2.		
Client Name	AMIL Properties	**Client Phone**	
Address line 1		**Client Email**	
Address line 2		**Assessor Name**	Strutec
Address line 3		**Assessor Reg No.**	
County		**Developer Name**	
Post Code		**Development Name**	

DIMENSION DETAILS

	Area [m²]	Height [m]	Volume [m³]
Ground Floor	101.90	2.70	275.13
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	101.90		275.13
Living Area [m²]	40.71	**Living area percentage [%]**	39.95
No of Storeys	1		

VENTILATION DETAILS

	Number		
Chimneys	0	**Has a permeability test been carried out?**	Yes
Open Flues	0	**Result of air permeability test in ac/h**	0.150
Fans & Vents	2	**Is there a suspended wooden ground floor?**	
Number of flueless combustion room heaters	0	**Percentage windows/doors draughtstripped [%]**	
Is there a draught lobby on main entrance?	No	**Number of sides sheltered**	2

Ventilation method	Natural ventilation
Specific fan power [W/(L/s)]	Not Applicable
Heat exchanger efficiency [%]	Not Applicable
Mechanical Ventilation Manufacturer	Not Applicable
Mechanical Ventilation Model Name	Not Applicable

How many wetrooms (incl. kitchen)? Is the vent. ducting flexible/rigid/both?	

BUILDING ELEMENTS - Floor Details

Type	Description	U-Value [W/m²K]	Area [m²]	Underfloor heating
Ground Floor - Solid	150mm insulation @ 0.022	0.120	101.900	No

BUILDING ELEMENTS - Roof Details

BUILDING ELEMENTS - Wall Details

Type	Description	U-Value [W/m²K]	Area [m²]
Other	Cavity 100/150/100 w/110mm Xtrowall+ part-fill @ 0.020	0.150	119.960

BUILDING ELEMENTS - Door Details

Description	Number of Doors	U-Value [W/m²K]	Area [m²]
Front	1	0.900	1.870

BUILDING ELEMENTS - Window Details

Glazing type	User defined u-value	U-Value [W/m²K]	Area [m²]
Triple-glazed, argon filled (low-E, en = 0.05, soft coat)	Yes	0.900	3.400
Triple-glazed, argon filled (low-E, en = 0.05, soft coat)	Yes	0.900	1.700
Triple-glazed, argon filled (low-E, en = 0.05, soft coat)	Yes	0.900	12.700
Triple-glazed, argon filled (low-E, en = 0.05, soft coat)	Yes	0.900	0.980
Triple-glazed, argon filled (low-E, en = 0.05, soft coat)	Yes	0.900	2.900

OTHER DETAILS

Thermal bridging factor [W/m²k]	0.0800	**Thermal mass category of dwelling**	Medium
Low Energy Lighting [%]			100

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, η_0	n/a	**Collector heat loss coefficient, a1 [W/m²K]**	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		

HEATING SYSTEM - Hot Water System

Distribution Losses	Yes	**Combi boiler present?**	No
Supplementary electric water heating	No	**Water Storage Volume [L]**	200
Hot water storage manufacturer and model name	TBC	**Declared loss factor [kWh/d]**	2.000
Temperature factor unadjusted **(table 2 in DEAP)**	0.89	**Temperature factor multiplier** **(table 2 in DEAP)**	0.81
Primary Circuit loss type	Boiler and thermal store within a single casing (cylinder thermostat present)		
Is hot water storage indoors or in group heating system	Yes		

HEATING SYSTEM – Dist. system losses and gains (Table 4 in DEAP)

Temperature adjustment [ºC]	0.000	**Control Category**	3	**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 [%]	400.00	**Space heating efficiency adjustment factor**	1.0000	**Main space heating fuel**	Electricity
Main water heating system efficiency [%]	250.00	**Water heating efficiency adjustment factor**	1.0000	**Main water heating fuel**	Electricity
Secondary heating system efficiency [%]	0.00	**Fraction of heating from secondary heating system**	0.00	**Secondary space heating system fuel**	None
Fraction of main space and water heat from CHP	0.00	**Electrical efficiency of CHP**	0.00	**Heat efficiency of CHP**	0.00
CHP Fuel type	None				

SUMMARY FOR PART L CONFORMANCE (Applies to TGD L 2008/2011 for new dwellings only)

BER Number		**Building Regulations**	2011 TGD L
BER Result	A3	**Energy Value kWh/m²/yr**	51.46
CO2 emissions [kg/m²/yr]	10.12	**Total compliance with Part L in DEAP?**	Pass
EPC	0.296	**EPC Pass/Fail**	Pass
CPC	0.281	**CPC Pass/Fail**	Pass

PART L CONFORMANCE - Fabric

Conformity with Maximum avg U-value requirements	**U-value[W/m²K]**	**Pass / Fail**	**Conformity with Maximum U-value requirements**	**U-Value [W/m²K]**	**Pass / Fail**
Pitched roof insulated on ceiling	0.00	Pass	**Roofs**	0.00	Pass

Pitched roof insulated on slope	0.00	Pass	**Walls**	0.15	Pass
Flat Roof	0.00	Pass	**Floors**	0.12	Pass
Floors with no underfloor heat	0.12	Pass	**External doors / windows / rooflights**	0.90	Pass
Floors with underfloor heat	0.00	Pass			
Walls	0.15	Pass			
Percentage of opening areas [%]	23.1	Pass			
Average U value of openings	0.90				
Permeability test carried out and meets guidelines in TGD L					

PART L CONFORMANCE – Renewables (individual heating system)

Type of renewable	Total contribution [kWh/y]	Part L renewable contribution [kWh/m²/y]
Solar water heating system	**0.00**	**0.00**
Heat pump as main space heating system	**1205.20**	**11.83**
Heat pump as secondary space heating system	**0.00**	**0.00**
Heat pump as main water heating system	**0.00**	**0.00**
Wood/Biomass heater as main space heating system	**0.00**	**0.00**
Wood/Biomass heater as secondary heating system	**0.00**	**0.00**
Wood/Biomass heater as main water heating system	**0.00**	**0.00**
Contribution from CHP	**0.00**	**0.00**
Heat pump renewable contribution	**150.00**	**1.47**
	0.00	**0.00**
	0.00	**0.00**

Total thermal	**1355.20**	**13.30**
Total electrical	**0.00**	**0.00**
Total thermal equivalent	**1355.20**	**13.30**
Does total thermal equivalent meet part L requirement?	**Pass**	

5.1 Example 2

Property Details			
Dwelling Type	Semi-detached house	**Type Of BER Rating**	New Dwelling - Provisional
Address line 1	House No. 14 Type D Semi-D	**Year of Construction**	2018
Address line 2	Ballowen/Ramsfortpark	**Date of Assessment**	02/10/2018
Address line 3	Gorey	**Date of Plans**	02/10/2018
County	Co. Wexford	**Planning Reference**	
Post Code		**Building Regulations**	2011 TGD L
Has a rating been previously submitted?	No	**Is MPRN shared with another dwelling?**	No
BER Number		**MPRN No.**	
Purpose of rating	Sale		
Comment	Air-to-water heat pump with low-temp radiators throughout. Natural ventilation. Closable wall vents generally plus mechanical extract to wet rooms and kitchen. No secondary heating system. Window U-value 0.9. 2 no. PV Panels @ 0.25 kWp Gross. Assumptions: Details to comply with Part L 2011 ACDs. Air permeability set at 3m3/h.m2.		
Client Name	AMIL Properties	**Client Phone**	
Address line 1		**Client Email**	
Address line 2		**Assessor Name**	Strutec

Address line 3		**Assessor Reg No.**	
County		**Developer Name**	
Post Code		**Development Name**	

DIMENSION DETAILS

	Area [m²]	Height [m]	Volume [m³]
Ground Floor	56.40	2.68	151.15
First Floor	56.40	2.80	157.92
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	112.80		309.07
Living Area [m²]	16.47	**Living area percentage [%]**	14.60
No of Storeys	2		

VENTILATION DETAILS

	Number		
Chimneys	0	**Has a permeability test been carried out?**	Yes
Open Flues	0	**Result of air permeability test in ac/h**	0.150
Fans & Vents	5	**Is there a suspended wooden ground floor?**	
Number of flueless combustion room heaters	0	**Percentage windows/doors draughtstripped [%]**	
Is there a draught lobby on main entrance?	Yes	**Number of sides sheltered**	2

Ventilation method	Natural ventilation
Specific fan power [W/(L/s)]	Not Applicable
Heat exchanger efficiency [%]	Not Applicable

Mechanical Ventilation Manufacturer	Not Applicable
Mechanical Ventilation Model Name	Not Applicable
How many wetrooms (incl. kitchen)? Is the vent. ducting flexible/rigid/both?	

BUILDING ELEMENTS - Floor Details

Type	Description	U-Value [W/m²K]	Area [m²]	Underfloor heating
Ground Floor - Solid	150mm insulation @ 0.022	0.120	56.400	No

BUILDING ELEMENTS - Roof Details

Type	Description	U-Value [W/m²K]	Area [m²]
Pitched Roof – Insulated on Ceiling	400mm fibre @ 0.044 between+over joists (100+300mm) @ 400c/c	0.120	55.760

BUILDING ELEMENTS - Wall Details

Type	Description	U-Value [W/m²K]	Area [m²]
Other	Cavity 100/150/100 w/110mm Xtrowall+ part-fill @ 0.020	0.150	101.550

BUILDING ELEMENTS - Door Details

Description	Number of Doors	U-Value [W/m²K]	Area [m²]
Front	1	0.900	3.150

BUILDING ELEMENTS - Window Details

Glazing type	User defined u-value	U-Value [W/m²K]	Area [m²]
Triple-glazed, argon filled (low-E, en = 0.05, soft coat)	Yes	0.900	5.940
Triple-glazed, argon filled (low-E, en = 0.05, soft coat)	Yes	0.900	4.460
Triple-glazed, argon filled (low-E, en = 0.05, soft coat)	Yes	0.900	3.780
Triple-glazed, argon filled (low-E, en = 0.05, soft coat)	Yes	0.900	0.950
Triple-glazed, argon filled (low-E, en = 0.05, soft coat)	Yes	0.900	2.000

Triple-glazed, argon filled (low-E, en = 0.05, soft coat)	Yes	1.300	0.640

OTHER DETAILS

Thermal bridging factor [W/m²k]	0.0800	**Thermal mass category of dwelling**	Medium
Low Energy Lighting [%]			100

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, η_0	n/a	**Collector heat loss coefficient, a1 [W/m²K]**	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		

HEATING SYSTEM - Hot Water System

Distribution Losses	Yes	**Combi boiler present?**	No
Supplementary electric water heating	No	**Water Storage Volume [L]**	200
Hot water storage manufacturer and model name	TBC	**Declared loss factor [kWh/d]**	2.000
Temperature factor unadjusted **(table 2 in DEAP)**	0.89	**Temperature factor multiplier** **(table 2 in DEAP)**	0.81
Primary Circuit loss type	Boiler and thermal store within a single casing (cylinder thermostat present)		
Is hot water storage indoors or in group heating system	Yes		

HEATING SYSTEM – Dist. system losses and gains (Table 4 in DEAP)

Temperature adjustment [°C]	0.000	**Control Category**	3	**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 [%]	375.00	**Space heating efficiency adjustment factor**	1.0000	**Main space heating fuel**	Electricity
Main water heating system efficiency [%]	200.00	**Water heating efficiency adjustment factor**	1.0000	**Main water heating fuel**	Electricity
Secondary heating system efficiency [%]	0.00	**Fraction of heating from secondary heating system**	0.00	**Secondary space heating system fuel**	None
Fraction of main space and water heat from CHP	0.00	**Electrical efficiency of CHP**	0.00	**Heat efficiency of CHP**	0.00
CHP Fuel type	None				

SUMMARY FOR PART L CONFORMANCE (Applies to TGD L 2008/2011 for new dwellings only)

BER Number		**Building Regulations**	2011 TGD L
BER Result	A2	**Energy Value kWh/m²/yr**	44.38
CO2 emissions [kg/m²/yr]	8.73	**Total compliance with Part L in DEAP?**	Pass

EPC	0.295	**EPC Pass/Fail**	Pass
CPC	0.282	**CPC Pass/Fail**	Pass

PART L CONFORMANCE - Fabric

Conformity with Maximum avg U-value requirements	**U-value[W/m²K]**	**Pass / Fail**	**Conformity with Maximum U-value requirements**	**U-Value [W/m²K]**	**Pass / Fail**
Pitched roof insulated on ceiling	0.12	Pass	**Roofs**	0.12	Pass
Pitched roof insulated on slope	0.00	Pass	**Walls**	0.15	Pass
Flat Roof	0.00	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	0.15	Pass			
Percentage of opening areas [%]	18.5	Pass			
Average U value of openings	0.92				
Permeability test carried out and meets guidelines in TGD L					

PART L CONFORMANCE – Renewables (individual heating system)

Type of renewable	**Total contribution [kWh/y]**	**Part L renewable contribution [kWh/m²/y]**
Solar water heating system	**0.00**	**0.00**
Heat pump as main space heating system	**861.28**	**7.64**
Heat pump as secondary space heating system	**0.00**	**0.00**
Heat pump as main water heating system	**0.00**	**0.00**
Wood/Biomass heater as main space heating system	**0.00**	**0.00**

Wood/Biomass heater as secondary heating system	**0.00**	**0.00**
Wood/Biomass heater as main water heating system	**0.00**	**0.00**
Contribution from CHP	**0.00**	**0.00**
Heat pump renewable contribution	**100.00**	**0.89**
PV Panels @ 0.25 kWp Gross	**408.40**	**3.62**
	0.00	**0.00**
Total thermal	**961.28**	**8.52**
Total electrical	**408.40**	**3.62**
Total thermal equivalent	**1982.28**	**17.57**
Does total thermal equivalent meet part L requirement?	**Pass**	

5.1 Example 3

Property Details			
Dwelling Type	Detached house	**Type Of BER Rating**	New Dwelling - Provisional
Address line 1	House 133 Type J Detached	**Year of Construction**	2018
Address line 2	Ballowen/Ramsfortpark	**Date of Assessment**	02/10/2018
Address line 3	Gorey	**Date of Plans**	02/10/2018
County	Co. Wexford	**Planning Reference**	
Post Code		**Building Regulations**	2011 TGD L
Has a rating been previously submitted?	No	**Is MPRN shared with another dwelling?**	No
BER Number		**MPRN No.**	
Purpose of rating	Sale		
Comment	Air-to-water heat pump with low-temp radiators throughout. Natural ventilation. Closable wall vents generally plus mechanical extract to wet rooms and kitchen. No secondary heating system. Window U-value 0.9.		

	Assumptions: Details to comply with Part L 2011 ACDs. Air permeability set at 3m3/h.m2.		
Client Name	AMIL Properties	**Client Phone**	
Address line 1		**Client Email**	
Address line 2		**Assessor Name**	Strutec
Address line 3		**Assessor Reg No.**	
County		**Developer Name**	
Post Code		**Development Name**	

DIMENSION DETAILS

	Area [m²]	**Height [m]**	**Volume [m³]**
Ground Floor	72.40	2.68	194.03
First Floor	74.70	2.70	201.69
Second Floor	34.70	2.30	79.81
Third and other floors	0.00	0.00	0.00
Room in roof	0.00	0.00	0.00
Total Floor Area	181.80		475.53
Living Area [m²]	16.05	**Living area percentage [%]**	8.83
No of Storeys	3		

VENTILATION DETAILS

	Number		
Chimneys	0	**Has a permeability test been carried out?**	Yes
Open Flues	0	**Result of air permeability test in ac/h**	0.150
Fans & Vents	6	**Is there a suspended wooden ground floor?**	

Number of flueless combustion room heaters	0	**Percentage windows/doors draughtstripped [%]**	
Is there a draught lobby on main entrance?	No	**Number of sides sheltered**	2

Ventilation method	Natural ventilation
Specific fan power [W/(L/s)]	Not Applicable
Heat exchanger efficiency [%]	Not Applicable
Mechanical Ventilation Manufacturer	Not Applicable
Mechanical Ventilation Model Name	Not Applicable
How many wetrooms (incl. kitchen)? Is the vent. ducting flexible/rigid/both?	

BUILDING ELEMENTS - Floor Details

Type	Description	U-Value [W/m²K]	Area [m²]	Underfloor heating
Ground Floor - Solid	150mm insulation @ 0.022	0.120	72.400	No
Exposed / Semi Exposed	200mm quilt @ 0.044 betw joists + 25 @ 0.022 below	0.170	2.300	No

BUILDING ELEMENTS - Roof Details

Type	Description	U-Value [W/m²K]	Area [m²]
Pitched Roof – Insulated on Ceiling	400mm fibre @ 0.044 between+over joists (100+300mm) @ 400c/c	0.120	61.110
Pitched Roof – Insulated on Rafter	100mm @ 0.022 betw rafters + 60mm @ 0.022 below	0.160	15.140

BUILDING ELEMENTS - Wall Details

Type	Description	U-Value [W/m²K]	Area [m²]
Other	Cavity 100/150/100 w/110mm Xtrowall+ part-fill @ 0.020	0.150	158.150
Other	Semi-exposed to attic: 100mm @ 0.022 betw studs + 50mm @ 0.022 inside	0.160	37.300

BUILDING ELEMENTS - Door Details

Description	Number of Doors	U-Value [W/m²K]	Area [m²]
Front	1	0.900	3.990

BUILDING ELEMENTS - Window Details

Glazing type	User defined u-value	U-Value [W/m²K]	Area [m²]
Triple-glazed, argon filled (low-E, en = 0.05, soft coat)	Yes	0.900	8.560
Triple-glazed, argon filled (low-E, en = 0.05, soft coat)	Yes	0.900	7.020
Triple-glazed, argon filled (low-E, en = 0.05, soft coat)	Yes	0.900	2.000
Triple-glazed, argon filled (low-E, en = 0.05, soft coat)	Yes	0.900	3.600
Triple-glazed, argon filled (low-E, en = 0.05, soft coat)	Yes	0.900	10.500
Triple-glazed, argon filled (low-E, en = 0.05, soft coat)	Yes	0.900	7.550
Double-glazed, argon filled (low-E, en = 0.05, soft coat)	Yes	1.300	0.640

OTHER DETAILS

Thermal bridging factor [W/m²k]	0.0800	**Thermal mass category of dwelling**	Medium-low
Low Energy Lighting [%]			100

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, η_0	n/a	**Collector heat loss coefficient, a1 [W/m²K]**	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		

HEATING SYSTEM - Hot Water System

Distribution Losses	Yes	**Combi boiler present?**	No
Supplementary electric water heating	No	**Water Storage Volume [L]**	260
Hot water storage manufacturer and model name	TBC	**Declared loss factor [kWh/d]**	1.800
Temperature factor unadjusted **(table 2 in DEAP)**	0.89	**Temperature factor multiplier** **(table 2 in DEAP)**	0.81
Primary Circuit loss type	Boiler and thermal store within a single casing (cylinder thermostat present)		
Is hot water storage indoors or in group heating system	Yes		

HEATING SYSTEM – Dist. system losses and gains (Table 4 in DEAP)

Temperature adjustment [ºC]	0.000	**Control Category**	3	**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 [%]	400.00	**Space heating efficiency adjustment factor**	1.0000	**Main space heating fuel**	Electricity
Main water heating system efficiency [%]	250.00	**Water heating efficiency adjustment factor**	1.0000	**Main water heating fuel**	Electricity

Secondary heating system efficiency [%]	0.00	**Fraction of heating from secondary heating system**	0.00	**Secondary space heating system fuel**	None
Fraction of main space and water heat from CHP	0.00	**Electrical efficiency of CHP**	0.00	**Heat efficiency of CHP**	0.00
CHP Fuel type	None				

SUMMARY FOR PART L CONFORMANCE (Applies to TGD L 2008/2011 for new dwellings only)

BER Number		**Building Regulations**	2011 TGD L
BER Result	A2	**Energy Value kWh/m²/yr**	41.25
CO2 emissions [kg/m²/yr]	8.11	**Total compliance with Part L in DEAP?**	Pass
EPC	0.295	**EPC Pass/Fail**	Pass
CPC	0.280	**CPC Pass/Fail**	Pass

PART L CONFORMANCE - Fabric

Conformity with Maximum avg U-value requirements	**U-value[W/m²K]**	**Pass / Fail**	**Conformity with Maximum U-value requirements**	**U-Value [W/m²K]**	**Pass / Fail**
Pitched roof insulated on ceiling	0.12	Pass	**Roofs**	0.16	Pass
Pitched roof insulated on slope	0.16	Pass	**Walls**	0.16	Pass
Flat Roof	0.00	Pass	**Floors**	0.17	Pass
Floors with no underfloor heat	0.12	Pass	**External doors / windows / rooflights**	1.30	Pass
Floors with underfloor heat	0.00	Pass			
Walls	0.15	Pass			

Percentage of opening areas [%]	24.1	Pass
Average U value of openings	0.91	
Permeability test carried out and meets guidelines in TGD L		

PART L CONFORMANCE – Renewables (individual heating system)

Type of renewable	Total contribution [kWh/y]	Part L renewable contribution [kWh/m²/y]
Solar water heating system	**0.00**	**0.00**
Heat pump as main space heating system	**1735.58**	**9.55**
Heat pump as secondary space heating system	**0.00**	**0.00**
Heat pump as main water heating system	**0.00**	**0.00**
Wood/Biomass heater as main space heating system	**0.00**	**0.00**
Wood/Biomass heater as secondary heating system	**0.00**	**0.00**
Wood/Biomass heater as main water heating system	**0.00**	**0.00**
Contribution from CHP	**0.00**	**0.00**
Heat pump renewable contribution	**150.00**	**0.83**
	0.00	**0.00**
	0.00	**0.00**
Total thermal	**1885.58**	**10.37**
Total electrical	**0.00**	**0.00**
Total thermal equivalent	**1885.58**	**10.37**
Does total thermal equivalent meet part L requirement?	**Pass**	

5.1 Example 4

Property Details			
Dwelling Type	End of terrace house	**Type Of BER Rating**	New Dwelling - Provisional
Address line 1	House 168 Type H End of Terrace	**Year of Construction**	2018
Address line 2	Ballowen/Ramsfortpark	**Date of Assessment**	02/10/2018
Address line 3	Gorey	**Date of Plans**	02/10/2018
County	Co. Wexford	**Planning Reference**	
Post Code		**Building Regulations**	2011 TGD L
Has a rating been previously submitted?	No	**Is MPRN shared with another dwelling?**	No
BER Number		**MPRN No.**	
Purpose of rating	Sale		
Comment	Air-to-water heat pump with low-temp radiators throughout. Natural ventilation. Closable wall vents generally plus mechanical extract to wet rooms and kitchen. No secondary heating system. Window U-value 0.9. Assumptions: Details to comply with Part L 2011 ACDs. Air permeability set at 3m3/h.m2.		
Client Name	AMIL Properties	**Client Phone**	
Address line 1		**Client Email**	
Address line 2		**Assessor Name**	Strutec
Address line 3		**Assessor Reg No.**	
County		**Developer Name**	
Post Code		**Development Name**	
DIMENSION DETAILS			
	Area [m²]	**Height [m]**	**Volume [m³]**

Ground Floor	42.30	2.68	113.36
First Floor	42.30	2.80	118.44
Second Floor	0.00	0.00	0.00
Third and other floors	0.00	0.00	0.00
Room in roof			0.00
Total Floor Area	84.60		231.80
Living Area [m²]	32.97	**Living area percentage [%]**	38.97
No of Storeys	2		

VENTILATION DETAILS

	Number		
Chimneys	0	**Has a permeability test been carried out?**	Yes
Open Flues	0	**Result of air permeability test in ac/h**	0.150
Fans & Vents	3	**Is there a suspended wooden ground floor?**	
Number of flueless combustion room heaters	0	**Percentage windows/doors draughtstripped [%]**	
Is there a draught lobby on main entrance?	No	**Number of sides sheltered**	2

Ventilation method	Natural ventilation
Specific fan power [W/(L/s)]	Not Applicable
Heat exchanger efficiency [%]	Not Applicable
Mechanical Ventilation Manufacturer	Not Applicable
Mechanical Ventilation Model Name	Not Applicable
How many wetrooms (incl. kitchen)? Is the vent. ducting flexible/rigid/both?	

BUILDING ELEMENTS - Floor Details

Type	Description	U-Value [W/m²K]	Area [m²]	Underfloor heating

Ground Floor - Solid	150mm insulation @ 0.022	0.120	42.300	No

BUILDING ELEMENTS - Roof Details

Type	Description	U-Value [W/m²K]	Area [m²]
Pitched Roof – Insulated on Ceiling	400mm fibre @ 0.044 between+over joists (100+300mm) @ 400c/c	0.120	41.660

BUILDING ELEMENTS - Wall Details

Type	Description	U-Value [W/m²K]	Area [m²]
Other	Cavity 100/150/100 w/110mm Xtrowall+ part-fill @ 0.020	0.150	80.610

BUILDING ELEMENTS - Door Details

Description	Number of Doors	U-Value [W/m²K]	Area [m²]
Front	1	0.900	2.940

BUILDING ELEMENTS - Window Details

Glazing type	User defined u-value	U-Value [W/m²K]	Area [m²]
Triple-glazed, argon filled (low-E, en = 0.05, soft coat)	Yes	0.900	7.380
Triple-glazed, argon filled (low-E, en = 0.05, soft coat)	Yes	0.900	3.690
Triple-glazed, argon filled (low-E, en = 0.05, soft coat)	Yes	0.900	3.780
Triple-glazed, argon filled (low-E, en = 0.05, soft coat)	Yes	0.900	5.900
Double-glazed, argon filled (low-E, en = 0.05, soft coat)	Yes	1.300	0.640

OTHER DETAILS

Thermal bridging factor [W/m²k]	0.0800	**Thermal mass category of dwelling**	Medium
Low Energy Lighting [%]			100

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, η_0	n/a	**Collector heat loss coefficient, a1 [W/m²K]**	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		

HEATING SYSTEM - Hot Water System

Distribution Losses	Yes	**Combi boiler present?**	No
Supplementary electric water heating	No	**Water Storage Volume [L]**	200
Hot water storage manufacturer and model name	TBC	**Declared loss factor [kWh/d]**	1.800
Temperature factor unadjusted **(table 2 in DEAP)**	0.89	**Temperature factor multiplier** **(table 2 in DEAP)**	0.81
Primary Circuit loss type	Boiler and thermal store within a single casing (cylinder thermostat present)		
Is hot water storage indoors or in group heating system	Yes		

HEATING SYSTEM – Dist. system losses and gains (Table 4 in DEAP)

Temperature adjustment [ºC]	0.000	**Control Category**	3	**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 [%]	400.00	**Space heating efficiency adjustment factor**	1.0000	**Main space heating fuel**	Electricity
Main water heating system efficiency [%]	250.00	**Water heating efficiency adjustment factor**	1.0000	**Main water heating fuel**	Electricity
Secondary heating system efficiency [%]	0.00	**Fraction of heating from secondary heating system**	0.00	**Secondary space heating system fuel**	None
Fraction of main space and water heat from CHP	0.00	**Electrical efficiency of CHP**	0.00	**Heat efficiency of CHP**	0.00
CHP Fuel type	None				

SUMMARY FOR PART L CONFORMANCE (Applies to TGD L 2008/2011 for new dwellings only)

BER Number		**Building Regulations**	2011 TGD L
BER Result	A2	**Energy Value kWh/m²/yr**	49.62
CO2 emissions [kg/m²/yr]	9.76	**Total compliance with Part L in DEAP?**	Pass
EPC	0.293	**EPC Pass/Fail**	Pass
CPC	0.280	**CPC Pass/Fail**	Pass

PART L CONFORMANCE - Fabric

Conformity with Maximum avg U-value requirements	**U-value[W/m²K]**	**Pass / Fail**	**Conformity with Maximum U-value requirements**	**U-Value [W/m²K]**	**Pass / Fail**
Pitched roof insulated on ceiling	0.12	Pass	**Roofs**	0.12	Pass

Pitched roof insulated on slope	0.00	Pass	**Walls**	0.15	Pass
Flat Roof	0.00	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	0.15	Pass			
Percentage of opening areas [%]	28.8	Pass			
Average U value of openings	0.92				
Permeability test carried out and meets guidelines in TGD L					

PART L CONFORMANCE – Renewables (individual heating system)

Type of renewable	Total contribution [kWh/y]	Part L renewable contribution [kWh/m²/y]
Solar water heating system	**0.00**	**0.00**
Heat pump as main space heating system	**781.47**	**9.24**
Heat pump as secondary space heating system	**0.00**	**0.00**
Heat pump as main water heating system	**0.00**	**0.00**
Wood/Biomass heater as main space heating system	**0.00**	**0.00**
Wood/Biomass heater as secondary heating system	**0.00**	**0.00**
Wood/Biomass heater as main water heating system	**0.00**	**0.00**
Contribution from CHP	**0.00**	**0.00**
Heat pump renewable contribution	**150.00**	**1.77**
	0.00	**0.00**
	0.00	**0.00**

Total thermal	**931.47**	**11.01**
Total electrical	**0.00**	**0.00**
Total thermal equivalent	**931.47**	**11.01**
Does total thermal equivalent meet part L requirement?	**Pass**	