03-DEC-2025

Author	Barry O'Neill
Project Nr.	25_0925
Purpose	Planning
Version	F03

BBSC
Building Services
Consulting Engineers
80 Willow Park Avenue,
Dublin D11AE48
086 386 7097
Db1@bbsc.ie

ENERGY AND CLIMATE ACTION STATEMENT ENCOMPASING TBG PART F, PART L

611 UNIT DEVELOPMENT AT BOHERBOY CO. DUBLIN

On Behalf of **KELLAND HOMES LTD.**

Revision	Date of Issue	Reason For Issue	By	Chk'd
F03	**03-Dec-2025**	PLANNING	BON	BON

Boherboy LRD:

Kelland Homes Ltd. and Evara Developments Ltd. wish to apply for permission for a Large-scale Residential Development (LRD) on a site located at Boherboy, Saggart, County Dublin. To the immediate north of the site is the Carrigmore residential estate, to the west are agricultural lands and a single dwelling, to the east is the Corbally residential estate and Carrigmore Park, while to the south is the Boherboy Road.

The proposed development consists of 611 no. dwellings, comprised of 306 no. 2, 3, 4 & 4-5 bed, 2 & 3 storey, detached, semi-detached & terraced houses, 133 no. 1, 2 & 3 bed duplex units in 12 no. 2-3 storey blocks, and 172 no. 1, 2 & 3 bed apartments in 5 no. buildings ranging in height from 4-5 & 5 storeys. The proposed development also includes a 2-storey crèche (c.630m²).

Access to the development will by via one no. new vehicular access point from the Boherboy Road, along with new vehicular connections to adjoining developments at Corbally Heath to the east and Carrigmore Green to the north. Ten no. houses in the south-east part of the site will be accessed from Corbally Glade to the east. The proposed development includes for pedestrian and cyclist connections throughout the proposed development and accesses into adjoining lands at Carrigmore Park, Corbally Heath and Corbally Glade to the east and Carrigmore Green to the north.

Private amenity space for the residential units is provided in the form of rear gardens for houses and ground floor terraces / upper floor balconies for apartments and duplex units. The proposed development provides for a total of c. 2.3Ha of public open space, and c. 4,750sq.m of communal open space associated with proposed development.

The proposed development provides for (i) all associated site development works above and below ground, including surface water attenuation & an underground foul sewerage pumping station at the northern end of the site, (ii) public open spaces (c. 2.3Ha), (iii) communal open spaces (c. 4,750sq.m), (iv) hard & soft landscaping and boundary treatments, (v) surface car parking, (vi) bicycle parking, (vii) bin & bicycle storage, (viii) diversion of all existing overhead ESB lines underground, (ix) public lighting, and (x), plant / PV panels (M&E), utility services & 8 no. ESB sub-stations, all on an overall application site area of c.18.7Hha. In accordance with the South Dublin County Development Plan (2022-2028), an area of c.1.03Ha within the site is reserved as a future school site.

EXECUTIVE SUMMARY

Kelland Homes Ltd. appointed BBSC, September 2025, to study the impact on energy to the development as set out under SI 600/2001.

This report sets out the engineering pathways to demonstrate the engineering solutions employed in the by the development to achieve a A2 BER level using DEAP tools in accordance with Part F, Part L, Domestic of the Technical Guidance Document.

Domestic Element of Development		
BER:	A2 NZEB OR BETTER	
Heat Pumps:	To provide both Domestic Hot Water and Space Heating Hot Water via Radiators to each dwelling. • Maisonettes and Apartments, Waste Air Heat Pumps or Air to Water heat pumps • Houses shall employ outdoor condensers running to internal heat exchangers and vessels	
Part F Ventilation :	• Maisonettes, Apartments Waste Air Heat Pumps pulling air via fans, ducts and grilles from wet areas to heat pump and recovery energy from same, air enters via engineered wall vents to suit space requirements • Houses, whole house demand control extract ventilation, using central fan and engineered wall vents to suit space requirements • All fans to be A rated	
Pumps:	All space and water pumps to be A rated with low energy consumption	
Lighting:	All LED	
Public Street Lighting:	All LED	
Electrical Energy Generation:	Solar Photovoltaics to be provided to each roof to suit SEAI BER requirements in accordance with Part L in force at the time of sale.	
Fabric U-Values:	Walls	0.18 W/m²/K
	Roofs	0.16 W/m²/K
	Doors & Windows	1.4 W/m²/K
	Floors	0.18 W/m²/K
Thermal Bridging:	Limited to 0.05 of losses.	
Air Tightness:	Target 2.5 m³/hr/m² or better (0.13 Air Changes Per Hour of infiltration)	
Part B:	All services openings to be fire sealed to suit each building construction detail and build up.	

Commercial Elements of Development		
BER:	A2 NZEB OR BETTER	
Heat Pumps:	Heat Pumps outdoor condensers running to internal heat exchangers and vessels running to internal AC units for Cafe, Gym, Retail, Office, Healthcare or other similar units as detailed in the Development Description Underfloor heating for Creche	
Water Heating	Undersink Electrically Power Water heaters	
Part F Ventilation :	Energy recovery ventilation units for Fresh air and foul air requirements with ductwork running to wall mounted louvres using local system to minimise energy losses.	
Pumps:	All space and water pumps to be A rated with low energy consumption	
Lighting:	All LED	
Public Street Lighting:	All LED	
Electrical Energy Generation:	Solar Photovoltaics to be provided to each roof to suit SEAI BER requirements in accordance with Part L in force at the time of sale or lease.	
Fabric U-Values:	Walls	0.21 W/m²/K
	Roofs	0.16 W/m²/K
	Doors & Windows	1.6 W/m²/K
	Floors	0.21 W/m²/K
Thermal Bridging:	Limited to 0.05 of losses.	
Air Tightness:	Target 2.5 m³/hr/m² or better (0.13 Air Changes Per Hour of infiltration)	
Part B:	All services openings to be fire sealed to suit each building construction detail and build up.	

Contents

1 PURPOSE OF REPORT

Kelland Homes Ltd. appointed BBSC, September 2025 appointed BBSC to study the impact on energy to the development as set out under SI 600/2001.

The development will be over multiple phases.

It shall comprise Houses, Maisonettes, Apartments, Landlord areas, Civic Amenity, Creche as outlined in the Development Description above.

This report only studies the impact on the lands being developed by Kelland Homes ltd. Refer to others for the sections of the planning being submitted by other development teams.

2 PRINCIPLE STANDARDS

2.1 BUILDING REGULATIONS

Technical Guidance Documents as A through M as published and set out in Law, Department of the Environment, relevant edition relates to date of publication and date of building.

- S.I. No. 600/2001 - Planning and Development Regulations, 2001
- Domestic Energy Auditing Procedure, Published by SEAI
- Non Domestic Energy Auditing Procedure, Published by SEAI
- Part L of the building regulations for both Domestic and Non Domestic developments.
- Part F of the building regulations.

2.2 GENERAL

The purpose of this Sustainability Report is to define the requirements for achieving Part F & L of the Building Regulations with respect to the Energy usage of the development.

Planning requirements applicable shall be to the Meath Council Development Plan 2021-2027.

This report aims to satisfy the legislative planning requirements by addressing how the overall energy strategy of the proposed development has been approached in a holistic manner, striving to meet the highest standards of sustainable building design such as passive solar design, high efficiency systems and use of renewable energy technologies.

Principle energy targets and objectives shall be nZEB (Near Zero Energy Building As defined by Part L of the building regulations, current edition at time of publication).

This report sets out how the building will achieve these objectives, the underpinning Part L compliance are energy demand reduction through passive measures and increased supply from renewable and efficient sources.

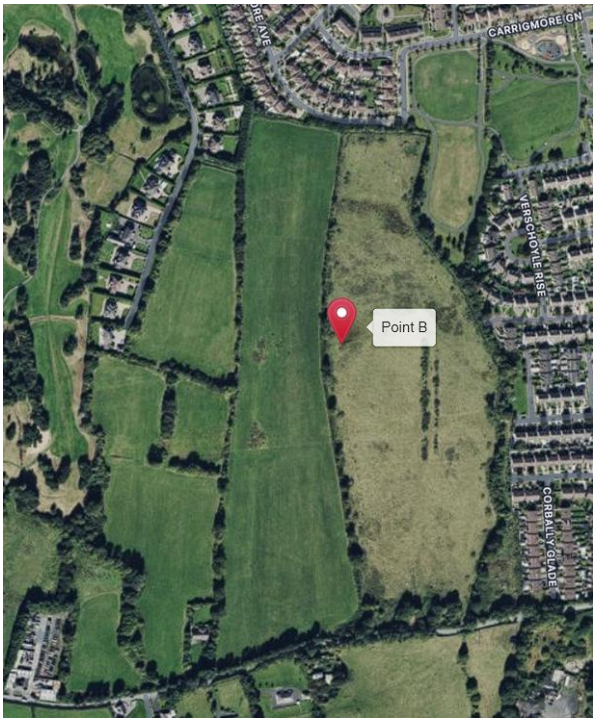
The proposed design will employ the necessary engineering solutions to follow this principle.

The proposed site development will meet or exceed where feasible the requirements of the Part L 2021 building regulations, which stipulates requirements on minimum renewable contribution, minimum fabric and air permeability requirements, maximum energy use and carbon dioxide emissions as calculated using the SEAI published DEAP (Dwellings Energy Assessment Procedure) methodology excel workbook.

Assessments carried out in this report are based on latest floor plans and elevations received from the Architect, at the time of assessment.

2.3 SITE LOCATION

The Site is located over a Green field site, near Carraigmore Avenue, Fortunestown, Tallaght-Jobstown DED 1986, Saggart, South Dublin, County Dublin, Leinster, D24 CPK7, Ireland.



Grid ref:	O 04802 26441
X (ITM)	704744
Y(ITM)	726466
Latitude :	53.278168
Longitude :	-6.4293994

(https://irish.gridreferencefinder.com/)

2.4 SCHEDULE OF UNITS

The following tables details the units.

Refer to the Schedule of space and accommodations for full details

In addition to the Residential, a Creche and a Retail unit is to be provided.

3 LEGISLATIVE/PLANNING REQUIREMENTS

3.1 BUILDING REGULATIONS TECHNICAL GUIDANCE DOCUMENT L 2022, CONSERVATION OF FUEL AND ENERGY – DWELLINGS

Principle energy targets and objectives shall be nZEB (Near Zero Energy Building As defined by Part L of the building regulations, current edition at time of publication).

- Part L of the Second, Schedule to the Building Regulations 1997 (S.I. No. 497 of 1997) as amended
- European Union (Energy Performance of Buildings) Regulations 2021 (S.I. No. 393 of 2021)

3.2 TECHNICAL GUIDANCE DOCUMENT L - CONSERVATION OF FUEL AND ENERGY – DWELLINGS (2022)

Regulation	Action
L1 A building shall be designed and constructed so as to ensure that the energy performance of the building is such as to limit the amount of energy required for the operation of the building and the amount of Carbon Dioxide (CO2) emissions associated with this energy use insofar as is reasonably practicable.	This shall be measured by means of SEAI NEAP calculation used for the purposes of BER calculations. SEAI, Sustainability Energy Authority of Ireland NEAP, Non Domestic Energy Auditing Procedure DEAP, Domestic Energy Auditing Procedure BER, Building Energy Rating
L2A …shall have installed ducting infrastructure (consisting of conduits for electrical cables) for each car parking space, to enable the subsequent installation of recharging points for electric vehicles where the parking space…	Parking with Curtilage we be provided with means to charge electrical vehicles. Apartments will be provided with Charging facilities.
Regulation 5 *(a) A new building shall, where technically and economically feasible, be equipped with self regulating devices for the separate regulation of the temperature in each room or, where justified, in a designated heated zone of the building unit.*	By means of Thermostatic Radiator Valves, Electromagnetic Powered Control Valves, Thermostats and a suitable controller the building will be capable of achieving practicable and compliant energy savings on a room by room basis or where grouped, zone by zone basis.
Regulation 8 *For new dwellings, the nearly zero energy performance requirements of this regulation shall be met by:* *(a) providing that the energy performance of the building is such as to limit the calculated primary energy consumption and related carbon dioxide (CO2) to that of a nearly zero energy building within the meaning of the Directive insofar as is reasonably practicable, when both energy consumption and carbon dioxide (CO2) emissions are calculated using the Dwelling Energy Assessment Procedure (DEAP) published by Sustainable Energy Authority of Ireland;*	SEAI BER certificates will be used at all stages of design to ensure compliance with Carbon and Energy regulations as required and discussed herein.
(b) providing that, the nearly zero or very low amount of energy required is covered to a very significant extent by energy from renewable	Subject to Part L, BER requirements, and by the use of heat pumps with photovoltaic provisions the buildings will be suitable to achieve this regulation. All Dwellings,

Regulation	Action
sources, including energy from renewable sources produced on-site or nearby;	buildings will be demonstrated as compliant by means of BER
(c) limiting the heat loss and, where appropriate, availing of heat gain through the fabric of the building;	Combination of Low U-Values, Air tightness and thermal bridging will be employed as outlined here in.
(d) providing and commissioning energy efficient space and water heating systems with efficient heat sources and effective controls;	Space heating will be spilt into a minimum of 2 zones plus hot water for control of energy within a dwelling
(e) providing that all oil and gas fired boilers shall meet a minimum seasonal efficiency of 90%;	Heat Pumps with SCOP of over 4 will be provided i.e. 400% or better.
(f) providing to the dwelling owner sufficient information about the building, the fixed building services, controls and their maintenance requirements so that the building can be operated in such a manner as to use no more fuel and energy than is reasonable.	On completion of the project, a handover manual will be issued
1.3.2 Fabric Insulation	As per Table 1, U-Values or the building shall be kept at or better than Sloped Roofs, 0.16 W/m²K Flat roofs, 0.16 W/m²K Walls, 0.18 W/m²K Floors, 0.18 W/m²K Windows, doors, 1.4 W/m²K
1.3.3.3 Thermal Bridging	Thermal bridging shall not exceed 0.08 W/m²K or better using Acceptable Construction Details
1.3.4 Building Envelope Air Permeability	Building Envelope Air Permeability, 5m³/(h.m²) when measured at 50Pa.
1.3.5 Limiting the Effects of Solar Gain in Summer	Building is not being air conditioned, natural ventilation is to be employed in general areas with temperature controlled extract fans to ensure ventilation is achieved.
1.4.3 Space Heating and Hot Water Supply System Controls	Space heating will be spilt into a minimum of 2 zones plus hot water for control of energy within a dwelling. Thermostatic Radiator Valves to be employed to each room. TBG Part L Table 2 & 3 is noted and to be applied as applicable.
1.4.4 Insulation of Hot Water Storage Vessels, Pipes and Ducts	All pipes and ducts used to convey systems with thermal performance requirements (heat or cool a space) shall be insulated.
1.4.6. Electric Vehicle Recharging Infrastructure	Please see sections on same herein.

Regulation	Action
1.5 CONSTRUCTION QUALITY AND COMMISSIONING OF SERVICES	All Dwellings shall be air pressure tested as per regulation 1.5.4 By Means of ACD's Thermal Bridging will be kept to 0.08 or 0.05, as per regulation 1.5.3 All Commissioning Activities shall conform to regulation 1.5.5 for services, with heat pumps to SEAI requirements, FGAS requirements, Fans to Part F requirements. On completion of project a User information pack will be issued to the owner of the Dwelling as per regulation 1.6

3.3 THE EUROPEAN UNION (ENERGY PERFORMANCE OF BUILDINGS) REGULATIONS 2021 (S.I. NO. 393 OF 2021)

SI393:2021 insofar as it relates to works relating to buildings other than dwellings, provides as follows:

Regulation 5	Action
(a) A new building shall, where technically and economically feasible, be equipped with self-regulating devices for the separate regulation of the temperature in each room or, where justified, in a designated heated zone of the building unit.	Space heating will be spilt into a minimum of 2 zones plus hot water for control of energy within a dwelling. Thermostatic Radiator Valves to be employed to each room. TBG Part L Table 2 & 3 is noted and to be applied as applicable.
(b) Where a heat generator is being replaced in an existing building, where technically and economically feasible, self-regulating devices shall also be installed.	Not applicable
(e) A building which has more than 10 car parking spaces, that is:	
(i) new, or	All Part M car parking spaces assigned to this development shall be provided with EV charger
(ii) subject to subparagraph (g), undergoing major renovation, shall have installed at least one recharging point and ducting infrastructure (consisting of conduits for electric cables) for at least one in every 5 car parking spaces to enable the subsequent installation of recharging points for electric vehicles.	All car parking spaces assigned to this development shall be provided with EV charger at the rated of 1 per 5 spaces and ducting provided under the ground to allow for future connections.
(g) The requirements of subparagraph (e) shall apply to a building undergoing major renovation where:	
(i) in a case where the car park is located inside the building, the renovations concerned include the car park or the electrical infrastructure of the building; or	Not applicable
(ii) in a case where the car park is physically adjacent to the building, the renovations concerned include the car park or the electrical infrastructure of the car park.	Not applicable

3.4 SOUTH DUBLIN COUNTY DEVELOPMENT PLAN 2022-2028

The following policies of Local County Council shall be applied

Section / Policy	Commentary pertaining to proposed development
6.7.1 Residential Design and Layout	
H7 Objective 2: To ensure that new residential developments incorporate energy efficiency measures and promote innovation in renewable energy opportunities	Development will comply with standards as per Building Regulations Near Zero Energy Buildings requirements. Technical Guidance Document L- Conservation of Fuel and Energy – Dwellings (2021) to be applied SEAI DEAP current edition to be applied for BER The following technologies shall be employed to meet Part L and or BER requirements • Solar Photovoltaic panel(s) • Air to water electrically powered heat pumps in housing and similar • Electrically powered waste air heat pumps in Apartments and similar • Demand controlled ventilation • All lights to be LED. • Buildings fabric will to current or better than Part L requirements • Controls to meet Achieving Compliance with Part L • Air Tightness • Thermal bridging to less than 5% of overall heat loss
6.10 Climate Change Audit	
Climate Action Audit "Promote location, siting and design of houses and apartments to take advantage of solar gain. Promotion of efficient Building Design and Standards in line with the Building Regulations"	Refer to Site plans for orientation of dwellings. North South axis has been generally employed. All Dwellings shall be issued with a BER as per EPBD requirements as transcribed into law in the Republic of Ireland via Part(s) F and L of the building regulations, SEAI Domestic Energy Auditing Procedure (DEAP) or NEAP (Commercial)
10.2.6 Solar PV	
Policy E7: Solar Energy Promote the development of solar energy infrastructure in the County, including the building of integrated and commercial-scale solar projects subject to a viability assessment and environmental safeguards including the protection of natural or built heritage features, biodiversity and views and prospects. E7 Objective 8:	All buildings, shall be capable of supporting Solar Photovoltaic panel(s), invertors etc. Solar provision to meet BER requirements. Cables from panel to roof will be provided for same.

Section / Policy	Commentary pertaining to proposed development
To support the installation of solar panels on up to 100% of residential roof space.	
11.0.2 Planning Policy Context	
NPO 64 requires us to 'Improve air quality and help prevent people being exposed to unacceptable levels of pollution in our urban and rural areas through integrated land use and spatial planning that supports public transport, walking and cycling as more favourable modes of transport to the private car, **the promotion of energy efficient buildings and homes, heating systems with zero local emissions**, green infrastructure planning and innovative design solutions.'	To meet the obligations of the NPO 64, electrically driven heat pumps shall be employed to ensure zero local emissions. See H7 Objective 2 for further details
11.5 Electricity Infrastructure	
IE6 Objective 1: To support roll-out of the Smart Grids and Smart Cities Action Plan enabling new connections, grid balancing, energy management and micro grid development in line with RPO 10.19.	All meters will be suitable for bi-directional flow of electricity and shall be Smart meter types to achieve the objectives as set out.
IE6 Objective 4: To ensure that the design of energy networks achieves the least possible environmental impact and that where such impacts are inevitable, they are mitigated to the greatest possible extent.	To reduce the impacts of the overhead wiring, it is proposed to route same to ducts and duct the cables to below ground.

4 CLIMATE ACTION MEASURES

4.1 EFFECTIVELY MANAGE AND REDUCE COSTS

This section shall list, or detail measures specifically considered by the proposer to effectively manage and reduce costs for the benefit of the buildings users and the building as a whole.

4.2 ENERGY AND CARBON EMISSIONS

The following are an illustration of the energy measures that are planned for the reduction of carbon emissions for the occupants.

Measure	Description	Benefit
BER Certificates	A **Building Energy Rating (BER)** certificate will be provided for the proposed development, which will provide detail of the energy performance of the dwellings. A BER is calculated through energy use for space and hot water heating, ventilation, and lighting and occupancy. It is proposed to target an A2 rating for the development this will equate to the following emissions. *MPEPC of 0.3, *MPCPC of 0.35, *RER of 0.2 Part L 2022 *Maximum Permitted Energy Performance Coefficient (MPEPC) *Maximum Permitted Carbon Performance Coefficient (MPCPC) *Renewable Energy Ratio (RER)	Higher BER ratings reduce energy consumption and running costs which aids in reducing associated carbon emissions etc. Please note that these values (MPEPV,MPCPC, RER) represent an improvement in the order of 60% over a similar Part L 2008 building with 20% of its energy provided from onsite or nearby renewables, and provide the numerical indicator for Nearly Zero Energy Buildings.
Fabric Energy Efficiency	Building Fabric Performance The U-values being investigated will be in line with the requirements set out by the current regulatory requirements of the Technical Guidance Documents Part L "Conservation of Fuel and Energy Dwellings". The current regulation was in effect from 2022 The development will be built under this planning permission, will be designed and constructed to meet the relevant regulation, as may be appropriate, in accordance with the transitional period. These Values are reflected in the BER Certificate	BERs indicate the overall energy performance of the building allowing a clear understanding of the developments energy consumption, thus allowing for better energy cost planning and achieving lower energy bills
	U-values The U-Values that will be targeted for the development, will exceed the minimum targets set out in Part L 2022 as may be appropriate. U-Values are listed above.	Lower U-values and improved air tightness is being considered to help minimise heat losses through the building fabric, lower of energy consumption and thus minimise carbon emissions to the environment.

Measure	Description	Benefit
	Thermal Bridging Thermal bridges occur at junctions between planar elements of the building fabric and are typically defined as areas where heat can escape the building fabric due to a lack of continuity of the insulation in the adjoin elements. Careful design and detailing of the manner in which insulation is installed at these junctions can reduce the rate at which the heat escapes. Standard good practice details are available and are known as Acceptable Construction Details (ACDs), published by the Department of Environment. Adherence to these details is known to reduce the rate at which heat is lost. The rate at which heat is lost is quantified by the Thermal Bridging Factor of the dwelling which is entered into the overall dwelling Part L calculation. It is intended that all building junctions will either be designed in accordance with the Acceptable Construction Details or that thermal modelling will be carried out for all thermal bridges on the dwellings within proposed development.	Reduces risk of condensation due to cold spots in walls and therefor lowers the risk of mould growth leading to better energy performances and healthier living spaces
	Air Tightness A major consideration in reducing the heat losses in a building is the air infiltration. This essentially relates to the ingress of cold outdoor air into the building and the corresponding displacement of the heated internal air. This incoming cold air must be heated if comfort conditions are to be maintained. In a traditionally constructed building, infiltration can account for 30 to 40 percent of the total heat loss, however construction standards continue to improve in this area. In order to ensure that a sufficient level of air tightness is achieved, air permeability testing will be specified carried out on all dwellings. A design air permeability target of 5 (1.3.4.3 Part L) $m^3/hr/m^2$ has been identified for the dwellings on the site.	Unwanted air movement leads to higher energy bills due to escape of warm air, this leads to better sealed buildings and lower energy costs.
	Limiting the Effects of Solar Gain in Summer The building does not have glazing other than the north facing entrance door area. As a result the impact on overheating from glazing is reduced.	

Measure	Description	Benefit
Energy Labelled White Goods	The white good package planned for the development will be of a very high standard and have a high energy efficiency rating. It is expected that the below appliance ratings will be provided: • Oven - A plus • Fridge Freezer - A plus • Dishwasher - AAA • Washer/Dryer - B The European Product Database for Energy Labelling (EPREL) has been set up under EU Regulation 2017/1369, to provide important energy efficiency information to consumers. It will also enhance market surveillance activities and enforcement, these cover the following, • Air conditioners • Cooking appliances (domestic) • Dishwashers (domestic) • Space and water heaters • Lightbulbs • Refrigeration (domestic) • Solid fuel boilers • Televisions • Tumble dryers • Tyres • Ventilation units (domestic) • Washing machines (domestic)	The provision of high rated appliances in turn reduces the amount of electricity required for occupants.
External Lighting	**Public Lighting** The proposed lighting scheme within the development consists of range of luminaires, each selected to suit the specific location on the site. All fittings selected will be LED and will be mounted on columns, height 3m to reduce impact on Bats. 3000K CCT LED to minimise impact on wildlife. High efficiency 119 lm/W or better subject to technology at the time of installation Zero Upward Light Output Ratio (ULOR) Intelligent lighting control systems provided along pedestrian routes in sensitive woodland areas. Shading louvres included on light fittings adjacent to the most sensitive areas of the site. Meets or exceeds all other Local County Council Specification criteria.	The site lighting will be designed to provide a safe environment for pedestrians, cyclists and moving vehicles, to deter anti-social behaviour and to limit the environmental impact of artificial lighting on existing flora and fauna in the area.

Measure	Description	Benefit
	Each light fitting shall be controlled via an individual Photoelectric Control Unit (PECU). The operation of the lighting shall be on a dusk-dawn profile.	

The following are Low energy technologies that are being considered for the development and during the design stage of the development the specific combination from the list below will be decided on and then implemented to achieve the NZEB BER Rating as outlined above.

As technology and Energy Assessment procedures advance and change the proposed solutions will be amended to suit best practice at the time of procurement.

Measure	Description	Benefit
Extract Ventilation	Air shall be drawn from the Training Areas via roof mounted ventilator fans. Air shall be made up from side mounted louvres to ensure each occupant receives 10l/s per person as per Part L of the building Regulations. Toilet ventilation shall be negative only at the rate of 6 Air Changes per hour.	Mechanical ventilation provides enhanced air quality in modern air tight building which are otherwise designed to minimise unwanted air infiltration
PV Solar Panels	PV Solar Panels will be considered as an option for both houses and apartments in order to meet the renewable energy contribution required by Part L of the Building Regulations. These panels convert sunlight into electricity which can be used within the dwelling. The panels are typically placed on the South facing side of the building to maximise the solar exposure.	PV Solar Panels offer the benefit of reducing fossil fuel consumption and carbon emissions to the environment. They also reduce the overall requirement to purchase electricity from the grid.
Heating	The building users are transient in nature in that training areas are booked for a limited period of intense training, therefore space heating is counter productive in these areas as the users will be hot from exercise. Therefore heating will be limited to seated cool down areas and toilets. Electrical Radiant panels will be employed to heat the occupants only in these areas.	Targeted use of radiant panels will heat only the occupants and not the building, this will reduce the energy usage for the entire building as a result.
ECAR Charging Points	As the Car Park is existing, the proposed EV charging shall be provided to the Part M car parking spaces only.	Charging points will be provided such that; • Common areas will be provided with community chargers 7.4-22kw in size, pay as you go where curtilage parking is not provided

4.3 MATERIALS

The practical implementation of the Design and Material principles has informed design of building facades, internal layouts and detailing of the proposed buildings, refer to the architectural statement for further details.

4.4 BUILDINGS

All proposed buildings are designed in accordance with the Building Regulations, in particular Part D 'Materials and Workmanship', which includes all elements of the construction.

The Design Principles and Specification are applied to dwelling units and the common parts of the building and specific measures taken include:

Measure	Description	Benefit
Building Aspect / Daylight	The design, separation distances and layout of the apartment blocks and other residential units aims to maximise provision of natural daylight. Design will take account of guidance contained in Sustainable Urban Housing: Design Standards for New Apartments (Guidelines for Planning Authorities).	Reduces reliance on artificial lighting, thereby reducing costs.
Accessibility	All units will comply with the requirements of Building Regulations and Technical Guidance Documents Parts K and M	Reduces the level of future adaptation and associated costs for residents.
Ventilation	Use of natural ventilation to common areas is under consideration.	Reduce energy usage costs of ventilation systems and associated maintenance/upgrade costs.
Security	The scheme is designed to incorporate principals of passive surveillance to deter antisocial behaviour. Allowance made for inclusion of CCTV monitoring details and secure bicycle stands for apartment blocks.	Helps to reduce potential security/ management cost
Amenity Space	Provision of public and communal open space.	Encourages community and social interaction among residents.
Private Open Space	Provision of balconies and openable windows, provides access to the outdoors and allows individuals to clean windows themselves.	Facilitates interaction with outdoors. Reduces the cost and reliance on 3rd party contractors for cleaning & maintenance.

4.5 MATERIAL SPECIFICATION

The following Materials shall be applied, please refer to the architectural statement for further details.

Measure	Description	Benefit
Design & Material Selection	Materials selected and chosen with due consideration to their durability, design life and maintenance requirements. Consideration given to Buildings Regulations, with particular reference to BS 7543:2015 'Guide to Durability of Buildings and Building Elements, Products and Components'. Consideration given where possible to use of recycled materials and those awarded an Environmental Products Declaration.	Longevity, durability. Minimises ongoing maintenance and replacements requirement.

Measure	Description	Benefit
Building Envelope	The main façade is primarily of Stretched polyurethane double skin insulated membrane.	Polyurethane has a high circular recyclability, as it is used in food packaging, milk cartons etc. It can also be reused and re purposed into smaller buildings. The frame of the building is steel and can be reused.
External Windows & Doors	Use of factory finished uPVC or Aluminium windows and doors is to be applied to the development.	Requires little or no maintenance aside from regular housekeeping.
Balconies & Railings	Use of Stainless steel internal balconies & railings will be applied to the development	Requires little or no maintenance aside from regular house-keeping.
Roofs, Sloped	Slope of the building is formed as part of the walls, refer to above, shall drain to other on site SUDS compatible areas as per County Development Plan	Reduces risk of major flood events
Electric Car Charging Points	Design includes for ducting to cater for designated electric car charging points. Charging to be provided from a local landlord distribution board. System would operate under management of the Operating Management Company and via use of charge point access card. As per County Development Plan	Provides option for residents to move to greener, more cost efficient modes of transport.
Low Energy LED Lighting	To be used in residential units and landlord areas.	Lower energy consumption, leading to lower costs and lower carbon emissions.
Condensing Boilers	None in the development	
Exhaust Air Heat Pump	None in the development	
PV Solar Panels	PV Panels convert energy in sunlight into electrical power which can be used in the building. It may not be practical to install and shall be subject to further investigation to overcome engineering limitations.	Reduced energy consumption and running/service charge costs.

4.6 LANDSCAPE

The following highlights the measures applied to landscaping of the development.

Measure	Description	Benefit
Site Planning	Generous and high-quality landscape with ecological corridors designed within the proposed development. Pedestrians prioritized over the car. Significant tree planting and soft landscaping around the development will be applied	Natural attenuation and landscape maintenance preferable
Green Roofs	Use of green roofs and traditional roof coverings with robust and proven detailing to roof elements.	Attenuation reduces the burden on vulnerable rainwater goods, resulting in fewer elements that could require replacement or repair.

Measure	Description	Benefit
Paving Materials	Use of robust materials with high slip resistance to be used for paving. Durable and robust equipment (e.g. play, exercise, fencing etc.) to be used throughout.	Required ongoing maintenance significantly reduced through use of robust materials installed with proven details.
Planting details	Proven trees staking details. Shrub, hedging, herbaceous and lawn installation planting details provided.	Correctly installed planting will develop into well established and robust soft landscape reducing future maintenance.

4.7 WASTE MANAGEMENT

The following measures relate to control of development waste and the integration with existing local waste handling streams

Measure	Description	Benefit
Construction and Demolition Waste Management Plan	Details regarding Construction and Demolition Waste Management Plan prepared by the Structural Engineer.	The Construction and Demolition Waste Management Plan demonstrates how the scheme has been designed to comply with best practice.
Operational Waste Management Plan	The application is accompanied by an Operational Waste Management Plan, refer to document issue sheet.	The report demonstrates how the scheme has been designed to comply with best practice.
Storage of Non-Recyclable Waste and Recyclable Household Waste	Residential waste storage allows for a weekly (seven day) storage capacity for MDR, food, glass and residual (i.e. nonrecyclable). Residential bins will be provided within dedicated storage rooms within the core of each residential block.	Easily accessible by all residents and minimises potential littering of the scheme
	Domestic waste management strategy: Grey, Brown, Green and or Blue bin distinction. Competitive tender for waste management collection.	Helps reduce potential waste charges.
Composting	Organic waste bins to be provided throughout.	Helps reduce potential waste charges.
Litter	The MUD agency shall undertake litter collection	This shall the development is kept in a litter free and reduce unwanted plastic pollution

4.8 MANAGEMENT

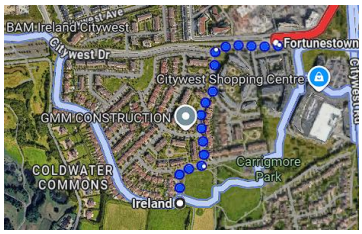
Consideration has been given to the ensuring the homeowners have a clear understanding of their property

Measure	Description	Benefit
User Guide	The building developer will be provided and Operations and Maintenance Manual which will include:	Residents are as informed as possible so that any issues can be addressed in a timely and efficient manner.

Measure	Description	Benefit
	Manual – this will provide important information for the users on details of their new property. It typically includes details of the property such as MPRN and GPRN, Information in relation to connect with utilities and communication providers, Contact details for all relevant suppliers and User Instructions for appliances and devices in the property. **A Pack** prepared by the development team which will typically provide information on contact details for the Managing agent, emergency contact information, transport links in the area and a clear set of rules and regulations.	
Commercial Records	A Building safety file shall be handed to the developer for there action in maintaining the building and its systems	This shall ensure that all systems in the building are in working and well maintained order

4.9 TRANSPORT

The following highlights the transport links available to the development.

Measure	Description	Benefit
Access to Public Transport (Bus Services)	Luas is approximately 12min Walk to Fortunestown Station Dublin Bus S8 route is 20min walk Dublin Bus 77a route is 14min walk Dublin Bus 27 route is 27min walk  *Google Maps used to estimate walk distances from the Northern Boundary of the site*	The availability, proximity and ease of access to public transport services contributes to reducing the reliance on the private motor vehicle for all journey types.
Cycle Route	Links to existing Roads shall have dedicated Cycle ways with other paved links to adjoining estates and amenities.	Cycle to work schemes allow for purchase of electric bikes to facilitate no car travel
Greenway	Greenways are available at the Boyne Greenway, to the north and the Royal Canal to the south of Ratoath.	Cycle to work schemes allow for purchase of electric bikes to facilitate no car travel
Permeable Connections	Provision and subsequent maintenance of dedicated pedestrian and cycle infrastructure along the proposed links as per Architects Design Statement. Permeable connections through the blocks to connect to the wider network of pedestrian and cycle infrastructure.	Ensure the long-term attractiveness of walking and cycling to a range of local education, retail and community facilities and services.
Bicycle Storage	The provision of high quality secure and sheltered bicycle parking facilities, for both short term and long-term parking requirements.	Accommodates the uptake of cycling and reducing the reliance on the private motor vehicle.
E-car Facilities	Ducting will be provided from a local ESB distribution board to designated E-car charging car park spaces as per the County Development Plan and to Part L Building Regulations.	To accommodate the growing demand for E-car which assist in de-carbonising society and reducing oil dependency.

4.10 EV CAR CHARGING, TBG PART L 2022, SECTION 1.4.6 RELATES.

Section / Policy	Commentary pertaining to proposed development
EV Charging Points The Climate Action Plan, 2019 acknowledges that the pricing structure for EV vehicles is a major factor in consumers decision making. However the Plan also acknowledges the importance of 'ensuring the EV Charging network underpins public confidence.'19 The Council will encourage the provision of EV charging points in all developments for future proofing. **County Development Plan** All car parks shall include the provision of necessary wiring and ducting to be capable of accommodating future Electric Vehicle charging points, at a rate of 10% of total space numbers, as mandated by Part L of the building Regulations **County Development Plan** In any car park in excess of 20 spaces where public access is available, one fully functional charging point for Electric Vehicles shall be provided in accordance with IEC 61851 Standard for Electric Vehicle Conductive Charging Systems. S.I. No. 115/2021 - Planning and Development Act 2000 (Exempted Development) (No. 2) Regulations 2021	The Car Park is existing. Mode 3 EN 61851-1, IEC 61439-7 charging to be provided in limited use cases. It is proposed to provide additional Part M car Parking spaces. These spaces shall be provided with EV charging as per Part L of the building regulations. ESB metered supply shall be provided to these car chargers and a dedicated PAYG system complying with national Standards for charging the OCPP 1.5 / 1.6 protocols shall be applied for charging solutions etc. All Charging infrastructure to Part L current edition. Ducting will be provided for Part M site car parking in accordance with Part L 2021 section 1.4.6. Chargers will be capable of 7.4-22kw of Charging.

5 PART F

5.1 PRINCIPLE STANDARD

- Technical Guidance Document F - Ventilation (2009)
- Leakage classification of Class 2 or better as defined in IS EN 13141-7

5.2 COMMENT

Each Dwelling is to be sealed against un-wanted external air, infiltration.

This is to be achieved using certified building products CE and Irish Agrément certification.

As a result of sealing of the building it is intended to meet the requirements of Part F, section 1.2.3 by means of Whole House Extract System, demand based. This unit shall fully comply with the requirements of Section 1.2.3.

Air shall be supplied to all habitable rooms and removed from ancillary rooms i.e. bathrooms etc. via ducting to roof mounted unit. All air Intake sections shall be demand controlled. All Extract points will be demand controlled. The Attic mounted unit will change it's air extraction rate based on humidity and other factors .

This typically defined as demand-controlled mechanical exhaust ventilation (DCMEV) is a ventilation system that automatically adapts the airflow based on the actual needs of each room in a building. Instead of providing a constant rate of ventilation, it intelligently adjusts the airflow in response to detected levels of humidity, presence, CO2, or VOCs (volatile organic compounds).

All air shall be ducted in Class E fire rated Ductwork, with fire dampers at all fire compartment zones.

Air shall be feed from the external walls on the same level as the apartment, no ducting shall rise vertical or cross structural floors.

All ducting shall be contained in the dwelling it services.

All Apartments, and Duplex 1 storey units shall be provided with a waste air to water heat pump. It shall extract air from the wet rooms and using this waste heat, with a heat pump, introduce the heat into the dwelling. It works in the similar to the above.

5.3 AIR PERMEABILITY OF THE DWELLING.

Air Tightness shall not exceed the limits as laid down in Part L, Section 1.5.4.2,

Below 3 $m^3/hr/m^2$ - Ventilation to be provided. Out target will be 0.1 .1Air Changes per hour or 2 $m^3/hr/m^2$

Over 3 $m^3/hr/m^2$ - Building shall be remediated to achieve limits above

The dwellings shall be tested as per the requirements of section 1.5.4, Air permeability pressure tests.

5.4 VENTILATION CHARACTERISTICS OF THE DWELLING AND VENTILATION EQUIPMENT;

The building regulations permit a number of solutions to achieve compliance with Part F.

Currently Part F allows the following or similar systems employing these principles and Irish Agrément certificated systems.

DEAP allows for additional systems and is detailed in the SEAI DEAP manual

- Centralized demand-controlled mechanical exhaust ventilation (DCMEV)
- Centralized Mechanical Ventilation with Heat Recovery using Waste Air to Water heat pump (WAHP)
- Natural Ventilation

5.5 DEAP

- Intermittent Fans and passive vents (Extract fans, Passive stack ventilators, Trickle vents or air bricks)
- Positive input ventilation

- Mechanical extract ventilation (Demand Control Ventilation)
- Exhaust Air Heat Pumps

Apartments will generally be heated and ventilated by means of waste air heat recovery system providing heat from the waste hot air in the apartment, this solution is recognised in the Part F

Houses will be ventilated by means of an Irish Agrément certificated Demand Controlled Mechanical Extract Systems.

A demand-driven ventilation system will ventilate each dwelling comprising Humidity controlled ventilators to continuously transport the exhaust air from the bathrooms, kitchen, utility room and WC to external, creating a slightly reduced, or negative air pressure in the living spaces.

Due to this low-pressure fresh air is made up to the living and sleeping areas through humidity controlled fresh air inlets. Air inlets will be acoustic and wind pressure protected and ensure draught free fresh air.

System Components:

- Air inlets to bring fresh air to habitable rooms
- Extract units to transfer moisture or odour intensive air to external via ducting and a central extract fan(s).
- Central electric constant pressure fan to extract moisture and odour intensive air from each dwelling to external.

Humidity sensors in the fresh air inlets and extract units automatically adjust air flow volume to ensure a comfortable room climate. The system automatically adjusts ventilation volume according to the humidity.

All ducts running to the unit from or too external shall be insulated to reduce cold bridging effects.

This distance between intake and discharge shall not be less than 3m in so far as is practicable.

6 COMPLIANCE (PART L AND PART F)

The principal standard to be employed, and reference model.

- Technical Guidance Document L- Conservation of Fuel and Energy – Dwellings (2021)
- Table E1.6 Example F Mid Floor Apartment Dwelling space heating-heat pump and continuous mechanical extract ventilation
- nZEB or Part L

These stipulates the requirements for

- the minimum fabric and air permeability requirements,
- maximum primary energy use and carbon dioxide (CO2) emissions
- to be calculated using the DEAP (Domestic Energy Assessment Procedure) methodology.

This is a national standard and compliance is compulsory for all new dwellings.

Three design aspects demonstrate compliance:

- The limitation of primary energy use and CO2 emissions
- Building fabric (namely thermal performance)
- The use of renewable energy sources

6.1 LIMITATION OF PRIMARY ENERGY USE AND CO2 EMISSIONS

To demonstrate that an acceptable primary energy consumption rate has been achieved, the calculated Energy Performance Coefficient (EPC) shall be no greater than the Maximum Energy Performance Coefficient (MEPC).

- Part L, MPEPC is 1.0 non Domestic
- As per section 0.7.1, Part L, MPEPC is 0.30. Domestic

To demonstrate that an acceptable CO2 emission rate has been achieved, the calculated Carbon Performance Coefficient (CPC) of the dwellings being assessed will be no greater than the Maximum Carbon Performance Coefficient (MPCPC).

- Part L, MPCPC is 1.15. non Domestic
- As per Section 0.7.2, Part L, MPCPC is 0.35. Domestic

As Renewable Energy Technologies are being applied the then 1.2.1 shall apply with the RER of either 0.2 for MPEPC of 1.0 and MPCPC of 1.15 or 0.10 for MPEPC of 0.90 and MPCPC of 1.04, for non domestic buildings.

6.2 THERMAL INSULATION OF THE DIFFERENT ELEMENTS OF THE BUILDING FABRIC

The Building fabric shall be constructed form various differing materials with different thermal properties. For full data on elements used in construction shall be listed as part of the BCAR process with the total U-Values as per regulations, see above, when calculated as per Part L Appendix A and B.

Refer to the Architects general arrangements, site plan for details of the Buildings size, geometry and exposure. Regulation requirements from the Part L Building Regulations, as below, for Domestic Buildings, refer to Part L for Non Domestic Buildings.

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

Notes:

1. *The U-value includes the effect of unheated voids or other spaces.*
2. *For alternative method of showing compliance see paragraph 1.3.2.3.*
3. *For insulation of ground floors and exposed floors incorporating underfloor heating, see paragraph 1.3.2.2.*
4. *Windows, doors and rooflights should have a maximum U-value of 1.4 W/m^2K.*
5. *The NSAI Window Energy Performance Scheme (WEPS) provides a rating for windows combining heat loss and solar transmittance. The solar transmittance value g_{perp} measures the solar energy through the window.*

6.3 EFFICIENCY, RESPONSIVENESS AND CONTROL CHARACTERISTICS OF THE HEATING SYSTEM(S)

The heating system control characteristics is defined as per the requirements of NEAP as per samples attached in the Appendix 1

6.4 SOLAR GAINS THROUGH GLAZED OPENINGS OF THE BUILDING

Solar gains are based on aspect to the sun, based on typical constructions employed.

6.5 THERMAL STORAGE (MASS) CAPACITY OF THE DWELLING

The buildings are being constructed of Concrete Materials with storage capacities as indicated in the databases used for the SEAI published in the National Calculation Methodology.

That stated the buildings insulation envelope will be on the inner side of the occupied wall thus ensuring that the buildings thermal response is lightweight in nature.

6.6 THERMAL BRIDGING

The impact of Thermal Bridging can result in a heat loss of 15%, as a result the development shall conform to the meet or exceed the Approved Construction Details, the development will be limited to 0.08W/m²K or better.

Refer to Appendix 1 for details.

The details are proposed and shall be finalised during the BCAR process.

6.7 RENEWABLE AND ALTERNATIVE ENERGY GENERATION TECHNOLOGIES TO BE INCORPORATED

Each Dwelling shall be provided with Photovoltaic panels to produce electrical energy to meet or exceed the 4 kw/hr/annum/ m² requirement. Refer to Appendix 1 for calculations of same.

Part L, section 1.2.1, allows for Heat pumps to be define the Renewable Energy requirement and the effect of heat pumps is included in the calculation procedure.

The apartments shall be heated or cooled by Heat Pumps.

These shall be verified using BER software as published by SEAI and operated by a licensed BER consultant as part of the design and during the BCAR process.

Photovoltaic cells shall be applied, however the requirement to provide green roofs will limit this or Thermal Solar Cells for water heating.

6.8 PRIMARY ENERGY USAGE.

It is envisaged to provide on a dwelling-by-dwelling basis a Electrically operated Heat Pump, Waste Air heat recovery type, it shall feed heat via radiators with pipes to the space and shall provide heat via coils to the hot water storage vessel.

Storage vessel shall be selected to be A rated or better.

Controls shall be by means of valves linked to temperature and 2 zone control valves, these shall be supplemented with each radiator being thermostatically controlled.

Radiators to be selected in accordance with SR50 calculation methodology

6.9 THE FUEL USED TO PROVIDE SPACE AND WATER HEATING, VENTILATION AND LIGHTING.

The following systems shall be provided and operated

- Space Heating
- Air to Water Heat Pump.
- Water Heating
- Air to Water heat pump with summer immersion to a calorifier
- Lighting

Shall be by means of LED Fittings, electrically operated.

6.10 WATER FIXTURES & SANITARY FITTING

For Non Domestic Buildings, Sinks, Basins and similar shall be limited to 6l/min and have throttling devices fitted on a unit by unit basis. Showers shall be limited to 9l/min of flow.

For Domestic Buildings, the calculation methodology requires the use of water consumption figures provided from manufacturers' product details.

Before the assessment can be carried out, figures will need to be collected from manufacturers product information to determine the consumption of each terminal fitting

DEAP-Water-Efficiency-Calculator_v.0 Calculation Tool (SEAI) Typical 3-bedroom calculation indicated the maximum flowrates etc to be employed.

Using the tool, the values are determined as, 184.19 litres per unit time per person as per the calculation for the above example.

7 BUILDING SERVICES

The following details the proposed building services solutions to be applied

<table>
<tr><th>Method of Heating :</th><th>To be a HARP registered Heat Pump</th></tr>
<tr><td>Heating appliance efficiency:</td><td>Greater than 350 % subject to BER Calculations etc. based on the final selection of products to be used</td></tr>
<tr><td>Space heating and hot water supply system controls</td><td>Controls shall meet the requirements as per ‘Heating and Domestic Hot Water Systems for Dwellings- Achieving Compliance with TGD Part L 2008’ Section 8 Heat pump systems. In summary
<table>
<tr><th>Type</th><th>Heat Pump</th></tr>
<tr><td>Medium</td><td>Refrigerant Gas/ Water</td></tr>
<tr><td>Efficiency</td><td>350 % or better</td></tr>
<tr><td>Radiators</td><td>High-efficiency radiators with high water volume to be utilized
Supply water temperature to the radiators should be in the range 55ºC return at 50ºC</td></tr>
<tr><td>Installation</td><td>A pressurised water distribution system with expansion vessel is to be employed
Works to be undertaken by a F-Gas Plumber so qualified to undertake the works as described.</td></tr>
<tr><td>Domestic hot water</td><td>The domestic hot water system will include a tank thermostat and a time clock to optimise the time taken to heat the water</td></tr>
<tr><td>Controls</td><td>As required by the Supplement to Part L</td></tr>
</table></td></tr>
<tr><td>Insulation of hot water storage vessels, pipes and ducts</td><td>Insulation of primary stores. Because of the higher than normal storage temperatures in primary stores shall be insulated to meet or exceed the following standards
Standards BS 1566: 2002 Copper indirect cylinders for domestic purposes. Open vented copper cylinders. Requirements and test methods
BS 7206:1990 Specification for unvented hot water storage units and packages
Heating pipework
All pipes where not in the thermal envelope shall be insulated.
BS 5422:2001 Method for specifying thermal insulating materials for pipes, tanks, vessels, ductwork and equipment operating within the temperature range of –40°C to +700°C
BRE Report No 262 Thermal insulation: avoiding risks, 2002 edition
Where insulation is labelled as complying with the Heating and Domestic Hot Water Systems for dwellings-Achieving Compliance with Part L it must not exceed the following heat loss levels:
<table>
<tr><th>Pipe diameter (OD) mm</th><th>Maximum permissible heat loss (W/m)</th></tr>
<tr><td>8mm</td><td>7.06</td></tr>
<tr><td>10mm</td><td>7.23</td></tr>
<tr><td>12mm</td><td>7.35</td></tr>
<tr><td>15mm</td><td>7.89</td></tr>
<tr><td>22mm</td><td>9.12</td></tr>
<tr><td>28mm</td><td>10.07</td></tr>
<tr><td>35mm</td><td>11.08</td></tr>
<tr><td>42mm</td><td>12.19</td></tr>
<tr><td>54mm</td><td>14.12</td></tr>
</table></td></tr>
</table>

Method of Heating :	To be a HARP registered Heat Pump
Mechanical ventilation systems	Fans are to be on the SEAI register or SAP Appendix Q database, all fans other than room based non ducted type, shall be SPF of 1.5 W/l/s or better in energy usage, to table 3 of the Building Regulations Part L Heat exchangers shall be greater than 67% efficient
Space Heating and Hot Water Supply System Control	Space and water heating systems to be effectively controlled so as to ensure the efficient use of energy by limiting the provision of heat to that required to satisfy the user requirements. The design intent is to provide the following minimum level of control; • Automatic control of space heating on the basis of room temperature • Automatic control of heat input to stored hot water on the basis of stored water temperature • Separate and independent automatic time control of space heating and hot water • Shut down of boiler or other heat source when there is no demand for either space or water heating from that source It is proposed to use a control system with full time and temperature control in each occupied room
Low Flow Sanitary Ware	Water efficient showers, taps, wash hand basins and baths to be employed. The installation of flow restrictors is required. Good practice would include: • Shower – 6L/min • Bath Volumes – Can vary but 175-130 L would be usual. 150L would be a recommended design target. These figures will be confirmed when the software officially becomes available
Lighting Design	A focus on lighting design will be another new aspect of the DEAP4 software where it is expected that credit will be given for an appropriate LED lighting design in relation to the dwelling. In the case of a deprived or over-elaborated lighting design spec, there will be a penalty for the building energy rating. A full lighting design analysis using appropriate software i.e. Dialux or allows for a full and balanced lighting design.

8 CONSTRUCTION QUALITY AND COMMISSIONING OF SERVICES

The building and its services shall be continuously monitored and adjusted on an on going basis but formally at three stages during the build.

- Stage 1 is a formal first fix walk down, snagging and reporting to Building Control Authority.
- Stage 2 is a formal second fix walk down, snagging and reporting to Building Control Authority.
- Commissioning of Services shall occur and be witnessed by the Site Engineers as per contract specifications and in accordance with CIBSE, IS10101, IS3218, IS3217, BSRIA etc. requirements.

8.1 INSULATION CONTINUITY AND AIR PERMEABILITY

Shall be monitored by the Architect and reported accordingly in accordance with the methodology outlined above.

8.2 THERMAL BRIDGING

All thermal bridging shall be kept to a minimum and to the Approved Construction Details for the relevant elements of the build.

8.3 AIR PERMEABILITY PRESSURE TESTS

All Dwellings shall be air sealed and tested as per the requirements of Part L. It should be noted that the details being employed shall so ensure that the air permeability of the building is better than that noted in the Part L.

9 UTILITIES INCLUDING SOLAR PV CELLS

9.1 GAS

No Gas is included in the development for space or other heating.

9.2 ELECTRICITY

9.3 EXTERNAL SUPPLY REQUIREMENTS.

Electricity shall be supplied to the development by ESB Networks, once application is made.

It is expected that the development, will consume, on peak electrical energy consumption approximately 4,200KVA (3,570KW). However as not all equipment will not be on at the same time the expected live electrical demand will be in the order of 1,850KVA (1,570KW).

At least 4 or 5 sub stations, unit type, will be required to service the development.

All Electrical Vehicles outside of a dwelling curtilage will be powered directly from metered supplies from ESB Networks infrastructure.

9.3.1 INTERNAL GENERATION.

All roofs for all buildings shall be capable of supporting Photovoltaic Units for generation of electricity from solar power.

Should all roofs be employed to generate electricity, then the development could offset the electricity import in the order of 1,136,000 kwh/yr or more depending on the panels wattage rating, 450w used to assess. It is noted that panels are currently becoming more efficient as the development of the technology matures, the development could therefore supply more power than that stated above.

9.4 BROADBAND

Telecommunications, are to be linked to the existing networks available in the roads, estates and surrounding the area of the proposed development.

All telecommunications related works will be carried out in accordance with;

- The Gigabit Infrastructure Act (GIA) 2024
- Guide to the Installation of Telecoms Infrastructure in Residential and Mixed Use Developments, April 2024 Version 13, Dublin City Council – Telecoms Unit
- South Dublin County Council Section 254 Appliance Licences - Telecommunications Infrastructure
- PAS 2016:2010, Next generation access for new build homes – Guide to telecommunications.
- EIR National standards “Duct Access Technical & Operational Manual”
- Siro National Standards.
- Virgin National Standards “New Build Handbook”

All ducts in the development will be vendor neutral

Ducts shall enter the development from each vendors network to a common manhole for distribution around the development.

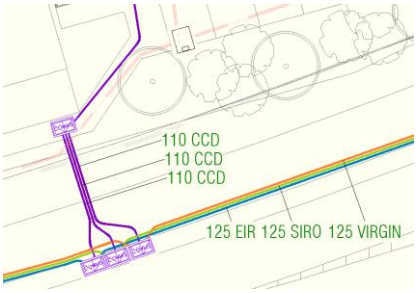


Figure 1 Example of Comms incomer to the development (CCD denotes Common Comms Duct)

Figure 2 CCD run out from in ground chamber (JB4 or similar) to dwelling. It shall terminate in an ETU interface module prior to entering the dwelling. 110 denotes 110mm diameter in ground duct. 38 denotes 38mm diameter in ground duct.

The installation of the utilities for the development will be conducted in parallel with the others services being provided to the proposed development.

The development will use fibre spitter panels which typically has extension ports to allow for speedy extension of the network to allow for future development.

In order to allow for the connection of fibre broadband local street mounted cabinets will be required, as is typical for such installations, as these allow for wiring terminations and other equipment to allow for connection to the internet. These are typically 850x350x1250mm high and are site agreed once application to connect has been lodged with the users.

Impact of these critical site preparation works is likely, positive, significant and permanent, will allow for users of the development to be provided with fibre based broadband, increase commerce and facilitate interconnectivity across communities.

The existing housing estates, primarily, to the east and north of the developments, existing infrastructure shall be extended into the proposed development as is normal practice for developments of this type.

For network integrity and security the development will install, in ground, vendor neutral ducting to allow for any user to be provided by any vendor. It is proposed to connect to the existing services on the existing roads surrounding the development. Branch offs from this spine shall be brought into the proposed development via 110mm Green Ducts. Access to the ducts will be by means of manhole cover junction relay boxes, mounted in ground.

Telecommunications supply, and the requirement for any alterations to the existing telecommunications network for the proposed development, will be agreed in advance of construction with the relevant telecommunications providers.

Eir, Siro and Virgin will be contacted and on similar projects in the area, have indicated that each entity has no issues with supplying the development with Fibre based telecommunications for broadband. There cables shall be routed in dedicated ducting as described above. Once the vendors enter the development, these ducts shall be common to all providers, please see Figure 2. It shall terminate in an ETU interface module prior to entering the dwelling. 110 denotes 110mm diameter in ground duct. 38 denotes 38mm diameter in ground duct.

Telecoms shall be to Gigabit Infrastructure Act 2024 with the arrangements for Fibre broadband to dwellings and Apartments requiring common ducting, chambers etc.

9.5 RULES FOR ROAD OPENINGS AND SITE WORKS

For Clarity it is noted that all works where so required, will follow standard rules of work as per HSA "Code of Practice For Avoiding Danger From Underground Services" which details all requirements to ensure a safe and continued supply of Utility being amended and extended from an existing source.

Works to be carried out to Guidelines for Managing Openings in Public Roads, 2017, as published by Department of Transport, Tourism and Sport, please see Figure 16.7 for typical ducting standards.

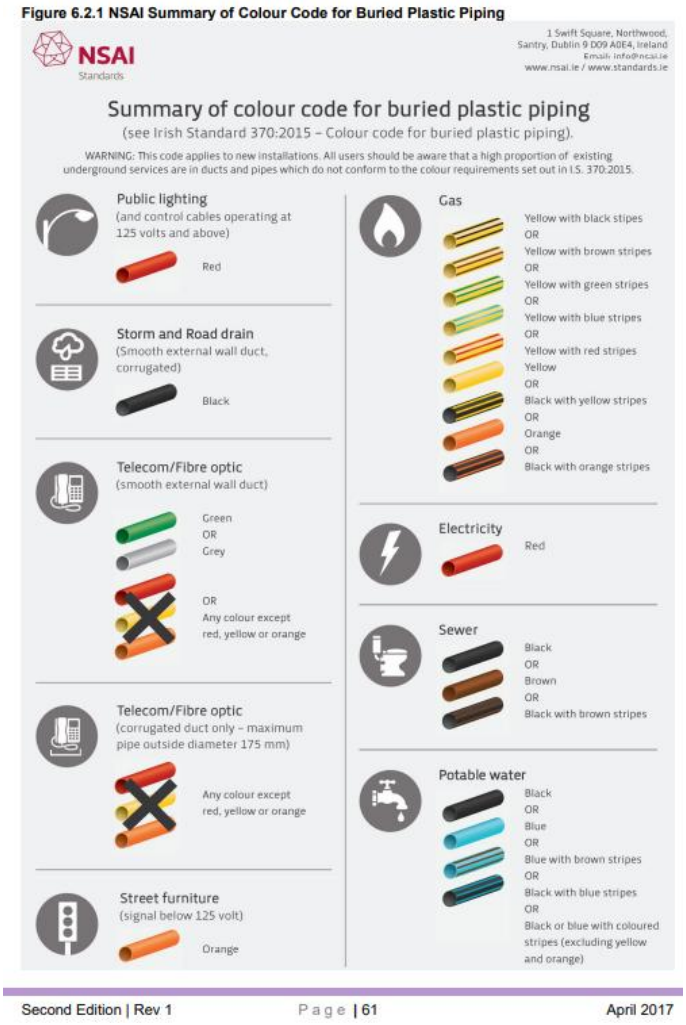


Figure 3 Extract from "Guidelines for Managing Openings in Public Roads"

9.6 IN DEVELOPMENT PATH SERVICES

Generally, all services will be ducted from existing connections to others infrastructure.

The services will be in dedicated ducting as described in IS370:2015 as described in the preceding paragraph.

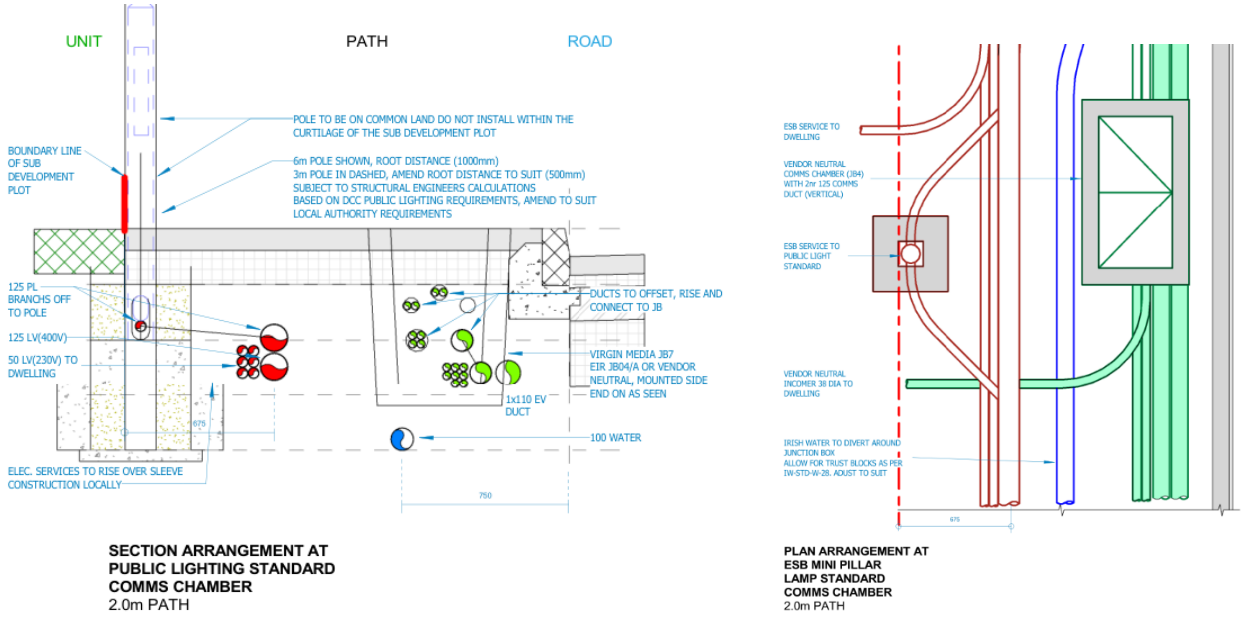


Figure 4 Example of In Path Services Co-ordination of Below Ground Services

10 USER INFORMATION

At the end of the project all relevant information will be published online with a link to the information being provided to each dwelling owner.

It shall comprise of but not limited to,

- Drawings of the unit(s)
- Details of the products used in the unit(s)
- Details of operation of same
- Wiring test reports and certifications to IS10101
- Fire Alarm test reports and certifications to IS3218 Part K
- Plumbing test reports and certifications to NSAI SR50-3, EN806
- Heat Pump test reports and certifications, F-Gas regulation requirement
- Public Health test reports and certifications for plumbing NSAI SR50-3, EN806
- These documents are typically entitled Operating and Maintenance (O&M) Manuals

11 DISTRICT HEATING

District heating was not considered as Apartments will be provided with Solar charging via Photovoltaic panels. All houses will be capable of 100% of roof supporting solar panels.

12 CRECHE AND OTHER COMMERICAL UNITS

The Creche is to achieve a nZEB rating of A2, using commercial NEAP as published by SEAI, it is to be heated by heat pumps with Solar PV Cells on the roof, covering up to 60% of the area of the roof as is typical for buildings of this type and energy classification.

Ventilation will be subject to current guidance relating to airborne infection control at the time of BER assessment, energy used will not be determined until final design is completed an shall not exceed the rating above.

At time of writing, 3 Air Changes Per hour, heat recovery ventilation unit(s) is proposed.

These units shall be to further applications for fire certification once the finalised plans are determined by the owner or tenant. The Part B, Part L, Part F, Part M shall all be demonstrated as being in compliance at that time.

APPENDIX 1 – DEAP (DOMESTIC ENERGY AUDITING PROCEDURE)

A Report by BER consultant, IHER has been prepared and is attached following this page

Please note,

- The DEAP is applicable to new and existing dwellings for compliance checking with Part L of the Irish Building Regulations 2019.
- For technical requirements, tables reference in the work book please refer to DEAP 4.2.2 Manual
- For Part L compliance at planning please refer to the report
- For Part F compliance at planning, Dwellings are provided with demand controlled extract ventilation systems.

PLANS

Refer to Architects General Arrangements for further details beyond information presented here after.

EPBD REQUIREMENTS

All Units to be assessed at time of BER submission, prior to Rent, Sale or Let of units as per EPBD (2018/844/EU) regulations.

BER certification will be issued prior to handover to a Family, Tenant or Landlord as is required.

REPORT

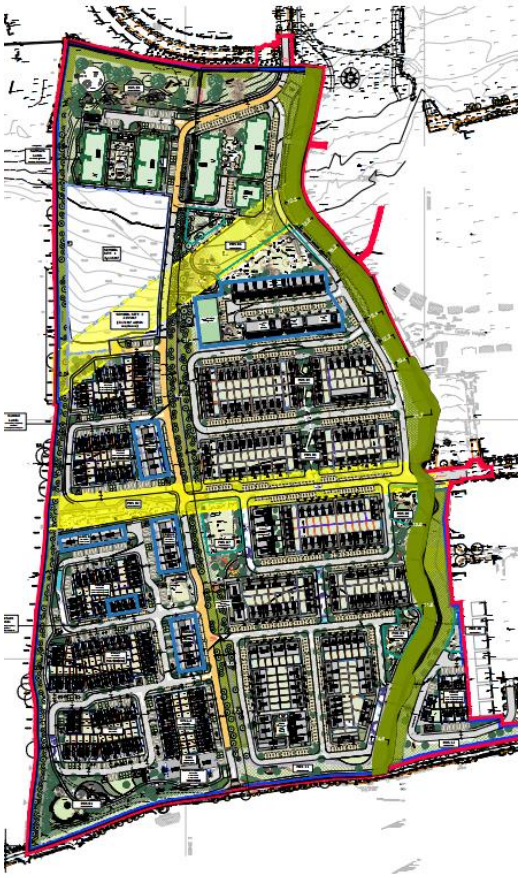
BER Report has been prepared by IHER Ltd., and is attached on the following pages

IHER are licenced by SEAI to carry out BER's and a sample of the most common units has been prepared.

All units will be required to achieve the Part L compliance criteria and shall be demonstrated to Building Control prior to the Sale of Units.

IHER Energy Services Ltd

Design Stage BER and TGD Part L 2022 Compliance Analysis for new development by Kelland Homes at Boherboy



Report prepared by:
Cristina Sanchez

IHER Energy Services Ltd
Unit 25 Docklands
Innovation Park
East Wall Road
Dublin 3 D03 P2K2

Version	Date	Amendments
0	14/11/2025	

Contents

1. Introduction

The aim of this study is to carry out a DEAP assessment and BER study of the new development by Kelland Homes at Boherboy, Saggart, Co. Dublin based on the design drawings provided in order to assess compliance with the requirements of the Department of Housing's Technical Guidance Document L 2022, more commonly referred to as TGD Part L 2022. (See full details in Appendix A).

TGD Part L 2022 sets out the minimum energy performance requirements for buildings and the application of these requirements to new buildings to achieve Nearly Zero Energy Buildings.

Nearly Zero-Energy Building (NZEB) means a building that has a very high energy performance, as determined in accordance with Annex I of the EU Energy Performance of Buildings Directive Recast (EPBD Recast) 2010/31/EU of 19th May 2010. The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby.

For new dwellings, the requirements of L1 shall be met by: -

(a) providing that the energy performance of the dwelling is such as to limit the calculated primary energy consumption and related carbon dioxide (CO2) emissions insofar as is reasonably practicable, when both energy consumption and carbon dioxide (CO2) emissions are calculated using the Dwelling Energy Assessment Procedure (DEAP) published by Sustainable Energy Authority of Ireland;

(b) 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;

(c) limiting heat loss and, where appropriate, availing of heat gain through the fabric of the building;

(d) providing and commissioning energy efficient space and water heating systems with efficient heat sources and effective controls;

(e) providing that all oil and gas fired boilers shall meet a minimum seasonal efficiency of 90%;

(f) ensuring that the building is appropriately designed to avoid the need for cooling

(g) providing to the dwelling owner sufficient information about the building, the fixed building services and their maintenance requirements so that the building can be operated in such a manner as to use no more fuel and energy than is reasonable.

A DEAP assessment should be carried out **early in the design process** to ensure that the dwelling when constructed complies with Part L. **Part L applies to the completed dwelling.** Alterations made in the design during construction are accounted for in the New Dwelling – Final assessment and could therefore affect compliance. **It is therefore important to consider and, using DEAP, track the effect of such decisions on Part L compliance.**

This document indicates the key requirements relating to compliance with TGD Part L 2022 and shows initial BER calculations for the proposed dwellings at design stage.

2. Design Stage Results Summary

The new development will comprise 609 dwellings where the main type dwellings are 2 & 3 storey end and mid terrace houses, duplex units, ground floor apartment below the duplex units and 2 & 3 bed apartments.

BER analysis has been conducted on the main dwelling types based on the specification outlined in Section 3 below.

Table 1 below provides a cross-check summary indicating that, for the proposed overall specification, **compliance will be achieved** with regard to the **backstop values** listed in TGD Part L.

Table 1: Backstop Compliance Checks

Building Fabric- Houses and Duplex units				
Element	**Detail**	**U Value Design**	**U Value Backstop**	**Compliance Achieved**
Floor 1	Solid	**0.11-0.16**	0.18	Yes
Roof 1	Pitched insulated at ceiling	**0.12**	0.16	Yes
Roof 2	Pitched insulated on slope	**0.16**	0.16	Yes
Roof 3	Flat dormer	**0.18**	0.2	Yes
Wall 1	Timber frame	**0.18**	0.18	Yes
Windows	Double PVC	**1.2**	1.4	Yes
Doors		**1.4**	1.4	Yes

Building Fabric- Block of Apartments				
Element	**Detail**	**U Value Design**	**U Value Backstop**	**Compliance Achieved**
Floor 2	Soffit floor exposed to bike areas	**0.15**	0.18	Yes
Roof 4	Green flat roof	**0.17**	0.2	Yes
Wall 2	Cavity wall filled	**0.17**	0.18	Yes
Wall 3	Exposed to unheated spaces as lift and risers	**0.52**	n/a	n/a
Windows	Double PVC	**1.2**	1.4	Yes
Doors		**1.4**	1.4	Yes

The dimensions and specification for the key dwelling types were entered into the DEAP 4 BER application. The BER results and key Part L 2022 compliance metrics for the mains dwelling types are summarised in table 2 below.

Table 2: Key Results

Table of results Variant 0						
Type	**Area m2**	**Energy Value kWh/m2/yr**	**Rating**	**EPC (0.30 max)**	**CPC (0.35 max)**	**RER (0.2 min)**
Type Gb House end of Terrace - 4 beds (West side- 3 Storeys)	158.50	35.47	A2	0.260	0.165	0.535
Type Ca House mid Terrace - 3 beds (West side-2 storeys)	96.83	37.63	A2	0.266	0.175	0.508
Type A1 Ground floor apartment block A1 - 2 beds (East side)	82.86	46.31	A2	0.290	0.190	0.200
Type F1 Ground floor apartment End of Terrace - 2 beds (East side)	78.52	53.47	A3	0.301*	0.195	0.208

These results show that the proposed specification solutions will achieve TGD Part L 2022 compliance for these dwelling types with regard to EPC, CPC and RER.

* While the EPC for Type F1 is just above 0.3, rounding down is allowed up to 0.304, so it would actually meet compliance.

Nevertheless, multiple minor factors will result in slightly different final result following site survey. TGD Part L allows an area weighted EPC average to be calculated for the whole block of duplexes and ground floor apartments. Thus, it is expected that compliance will be achieved either way.

3. Design Specification

The key design specifications for this BER study are provided in Table 3 below.

Table 3: Design Specification

Clonburris North - Design specification Version 1				
Building Fabric				
Element	**Detail**	**Description**		**U Value**
Floor 1	Solid	130mm Kore EPS70, λ=0.031 W/mK, on 150mm concrete slab		0.13-0.16
Floor 2	Soffit floor exposed to bike areas	120mm phenolic Safe-R, λ=0.020 W/mK, below reinforced concrete		0.15
Roof 1	Pitched roof, flat ceiling	400mm rockwool, λ=0.044 W/mK, with 200mm laid between and 200m laid over joists		0.12
Roof 2	Pitched roof, slope ceiling	170mm mineral wool roll between rafters, λ=0.044 W/mK, and 60mm Xtratherm XT below, λ=0.022 W/mK, plus 12.50mm plasterboard		0.16
Roof 3	Flat dormer roof	12.5mm plasterboard, 50mm Xtratherm XT, λ=0.022 W/mK, 140mm joists with 140mm mineral wool, λ=0.044 W/mK, 9mm OSB, 50mm cavity, 18mm WBP sheet and 5mm weather seal		0.18
Roof 4	Green flat roof	Warm flat roof with 140mm PIR insulation above joists, λ=0.025 W/mK		0.17
Wall 1	Timber frame	15mm plasterboard, 50mm Xtratherm XT/TL, λ=0.022 W/mK, with 140mm x 38mm stud filled mineral wool, λ=0.044 W/mK, 9mm OSB, 50mm cavity and 100mm outer brick leaf		0.18
Wall 2	Cavity wall filled	100mm outer brick leaf, 140mm cavity with 100mm NYRock insulation, λ=0.032 W/mK, and 19mm coreboard, plus 124mm SFS framing fill with 100mm NYRock insulation, λ=0.032 W/mK, airtight membrane and 15mm plasterboard		0.17
Wall 3	Exposed to unheated spaces as lift and risers	180mm reinforce concrete, 50mm mineral wool between steel studs, λ=0.044 W/mK		0.52
Openings		**Description**	**U Value**	**G factor**
Windows		Double PVC	1.2	0.73
Door		Solid	1.4	n/a
Ventilation				
Whole house extract ventilation, Aereco V4A Premium – Considered for houses				
Whole house extract ventilation, Joule Modul-AIR ALL-E – Considered for ground floor apartment below duplex and complex of apartments				
Air Permeability Test Target: 3 m3/(h*m2) @50Pa				

Thermal Bridging
Thermal bridging factor of 0.15 W/m2K
Lighting
100% energy efficient lights (LED and CFLs only)
Space and water heating details
Air to water heat pump Panasonic WH-ADC0509L3E5UK+WH-WDG07LE5 – Considered for houses Exhaust air heat pump Joule Modul-AIR ALL-E – Considered for ground floor apartment below duplex and complex of apartments Radiators at each level 55°C design flow temperature Uninsulated Primary Pipework
180 litre hot water cylinder
2 x Unvented hot water showers and 1x bath– Considered for houses 1 x Unvented hot water showers and 1x bath– Considered for ground floor apartment below duplex and complex of apartments
Full time and temperature zone control, cylinder thermostat– Considered for houses and duplexes Programmer, room thermostat, cylinder thermostat– Considered for ground floor apartment below duplex
PV Solar panels
N/A

4. Additional Assumptions for BER Calculation

The main design specification details are listed in Table 3. Information on additional assumptions used in the BER calculation is detailed below.

4.1. Dimensions

Dimensions taken from Autocad drawings supplied by Kelland Homes. The dimensions in DEAP are based on internal dimensions.

4.2. Living Area

The living area is the largest public room added to all rooms not separated from that room. DEAP assumes the living area is heated to 21°C and the rest of the house is heated to 18°C. Thus, the larger the living area, the greater the heating demand.

4.3. Thermal Bridging Factor

Table 4: Summary of DEAP inputs		
Variant	**Design/ assumed value**	**TGD Part L requirements**
Thermal Bridging Factor (y-value)	0.08 (All junctions designed and constructed in accordance with ACDs)	0.15 or lower

NB: In order to use a thermal bridging factor of 0.08, the 'Acceptable Construction Details [1]' issued by the Department of Environment, Community and Local Government (DECLG) must be used and the relevant drawings signed off by the developer, builder, site engineer or architect.

Details of the documentation that must be provided by the developer, builder, site engineer or architect are provided in Appendix B.

The BER Assessor must retain the relevant drawings and associated sign off in support of thermal bridging factor entered.

Please note that if signed-off ACD documentation is not provided, a thermal bridging factor of 0.15 must be used and thus the ratings will worsen and the dwellings may not comply.

4.4. Thermal Mass

The DEAP calculation takes account of a dwelling's capacity to store heat within its structure (internal heat capacity). The position of insulation affects the internal heat capacity of a construction. If a masonry component is insulated internally, the masonry will not contribute internal heat capacity, but if insulated externally, it will. The internal heat capacity of a building element (wall, roof, floor, internal partition, etc.) is determined primarily by the properties of the layers adjacent to the living space.

The index of internal heat capacity required is the thermal mass category of the dwelling. The five options are: low, medium-low, medium, medium-high or high.

Thermal Mass categories of Medium-Low was used for different dwelling types within this study.

4.5. Overshading

Over shading of a window is an estimate of the sky which is blocked when viewed outwards from the centre point of the window in question. The level of over shading affects the amount of solar gains through the windows and this affects the space heat demand. Overshading is assessed during the site survey for the final BER. We have assumed average levels of overshading.

[1] Acceptable Construction Details:
http://www.housing.gov.ie/search/archived/current?query=acceptable%20construction%20details

4.6. Lighting

A light bulb must be A-rated to count as a low energy light. Typically, this includes CFLs and LEDs.

For the base cases and all variants, **100%** low energy lighting has been assumed.

Please note: In order to be counted as a low energy light, **the light bulb must be in place at the time of the final BER survey.** Portable lamps are not accounted for in DEAP.

4.7. Space Heating Controls – Time & Temperature Zone Control

At least two room thermostats and a programmer are required to provide time and temperature zone control.

4.8. Water Heating Controls

All showers are assumed to be connected to unvented hot water systems.

APPENDIX A

TGD Part L 2022 Compliance Requirements

TGD Part L 2022 sets out the minimum energy performance requirements for buildings and the application of these requirements to new buildings to achieve Nearly Zero Energy Buildings.

The backstop values listed in the table below must be satisfied. These backstop values are checked and reported on within the BER application.

Overall Dwelling Performance	**2022 (NZEB)**
Improvement	70%
MPEPC	0.3
MPCPC	0.35
Individual Backstop Values - Part L 2021	
Renewable - Heat / Electrical (kWh/m^2/y)	Renewable Energy Ratio (RER) = 0.2
Pitched Roof U-value - Ceiling/Slope	0.16/0.16
Flat Roofs U-value	0.2
Walls U-value	0.18
Floors U-value	0.18
Floors with under floor heating U-value	0.15
Windows etc. (25% of floor area)	1.4
Air Tightness (m^3/hr/m^2 @ 50 Pa)	5
Boiler Efficiency	90%
SFP for balanced systems (W/litre/sec)	1.2

Limitation of Primary Energy Use and CO2 Emissions

The calculated primary energy consumption of the proposed dwelling is divided by that of the reference dwelling (as outlined in Appendix C of Part L 2021), the result being **the energy performance coefficient (EPC)** of the proposed dwelling.

To demonstrate that an acceptable primary energy consumption rate has been achieved, the calculated EPC of the dwelling being assessed should be no greater than the **Maximum Permitted Energy Performance Coefficient (MPEPC).** The MPEPC is **0.3**.

To demonstrate that an acceptable CO2 emission rate has been achieved, the calculated CPC of the dwelling being assessed should be no greater than the **Maximum Permitted Carbon Performance Coefficient (MPCPC)**. The MPCPC is 0.35.

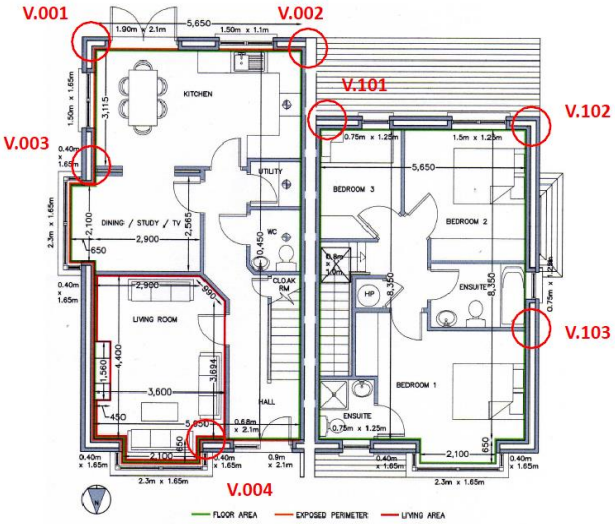
It is important to note:

- The individual performance levels as detailed in TGD Part L are in the nature of **backstop minimum performance levels**. Just meeting these minimum performance levels will not result in compliance with primary energy consumption & related CO_2 emissions. One or more of the individual performance levels specified will need to be exceeded **to achieve whole dwelling performance (EPC and CPC) compliance**.

APPENDIX B

SEAI requirements for substantiating ACD's / certified details

1	Plans, sections and elevations with each key junctions labelled. All drawings to be signed and dated by a relevant person. The plans below show an example of labelling vertical junctions on floor plans



2	Manifest of all key junctions and their corresponding Acceptable Construction Detail / certified detail

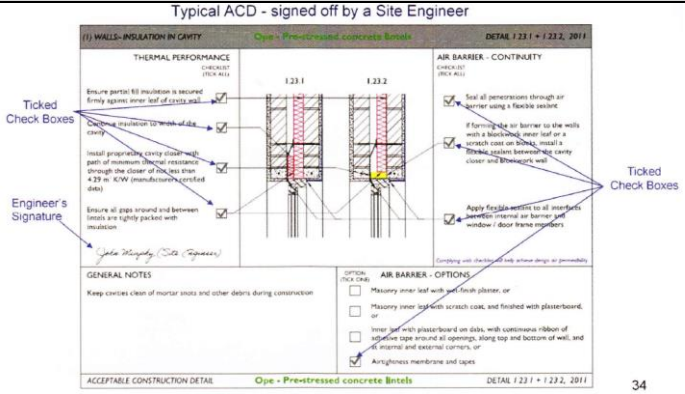
Dwelling Type: Type A (2-storey, 3-bedroom, semi-detached)
Dwelling Address: 5 Park Avenue, New Street, Co. Dublin

Thermal Bridge	Corresponding ACD / certified detail
V.001	1.27.1, 2011
V.002	1.06.1, 2011
V.003	1.08, 2011
V.101	1.06.1, 2011
V.102	1.27.1, 2011

Signature: _____ (Site Engineer)
Date: _____

3	Each ACD must also be printed and signed with all boxes ticked as appropriate confirming compliance

Typical ACD - signed off by a Site Engineer



APPENDIX C

Documentation required for final BER

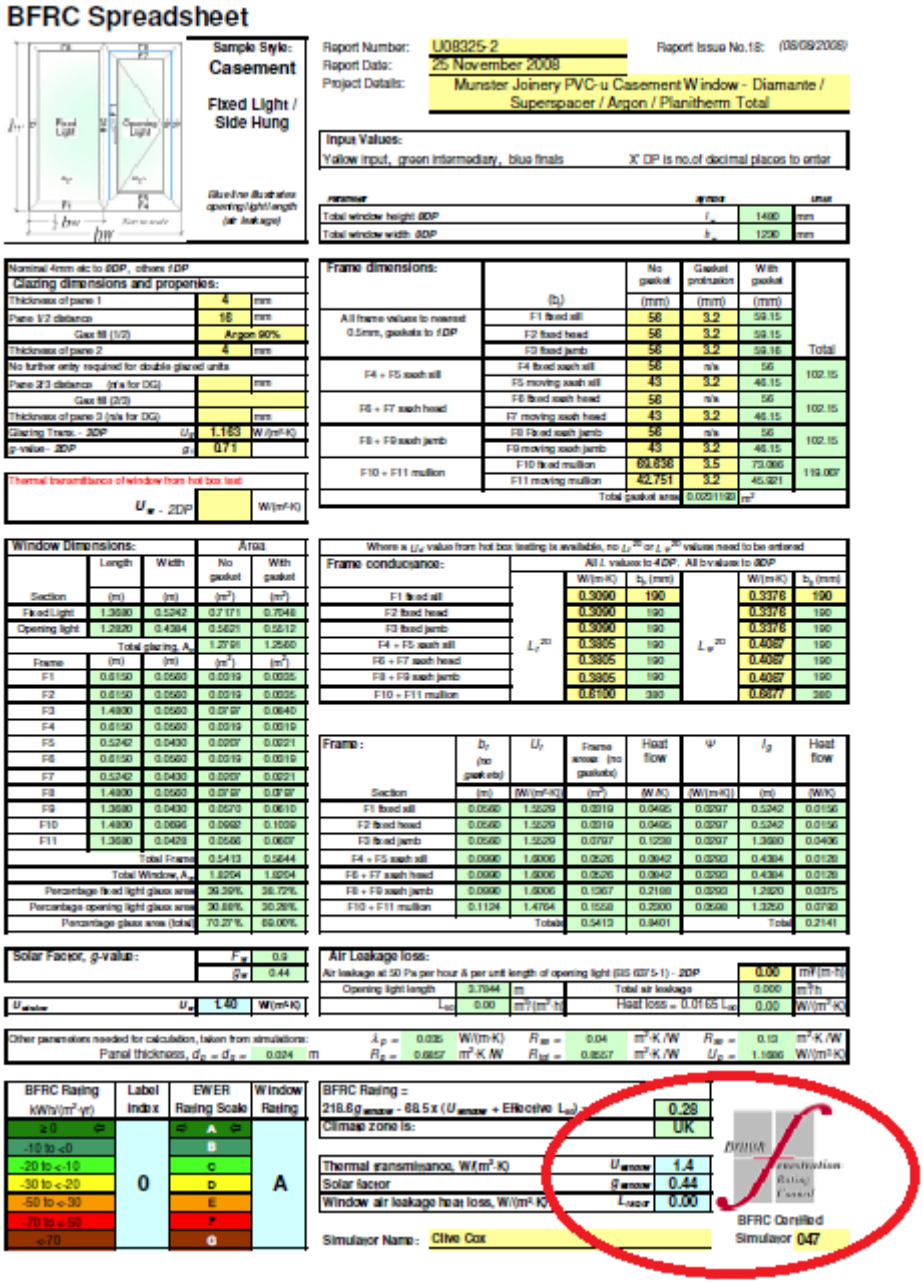
- Listing of all insulation products used, and certified data for all insulation materials used;
- As constructed build-ups of all exposed elements confirmed by architect / contractor including thickness of each layer;
- Certificates for doors, windows and roof lights (See Appendix D for more details) - certificates acceptable for use in DEAP must comply with the following:
    - Produced by an accredited test centre or CE marked
    - Certificates must state certified U-value for the window
    - Certificates must state solar transmittance value
    - Size of window tested: If the window tested is 1.48m high * 1.23m wide, the certificate will be acceptable for use for all window sizes of that type. Where the test results are based on a size other than 1.48m * 1.23m, the window size on the cert must match the size of the window installed.
- Copy of air tightness test report produced by registered air tightness tester;
- Where installed, make and model of mechanical ventilation system and ducting type (if applicable)
    - Proof that MHRV or DCV system is listed on the UK SAP Appendix Q
    - Where rigid ducting is installed, proof of the performance data taken from SAP Appendix Q database.
    - Where semi-rigid ducting is installed and the type of ducting shall be listed on SAP Appendix Q database.
- Where a thermal bridging factor (y-value) of less than 0.15 is applied in the DEAP assessment, the following documentation is required
    - Set of drawings (plans and sections) with all key junctions highlighted and referenced with the applicable acceptable construction detail and/or certified detail
    - A copy of each acceptable construction detail and/or certified detail used – signed by assigned certifier / engineer / contractor.
- Where a room heater is installed (a stove for example):
    - provide details of make and model and flue type if applicable (e.g. balanced flue / open flue)
    - provide copy of the independent test certificate for the stove listing the Gross efficiency. Stove certs should be provided to IHER to enable checks to ensure the test certs meet SEAI standards.
- Where a heat pump has been installed, the following is required:
    - Designer / installer sign off- sheet completed by the Installer (address specific)
    - Completed heating design sheet to SR50 standard where design flow temperature <55C used for radiator systems (address specific)
    - Eco design data for the heat pump installed
    - Certified reference hot water temperature for the heat pump
- Where PV panels have been installed
    - Certificate of performance for PV panels
    - Commissioning report for PV panels installed specific to the address.
- Where solar thermal system has been installed
    - Make & model and commissioning report of the system installed.

APPENDIX D

Sample Window Certificate of Thermal Performance

When using non-default values for windows and doors, the window cert must show <u>both</u> the thermal transmittance (U-value) and Solar Transmittance (g). See example below. Measurements of thermal transmittance for doors and windows should have a CE mark and should be made according to IS EN ISO 12567-1. Alternatively, U-values of windows and doors may be calculated using IS EN ISO 10077-1 or IS EN ISO 10077-2.

All non-default data used in calculations must be obtained from accredited sources such as the NSAI Window Energy Performance certification scheme or the British Fenestration Rating Council.



BFRC Spreadsheet

Sample Style: Casement — Fixed Light / Side Hung

Report Number: U08325-2 — Report Issue No.18: (05/09/2008)
Report Date: 25 November 2008
Project Details: Munster Joinery PVC-u Casement Window - Diamante / Superspacer / Argon / Planitherm Total

Input Values:
Yellow input, green intermediary, blue finals — 'X' DP is no.of decimal places to enter

parameter	symbol		unit
Total window height 0DP	l_w	1480	mm
Total window width 0DP	b_w	1230	mm

Nominal 4mm etc to 0DP, others 1DP

Glazing dimensions and properties:

Thickness of pane 1	4	mm
Pane 1/2 distance	16	mm
Gas fill (1/2)	Argon 90%	
Thickness of pane 2	4	mm
No further entry required for double glazed units		
Pane 2/3 distance (n/a for DG)		mm
Gas fill (2/3)		
Thickness of pane 3 (n/a for DG)		mm
Glazing Trans. - 2DP U_g	1.183	W/(m²·K)
g-value - 2DP $g_\perp$	0.71	

Thermal transmittance of window from hot box test

U_w - 2DP		W/(m²·K)

Frame dimensions:

	(b$_f$)	No gasket (mm)	Gasket protrusion (mm)	With gasket (mm)	
All frame values to nearest 0.5mm, gaskets to 1DP	F1 fixed sill	56	3.2	59.15	
	F2 fixed head	56	3.2	59.15	
	F3 fixed jamb	56	3.2	59.15	Total
F4 + F5 sash sill	F4 fixed sash sill	56	n/a	56	102.15
	F5 moving sash sill	43	3.2	46.15	
F6 + F7 sash head	F6 fixed sash head	56	n/a	56	102.15
	F7 moving sash head	43	3.2	46.15	
F8 + F9 sash jamb	F8 Fixed sash jamb	56	n/a	56	102.15
	F9 moving sash jamb	43	3.2	46.15	
F10 + F11 mullion	F10 fixed mullion	69.838	3.5	73.066	119.007
	F11 moving mullion	42.751	3.2	45.921	
	Total gasket area	0.0291192	m²		

Window Dimensions:

	Length (m)	Width (m)	Area No gasket (m²)	Area With gasket (m²)
Section				
Fixed Light	1.3680	0.5242	0.7171	0.7548
Opening light	1.2820	0.4384	0.5621	0.5512
Total glazing, A_g			1.2791	1.2560
Frame	(m)	(m)	(m²)	(m²)
F1	0.6150	0.0560	0.0319	0.0335
F2	0.6150	0.0560	0.0319	0.0335
F3	1.4800	0.0560	0.0797	0.0840
F4	0.6150	0.0560	0.0319	0.0319
F5	0.5242	0.0430	0.0207	0.0221
F6	0.6150	0.0560	0.0319	0.0319
F7	0.5242	0.0430	0.0207	0.0221
F8	1.4800	0.0560	0.0797	0.0797
F9	1.3680	0.0430	0.0570	0.0610
F10	1.4800	0.0696	0.0992	0.1039
F11	1.3680	0.0428	0.0566	0.0607
Total Frame			0.5413	0.5644
Total Window, A_w			1.8204	1.8204
Percentage fixed light glass area			39.39%	38.72%
Percentage opening light glass area			30.88%	30.28%
Percentage glass area (total)			70.27%	69.00%

Where a U_w value from hot box testing is available, no L_f^{2D} or L_g^{2D} values need to be entered

Frame conductance:

	All L values to 4DP. All b values to 0DP				
	L_f^{2D} W/(m·K)	b_f (mm)	L_g^{2D} W/(m·K)	b_g (mm)	
F1 fixed sill	0.3090	190	0.3376	190	
F2 fixed head	0.3090	190	0.3376	190	
F3 fixed jamb	0.3090	190	0.3376	190	
F4 + F5 sash sill	0.3805	190	0.4087	190	
F6 + F7 sash head	0.3805	190	0.4087	190	
F8 + F9 sash jamb	0.3805	190	0.4087	190	
F10 + F11 mullion	0.8100	380	0.8877	380	

Frame:

Section	b_f (no gaskets) (m)	U_f (W/(m²·K))	Frame areas (no gaskets) (m²)	Heat flow (W/K)	Ψ (W/(m·K))	l_g (m)	Heat flow (W/K)
F1 fixed sill	0.0560	1.5529	0.0319	0.0495	0.0297	0.5242	0.0156
F2 fixed head	0.0560	1.5529	0.0319	0.0495	0.0297	0.5242	0.0156
F3 fixed jamb	0.0560	1.5529	0.0797	0.1238	0.0297	1.3680	0.0406
F4 + F5 sash sill	0.0990	1.6006	0.0626	0.0842	0.0293	0.4384	0.0128
F6 + F7 sash head	0.0990	1.6006	0.0626	0.0842	0.0293	0.4384	0.0128
F8 + F9 sash jamb	0.0990	1.6006	0.1367	0.2188	0.0293	1.2820	0.0375
F10 + F11 mullion	0.1124	1.4764	0.1558	0.2300	0.0598	1.3250	0.0793
		Totals	0.5413	0.8401		Total	0.2141

Solar Factor, g-value:

F_w	0.9	
g_w	0.44	

U_{window}	1.40	W/(m²·K)

Air Leakage loss:

Air leakage at 50 Pa per hour & per unit length of opening light (BS 6375-1) - 2DP: 0.00 m³/(m·h)

Opening light length	2.7044	m	Total air leakage	0.000 m³/h
L_{AD}	0.00	m³/(m²·h)	Heat loss = 0.0165 L_{AD}	0.00 W/(m²·K)

Other parameters needed for calculation, taken from simulations:

Panel thickness, d_p = d_g =	0.024	m	L_p =	0.035	W/(m·K)	R_{se} = 0.04 m²·K/W
			R_g =	0.6857	m²·K/W	R_{sw} = 0.13 m²·K/W
			R_{tot} =	0.8557	m²·K/W	U_p = 1.1686 W/(m²·K)

BFRC Rating kWh/(m²·yr)	Label Index	EWER Rating Scale	Window Rating
≥ 0	0	A	A
-10 to <0		B	
-20 to <-10		C	
-30 to <-20		D	
-50 to <-30		E	
-70 to <-50		F	
<-70		G	

BFRC Rating = 218.6 g_{window} - 66.5 x (U_{window} + Effective L_{AD}): 0.28
Climate zone is: UK

Thermal transmittance, W/(m²·K)	U_{window}	1.4
Solar factor	g_{window}	0.44
Window air leakage heat loss, W/(m²·K)	$L_{AD/A}$	0.00

Simulator Name: Clive Cox

BFRC Certified Simulator 047