T5 PARTNERSHIP LTD.

Energy Statement & Report on Sustainability Measures

Document 1 of 1

FOR

Proposed Development at
Riverbank Arts Centre
Main St. Greatconnell
Newbridge
CO. Kildare

On behalf of

Client:

Studio Red Architects

June 2026

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1. Introduction

The Energy Statement has been prepared by T5 Partnership Ltd. for our client, Studio Red Architects as part of design submission for the proposed extension and renovation of Riverbank Art Centre in Newbridge, Co. Kildare.

Riverbank Arts Centre are planning to demolish the existing Arts Centre building and construction of a new of new Arts Centre building including the renovation and part fabric upgrade of the adjoining library office building.

T5 Partnership and Studio Red Architects are equally bound to supporting energy conservation and energy efficiency measures to reduce the emissions of greenhouse gases and incorporate the principles of sustainability. In Urban centres, on average, 55% of buildings are responsible for total CO2 emissions so therefore sustainable design can realize the greatest possible opportunities for CO2 reduction.

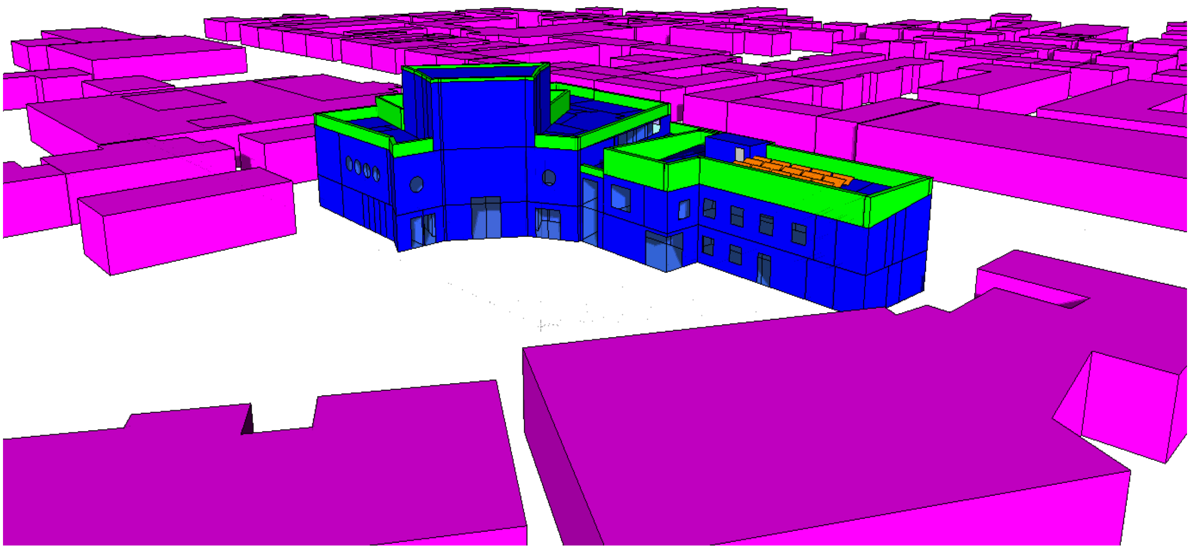


Figure 1.0 3D Representation of Energy Model

This Energy Statement emphasizes how the long-term management of the proposed development will be accommodated and how total energy considerations have been focused. This Energy Statement also includes how the development will achieve Nearly Zero Energy Buildings (NZEB) requirements and comply with Technical Guidance Document (TGD) Part L – Conservation of Fuel and Energy 2022 (Buildings other than Dwellings), which is the relevant standard for energy performance and CO2 emissions in Republic of Ireland. The Design team scheme will meet and/or exceed where possible building fabric and HVAC performance requirements to those stipulated in the applicable Buildings Regulations. Many sustainable design options for the building services systems have been considered for the proposed development.

Assessments carried out in this report are based on latest floor plans and elevations received from the architect and all design parameter figures and assumptions stated are based on the current preliminary design received from the design team; these are subject to change during detailed design

2. Kildare County Development Plan 2023-2029

The Kildare County Development Plan 2023 sets out the impact of climate change and how to address this impact into the future. The proposed redevelopment of the Arts Centre will comply with the new guidelines outlined in the Kildare County Development Plan. The specific policy sections addressing energy efficient design are as follows:

2.1. Policy 15.9.3.2 Energy Efficiency and Climate Change Adaptation Design Statement

Development proposals for Industrial, Warehousing, Business and Technology Park developments in excess of 1,000 m² of commercial floor space should be accompanied by an Energy Efficiency and Climate Change Adaptation Design Statement.

The statement should detail how any on-site demolition, construction and long-term management of the development will be catered for and how energy and climate change adaptation considerations have been inherently addressed in the design and planning of the scheme.

Such developments shall have regard to;

- *"The requirements of the current Building Regulations Part L – Conservation of Fuel and Energy (2008 and 2011), and any other supplementary or superseding Regulations or guidance documents."*

- *"The DECLG guidance document 'Towards nearly Zero Energy Buildings in Ireland - Planning for 2020 and Beyond', which promotes the increase of near Zero Energy Buildings (nZEB)."*

New development proposals shall show how energy efficiency is achieved through siting, layout, design and incorporate best practice in energy technologies, conservation, and smart technology.

The author of an Energy Efficiency and Climate Change Adaptation Design Statement should be appropriately qualified or competent and shall provide details of their qualifications and experience along with the statement.

2.2. Policy EC P2 & P3: Renewable Energy

"Promote renewable energy use generation and associated electricity grid infrastructure at appropriate locations within the built environment and open countryside to meet national objectives towards achieving a net zero carbon economy by 2050."

"Support the roll-out of the Smart Grids and Smart Cities Action Plan enabling new connections, grid balancing, energy management and micro grid development."

Renewable energies will play a crucial role in the future in the drive the reduction in Green House Gases emission and transition to a low carbon society. Kildare County development plan offers a range of opportunities for renewable energy. It also supports the increase in use of renewable energy resources namely heat pumps, district heating, solar photovoltaic, geothermal, solar thermal, hydro, tidal power, offshore and small-scale onshore wind.

3. Summary of Part L 2022 (Buildings Other Than Dwellings)

The Part L 2022 (Buildings Other Than Dwellings) is the building regulation guidelines which is followed in Ireland for all the new buildings or any building going under major renovation. All buildings constructed after 27th July 2021 must follow the Part L guidelines. The Part L 2022 (Buildings Other Than Dwellings) regulations set the energy performance conditions to succeed Nearly Zero Energy Buildings performance as required by Article 4 (1) of the mandate for the new buildings.

3.1. Nearly Zero Energy Building Energy (NZEB)

The definition of Nearly Zero Energy Buildings is defined as:

"Nearly zero-energy building' means a building that has a very high energy performance, as defined in Annex 1. The nearly zero or very low amount of energy required should be covered to a significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby".

For new buildings other than dwellings, 'L1' requirements 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) emissions to a Nearly Zero Energy Building level insofar as is reasonably practicable, when both energy consumption and Carbon Dioxide emissions are calculated using the Non-domestic Energy Assessment Procedure (NEAP) by Sustainable Energy Authority of Ireland (1.00 for EPC and 1.15 for CPC)
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 produced on-site or nearby.
c) Limiting the heat loss and, where appropriate, availing of the heat gains through the fabric of the building.
d) Providing and commissioning energy efficient space heating and cooling systems, heating and cooling equipment, water heating systems and ventilation systems with effective controls.
e) Ensuring that the building is appropriately designed to limit need for cooling and where air conditioning or mechanical ventilation is installed, that installed systems are energy efficient, appropriately sized and adequately controlled.
f) Limiting heat loss from pipes, ducts and vessels used for transport or storage of heated water or air.
g) Limiting the heat gains by chilled water and refrigerant vessels and by pipes and ducts that serves air conditioning systems.
h) Providing energy efficient artificial lighting systems and adequate control of these systems.
i) Providing sufficient information to the building owner or occupants about building as well as fixed building services, how to control and maintain the systems so that buildings can function in such a way that it will not use excess of fuel and energy than required.

In addition, Part L (2022) – Buildings Other Than Dwellings now includes requirements relating to self-regulating devices and electrical vehicle charging.

For new and existing buildings other than dwellings, the Part L 2022 (Buildings Other Than Dwellings) 'Regulation 5' requirements shall be met by:

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;

b) Where a heat generator is being replaced in an existing building, where technically and economically feasible, self-regulating devices shall also be installed;

c) A building which has more than 10 car parking spaces, that is:

   i. New, or

   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.

d) 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 renovation concerned include the car park or the electrical infrastructure of the building; or
   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.

3.2. Building Energy Rating (BER)

Building Energy Rating (BER) certificate shows that the building energy performance on a grading scale from A to G and **A0** being the most energy efficient.

BER is calculated based on following points:

- Building Fabric
- Building Orientation
- Thermal envelope
- Air permeability
- Space heating
- Hot water demand
- Ventilation
- Lighting

The energy performance of the building is expressed as follows;

- The primary energy use per unit floor area per year (kWh/m2/yr) represented on an A to G scale

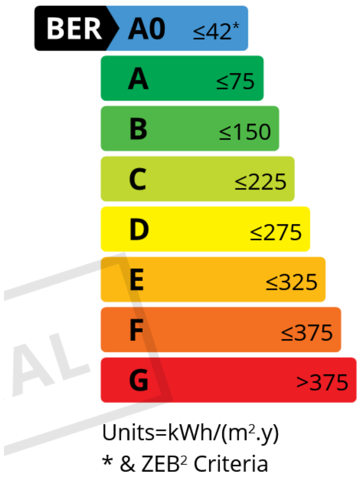


Figure 2.0 Representation of BER Chart

3.3. Renewable Energy Ratio (RER)

The major change was introduced as a part of Part L 2022 (Building Other Than Dwellings) that for all non-residential buildings must meet all performance requirements as follows:

1. The new policies will require a major level of energy provision be provided onsite or nearby renewable energy technologies, e.g. solar energy (thermal and photovoltaic), air and exhaust air source heat pumps, combine heat and power, biomass boiler etc.

2. The current NZEB requirements does not allow the renewable requirements to be met through the purchase of off-site green electricity.

3. There are two routes in achieving compliance with the renewable target:
   a. Option 1 – If the Part L compliance is achieved with no tolerance, 20% of the building's energy use must be provided by onsite or near site renewables sources.
   b. Option 2 – If the Part L compliance is achieved with a minimum of 10% margin, then 10% of the building energy use must be provided by onsite or near site sources. To achieve the 10% margin, the building envelope, lighting and M&E specification will likely have to exceed the minimum requirements.

4. Building Fabric

To limit the heat loss through the façade, careful consideration must be shown when designing the external façade. The specification of the insulation utilised, and the continuity of insulation are crucial. Insulation slows the rate at which heat is lost to the atmosphere. Heat flows in three ways: by conduction, convection, and radiation.

The target maximum average elemental U-values for this development are detailed as follows:

FABRIC ELEMENTS	Part L 2022 Limiting Values	TARGETS (W/m^{2}K)
External Wall	0.21	0.21
Ground Floor	0.21	0.21
External Doors, Windows and Rooflights	1.60	1.60
Roof	0.20	0.16

4.1. Air Permeability

In addition to fabric heat loss/gain, considerable care will be taken during the design and construction to limit the air permeability. High levels of infiltration can contribute to uncontrolled ventilation. Infiltration is unlikely to provide adequate ventilation as required in a correct location. It is important, as air permeability is reduced, that adequate purpose designed provided ventilation is provided. Part L requires an air permeability level no greater than 5m^3/m^2/hr @50Pa for a new building which represents a reasonable upper limit of air tightness. The target air permeability for this development is 3m^3/m^2/hr @50Pa.

4.2. Thermal Bridging

To avoid excessive heat losses and local condensation problems, consideration will be given to ensure continuity of insulation and to limit local thermal bridging, e.g. around windows, doors, and other wall openings at junctions between elements and other locations. There are no specific Psi value targets required for buildings other than dwellings for development or renovation works. However, condensation risks still must be assessed in accordance with Part L 2022- Buildings other than Dwellings.

5. Passive Solar Design

5.1. Overview

In order to achieve a building energy performance that complies with Building Regulations Part L (2022) and improves the energy performance of buildings, measures to design naturally low energy demand must be incorporated within the scheme. These measures are applied in accordance with legislation to reduce energy demand at source.

Passive design measures manage internal heating through Solar Gain and it reduces the need for heating and cooling. Buildings that are aligned with south-east orientation are observed to maximize daylight and sunlight (i.e. solar gain), subsequently reducing energy consumption with excessive heating and lighting requirements.

5.2. Assessment

Although the orientation of the building is largely determined by location and access to site, the design team has managed to optimize solar gain through the consideration of building orientation and spacing, wherever possible.

1. The building should be designed and constructed so that:
    a. Those occupied spaces that rely on natural ventilation do not risk unacceptable levels of thermal discomfort due to overheating caused by solar gain; and
    b. Those spaces that incorporate mechanical ventilation or cooling do not require excessive plant capacity to maintain the desired space conditions.
2. For the purpose of Part L, reasonable provision for limiting solar gain through the building fabric would be demonstrated by showing that for each space in the building that is either occupied or mechanically cooled, the solar gains through the glazing aggregated over the period from April to September inclusive are no greater than would occur through one of the following glazing systems with a defined total solar energy transmittance (g-value) calculated according to I.S. EN410:2011.
    a. For every space that is defined as the side lit, reference case is an east facing façade with full width glazing to a height of 1m having framing factor of 10% and a g-value of 0.68.
    b. For top lit spaces, reference case is a horizontal roof of the same total area that is 10% glazed as viewed from the inside out and having roof lights that have a framing factor of 25% and g-value of 0.68.
    c. For purpose of this guidance, an occupied space means a space that is intended to be occupied by the same person for substantial part of the day. This excludes the circulation spaces and other areas of transient occupancy such as toilets and spaces not intended for occupation, e.g. display windows.

For Ireland, solar gain from a period of April to September comes around 217.03kWh/m. Assessment was carried out with g-value 0.40 to limit solar gains while not adversely affecting the winter heating demand or daylight provision.

Top floor zones such as General Office, Admin Offices, Shared Spaces and Conference Room requires provision of mechanical ventilation to meet cooling demands. Another solution to control solar gains is an inclusion of low emissivity coating to the glass, this will reduce the solar energy transmitted through the glazed panes. Additionally, roller blinds can be specified and it will assist in reducing glare as a result of direct light into the space.

6. Mechanical Services

It is proposed that the primary fuel for this building is direct electric, with Air Source Heat pumps located on the roof providing low temperature hot water for space heating needs. Domestic hot water is provided by a heat pump unit also. The building services will be controlled by a central Building Management System (BMS), designed to optimize 'intelligent' heating, cooling and ventilation. The following technologies have been assumed for preliminary assessments:

6.1. Heating and Cooling

The space heating requirements will be reduced by the passive fabric and air tightness measures mentioned above. Outdoor Air Source heat pump units provide space heating and cooling to most areas in the buildings. It is proposed that these units are housed together in a screened area on the roof. A constant air volume all air systems will provide heating and cooling to auditorium area. Low Temperature hot water generated via a dedicated air source heat pump will serve underfloor heating/low temperature radiators/ceiling recessed radiant panels to provide heating to the rest of the occupied zones. Outdoor units supplying heating and cooling to the internal systems utilize proprietary controls which can transfer waste heat from one zone to another (if one zone is calling for cooling and another heating). Simple thermostatic control over this system is provided using local remote controllers, which the occupants can use to select the desired temperatures in each zones.

Figure 3.0 Typical Rooftop Heatpump Unit

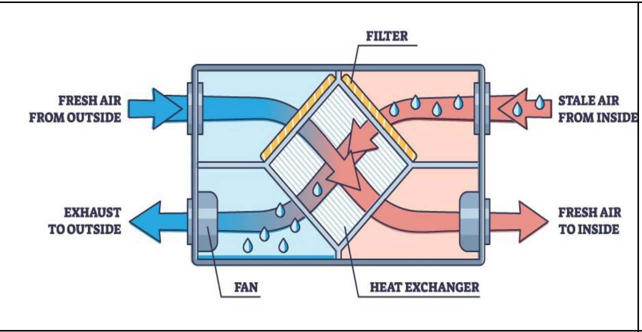
These types of systems are highly efficient and their performance is measured in COP (Coefficient of Performance) for heating and EER (Energy Efficient Ratio) for cooling.

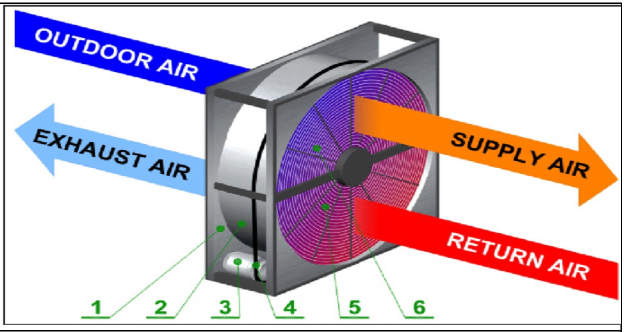
Typically, the COP will be ≥ 3.0 (i.e. 1 unit of electricity will provide 3 units of heating). Similarly the EER will be ≥ 2.5.
By comparison a central heating system using gas will only be 90% efficient i.e. one unit of gas will provide 0.9 units of heat.

6.2. Ventilation

The intention is to provide ventilation by natural means where feasible, by utilizing openable windows. This reduces the need of Air Handling Units (AHUs) which would be consume both thermal and electrical energy e.g. electrical energy to power the fans and thermal energy to heat and cool the supply air to an acceptable temperature.

Where minimum fresh air ventilation rates cannot be achieved by natural means, 100% outdoor air AHU's complete with high efficiency plate heat exchangers or thermal wheels will be specified. Heat recovery will be utilized to transfer energy from the extract air to the supply air with little or no cross contamination of air streams.





Option (i) Cross Flow Plate heat Exchanger	Option (ii) Thermal wheel heat recovery

Figure 4.0 Types of Heat Recovery Units

All fans specified will come complete with Variable Speed Drives. Specific Fan Powers (SFP) will ≤1.6 W/l/s which is the recommended minimum energy efficiency standard.

6.3. Photovoltaic Panels

A feasibility study for various Renewable technologies established that Photovoltaics is an appropriate renewable technology for the site. Despite their relative low efficiency, the advantage is low maintenance and zero-carbon electricity that offsets grid electricity and hence provides considerable carbon emission savings.

As the development has available roof space on Library building, it is proposed that a PV array be sited in on this section of roof and the extent be maximized to suit the available area. The photovoltaic panels will be installed on the roof angled at 15° or more for maximum yield. 25 kWp PV system (approximately 100m^2) is estimate from efficient Tier 1 PV panels (measuring ~2.64m^2 each), which will reduce the site CO2 emission.

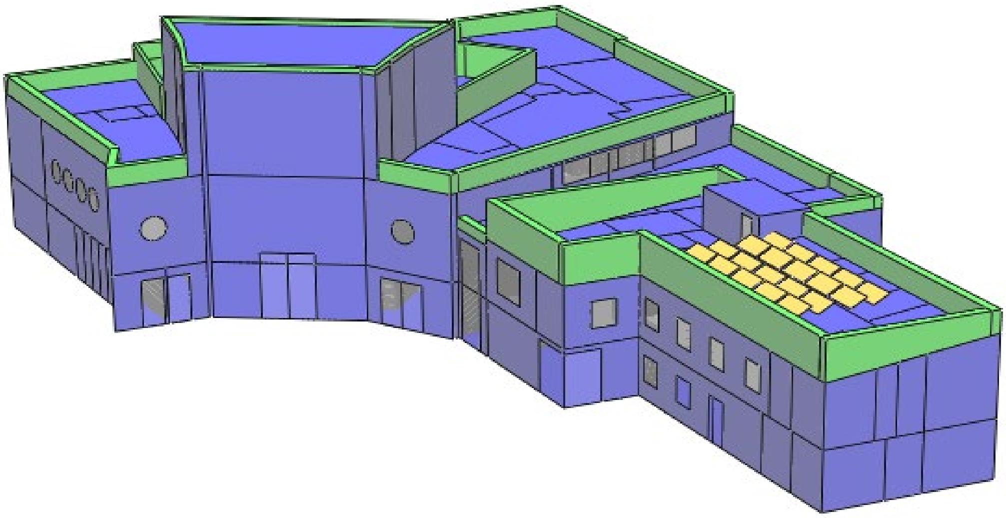


Figure 5.0 Allocation of PV Panels on Library Roof

7. Lighting

The building will be fitted with high performance energy efficient light fittings, such as LEDs. LED lighting consumes the least amount of power while providing the highest light output, and therefore they are the most efficient source of artificial light. Combined with a long lifespan, this minimizes whole life costs and reduces the carbon footprint. LED technology results in 30-35% reduction in electrical energy usage over CFL equivalent.

Intelligent lighting controls in the form of presence detectors shall be used in internal areas to ensure that lighting is not in operation when areas are not in use.

The design of the building facades will allow good levels of natural daylight into occupied zones. Lighting calculations have not been carried out at this stage of the project, so preliminary indicative lighting design has been included as is noted in the Design Inputs section of this report. As the design develops, further lighting design development will be implemented and results will be updated.

As lighting is a significant energy demand in buildings LED lighting will be installed with daylight sensors to reduce and manage this load.

8. Renewables Technologies

This section of the report details the different options in terms of available renewable technologies that have been considered. The viability and suitability of each option is assessed, the suitability of which will depending upon the site location/restrictions, economic conditions, functionality, and the efficiencies of the systems in each case.

Renewable energy sources have been reviewed based on the requirements of Part L of the building regulations and their suitability to this development. The systems that have been considered are as follows:

- Air Source Heat Pump
- Ground Source Source Heat Pump – Closed Loop
- Solar Photovoltaics (PV)
- Wind Power – Microgeneration / Mast Mounted
- Solar Water Heating
- Biomass Heating

8.1. Air Source Heat Pump

Air source heat pumps can be fitted externally, in a dedicated plant area on the roof space. ASHP technologies exploit seasonal temperature differences between external air and refrigerant temperatures to provide heating in the winter and cooling in the summer. ASHP systems use more electricity to run the heat pump when compared to gas fired heat pumps, but as most of the energy is taken from the air, they produce less greenhouse gas than conventional heating systems over the heating season.

Figure 6.0 Commercial Air Source Heat Pump

The efficiency of air source heat pump is measured by Coefficient of Performance (CoP); this is the ratio of units of each unit of electricity used to drive the system. Average Coefficient of Performance is around 3-4 although some systems may produce greater efficiency. Their COP can reduce to below 2.0 when outside air temperatures are ≤0°C and they can require additional energy for a defrost cycle.

ASHP provides an alternative to fossil fuel-based gas boilers and will contribute significantly towards reaching the requirements of Renewable Energy Ratio (RER) for Part L 2022.

Air source heat pump is a suitable technology for this project. It should be noted that the energy savings with mains electric air source heat pumps are low when compared to baseline energy analysis using Natural Gas as a main source of fuel due to the unit cost of each fuel type. They produce less greenhouse gas than conventional heating systems over the heating season and are therefore preferred in this instance.

8.2. Ground Source Heat Pump

Ground Source heat pumps are used for space heating and cooling, as well as water heating. They operate by virtue of the fact that the earth beneath the surface remains at a constant temperature throughout the year, and that the ground acts as a heat source in winter and a heat sink in summer. They can be used in both residential and commercial or institutional buildings. These operate on the same principle as air source heat pumps but the method of collecting heat is different.

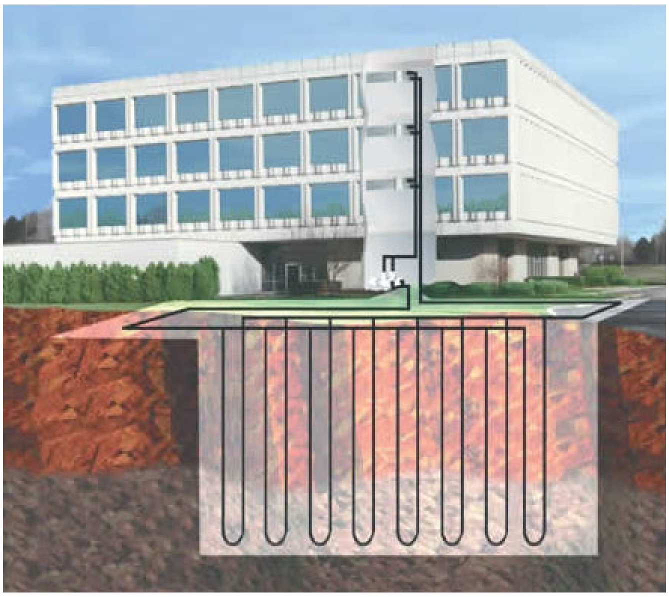


Figure 7.0 Commercial Ground Source Heat Pump

The earth's surface acts as a huge solar collector, absorbing radiation from the sun. In Ireland, the ground maintains a constant temperature between 11°C and 13°C, several metres below the surface. Heat pumps take advantage of this by transferring the heat stored in the earth or in ground water to buildings in winter and the opposite in summer for cooling. Through compression, heat pumps can 'pump up' heat at low temperature and release it at a higher temperature so that it may be used again. A heat pump looks similar to and can perform the same functions as a conventional gas or oil boiler, i.e. space heating and sanitary hot water production. For every unit of electricity used to operate the heat pump, up to four units of heat are generated. Therefore for every unit of electricity used to pump the heat, 3-4 units of heat are produced. Ground source heat pumps use a 'closed loop' system of water/anti-freeze to collect the soil heat.

GSHP systems are most efficient when delivering low temperature heat and high temperature cooling, suitable for underfloor heating or chilled beams. Additionally, there should be a good balance between heating and cooling loads to allow for high COPs and reasonable capital payback. Site restrictions would require the use of vertical boreholes as opposed to horizontal ground loops, increasing the capital cost of any GSHP system. GSHP technology would need further investigation during detailed design and would depend on a favorable ground Thermal Response Test. A well designed GSHP system operating under favorable conditions can achieve marginally better efficiencies than the proposed ASHP system. However, the capital cost difference leads to an unacceptable payback period

8.3. Solar Photovoltaics

Photovoltaic (PV) Panels convert sunlight into electricity to run lights and appliances. Photovoltaic panels use cells to convert light into electricity. A PV cell normally consists of 1 or 2 layers of a semi conducting material such as silicon. When light shines on a cell it generates energy causing electricity to flow, the higher the light intensity is, the more electricity flows. The amount of energy PV cells generate is referred to as Kilowatt Peak (kWp).

Figure 8.0 Roof Top Commercial Solar Photovoltaics Panels

PV arrays now come in a variety of shapes and colors, ranging from grey 'solar tiles' that look like roof tiles to panels and transparent cells that you can use on conservatories and glass to provide shading as well as generating electricity. For flat roofs or floor mounting the panels can be mounted on A-frames to give the optimum angle. The optimum panel inclination for solar collection is 35°, oriented due south; however, panels that are inclined between 35° and 45° and oriented south of west or east are generally suitable. If solar PV is oriented away from due south, then a larger surface area will be required to generate a set amount of energy.

PV could be mounted on the roof of the building. PV is certainly a viable solution. It could be utilized as either a feed into the main electrical distribution board for the development or direct feed to a specific load.

8.4. Wind Power

Wind power is one of the cleanest and safest methods of generating electricity. Wind power is feasible in Ireland and local wind conditions would be sufficient to provide power. Most wind turbines generate Direct Current (DC) electricity. Systems that are not connected to the national grid require battery storage and an inverter to convert DC electricity into Alternating Current (AC), which is mains electricity.

There are two types of wind turbine available:

- Micro Wind – These are mounted on the roof of buildings
- Mast mounted – Which are free standing

Figure 9.0 Roof Mounted Wind Turbine

Figure 10.0 Mast Mounted Wind Turbine

Important issues to consider when using wind turbines are:

- Wind speed increases with height so it's best to have the turbine high on a mast or tower.
- Generally speaking the ideal site is a smooth top hill with a flat, clear exposure, free from excessive turbulence and obstructions such as large trees, houses or other buildings.
- Small scale wind power is particularly suitable for remote off grid locations where conventional methods of supply are expensive or impractical.
- Where the local annual average wind speed is 5 m/s or more.
- Where there are no significant nearby obstacles such as buildings, trees or hills that are likely to reduce the wind speed or increase turbulence.

Micro wind turbines could be fitted to the roof of the building but would contribute a negligible amount of energy to the development. Furthermore, due to the urban nature of the site, both Micro and mast mounted turbines have been deemed unviable for this site given the obvious aesthetic and potential noise issues.

8.5. Solar Water Heating

Solar panel heating uses the radiant energy from the sun to heat hot water, most commonly for domestic hot water needs. There are two types of collectors used for solar water heating – flat plate collectors and evacuated tubes collectors. The systems function moderately successfully in some parts of an Ireland, as they can work in diffuse light conditions. The collector should be mounted on a 10-60 degrees pitch facing south, although other variations can be used, south is the most efficient.

Figure 11.0 Roof Mounted Solar Water Heater

The cost of installing the system is dependent on the distance between the solar collector and the hot water storage and therefore costs vary. The closer the collectors are to the hot water storage, the less pipe work is required. Annual maintenance checks are recommended. The solar collectors are typically connected to a condensing boiler via a HW cylinder with twin coil. A typical installation has a panel size of 3-5m^2 which is used in conjunction with a HW storage tank of 180-300litres, of which a minimum of 90-150 litres would be dedicated to solar hot water storage.

They are a 'simple' and guaranteed technology which will act as a pre-heat for the Hot Water and Heating usage. Payback between capital cost and energy saving can normally be achieved within 12 – 20 years, subject to usage and building type.

The orientation of the development should be fine for the utilization of solar water heating to provide domestic hot water however it will not achieve the carbon savings required to meet planning targets.

Carbon savings of approximately 4-5% are achievable with this technology. On a per square meter basis the carbon saving from installing a solar thermal system are a lot less than that of Photo Voltaic Panels. Additionally, they would compete with the preferred ASHP solution. For these reasons, solar thermal has been discounted as an option.

8.6. Biomass Heating

Modern boilers burn high quality wood fuels such as wood chips, pellets or uniform agricultural and industrial residues, automatically, free of any sign of smoke and with emissions comparable to modern oil fired systems. By pelleting residues from wood and crop processing, a possible disposal problem is turned into a high quality fuel.

Figure 12.0 Biomass Boiler and Fuel Hopper

Modern woodchip and pellet boilers retrieve the wood fuel automatically from the storage area and burn it, meeting high environmental standards. Modern wood boilers use up to 90% of the energy contained in the wood for heating, similar to good oil and gas boilers. State of the art models include automatic ignition and heat exchanger cleaning, automatic ash removal and ash compression.

Selecting the right capacity for the boiler is very important if its operation is to be economical and trouble-free. It often makes sense to use the biomass boiler as a base load system by under sizing the boilers and using a fossil fuel boiler as a peak load / backup system. In this way it is normally possible to provide 90%-95% of annual heat demand using a much smaller biomass boiler thus reducing capital investment costs considerably and reducing economic payback.

Fuel supply infrastructures have developed considerably in recent years. Wood chips are often available locally and equipment suppliers are often able to offer a wood chip supply contract if required ensuring security of supply.

Wood pellets are generally delivered by a silo truck, from which they are blown into the storage room. The silo truck should be able to come as close as possible to the filling connection, to minimise damage to the pellets during offloading. Silo trucks usually have pumping hoses that are a maximum of 30 m in length. Therefore, the pellet storage room (or the outside connectors or bag silo) should be situated a maximum of 30 m from the place where the truck can park. Rule of thumb per kW heating load = 0.9m3 storage space (including empty space).

Concerns exist over the level of NOx and particulate emissions from biomass boiler installations, particularly in urban areas. Moreover, such a system is most suitable as an alternative to oil or solid fuels where natural gas or heat pump technology are not suitable. Furthermore, storage requirements for fuel would be significant and there is insufficient space within the scheme, given the site restrictions to accommodate bulk storage and the boiler plant. Biomass boilers are therefore not considered a feasible option for the development.

9. Electrical Vehicle Recharging

Electric vehicle recharging infrastructure should be provided when major renovation upgrades are being carried out to a building, where there are more than 10 car park spaces and:

- Where car park is located inside the building, e.g. a basement car park and the renovation measures include the car park or the electrical infrastructure of the building; or
- Where there is a car park physically adjacent to the building, i.e. the car park is within the curtilage of the site and the renovation measures include the car park or the electrical infrastructure of the car park.

The following minimum electrical vehicle recharging infrastructure should be provided:

- At least 1 recharging point within the meaning of Directive 2014/94/EU of the European Parliament and of the Council of the European union; and
- Ducting infrastructure, consisting of conduits for electric cables, for at least 1 in every 5 car parking spaces, or part of thereof, to enable the subsequent installation of recharging points for electric vehicles.

Where electric vehicle recharging infrastructure is provided the guidance should be followed. Where an existing building is located within the curtilage of a campus with multiple buildings, and car parking is shared between buildings, any car parking spaces associated with the existing building must meet the minimum recharging infrastructure provisions.
Where an existing building contains mixed uses, i.e. dwellings and non-dwellings, the minimum recharging infrastructure provisions for each use should be provided. Where only 1 recharging point is provided in a car park with accessible spaces this should be located so that it can be used either from a standard car parking bay or from an accessible car parking bay. Where this is not possible then 2 recharging points should be provided, one of which should serve the existing accessible car parking bay.

It is proposed to meet the above requirements and provide 2No. EV charging spaces as indicated on the Architects site plan.

10. Abbreviations

- AHU's Air Handling Units
- ASHP Air Source Heat Pump
- BER Building Energy Rating
- BMS Building Management System
- BRIRL Building Regulations Part L Ireland
- CAV Constant Air Volume
- CFL Compact Fluorescent Lamps
- CHP Combined Heat & Power
- C02 Carbon Dioxide
- CPC Carbon Performance Coefficient
- DEC Display Energy Certificate
- EPBD Energy Performance in Buildings
- EPC Energy Performance Coefficient
- EU European Union
- GSHP Ground Source Heatpump
- HP Heatpump
- HVAC Heating, Ventilation and Air-Conditioning
- HW Hot Water
- IES Integrated Environmental Solutions
- LED Light Emitting Diode
- LZC Low to Zero Carbon (technology)
- MPCPC Maximum Permitted Carbon Performance Coefficient
- MPEPC Maximum Permitted Energy Performance Coefficient
- NEAP Non-domestic Energy Assessment Procedure
- NZEB Nearly Zero Energy Building
- PV Photovoltaic
- RER Renewable Energy Ration
- SBEM Simplified Building Energy Model
- SCOP Seasonal co-efficient of performance
- SEAI Sustainable Energy Authority of Ireland
- SEER Seasonal Energy Efficiency Ratio
- SFP Specific Fan Power

11. Appendix

11.1. Preliminary Design Data

Item	Brief Description	Notes
	The following information is required for the design submission	
1	**Building Type**	
1.1	D2-General Assembly and Leisure - Art Centre	
2	**Floor Construction Details**	
2.1	New Ground Floor	U-Value=0.21 W/m^2K
2.2	Library Ground Floor	U-Value=0.45 W/m^2K
3	**Wall Construction Details**	
3.1	External Wall	U-Value=0.21 W/m^2K
4	**Roof Construction Details**	
4.1	Roof	U-Value=0.16 W/m^2K
5	**Openings**	
5.1	Windows	U-Value=1.60 W/m^2K
5.2	Rooflights	U-Value=1.60 W/m^2K
5.3	Solar Energy Transmittance	g-Value=0.40 (40%)
6	**Ventilation**	
6.1	Air Permeability	3.0 $m^3/m^2/hr$ at 50 Pa
6.2	Constant Air Volume System SFP	1.6 W/l/s
6.3	Heat Exchanger Efficiency	75%
6.4	Extract rate Toilets/Changing	6 l/s & 15 l/s/shower
7	**HVAC**	
7.1	Auditorium - Constant Air Volume powered by HP	SCOP=2.75, SEER=4.50
7.2	Other Areas - Central Heating using Radiators powered by HP	SCOP=2.75
7.3	Server & CCTV Room - DX Split System	SEER=4.14
8	**Domestic Hot Water**	
8.1	Domestic Hot Water with HP	SCOP=2.00
9	**Lighting**	
9.1	All Zones	65Lm/Circuit Watt
10	**Renewables**	
10.1	Photovoltaics Panel	25kWp

11.2. Provisional Part L Compliance Document

BRIRL Output Document

Compliance Assessment with the Building Regulations (Ireland) TGD-Part L 2017

This report demonstrates compliance with specific aspects of Part L of the Building Regulations. Compliance with all aspects of Part L is a legal requirement. Demonstration of how compliance with every aspect is achieved may be sought from the Building Control Authority.

Riverbank Art Centre

Date: Mon Jun 15 12:37:21 2026

Administrative information

Building Details

Address: Main St,, Greatconnel, Newbridge, CO. Kildare, Co. Kildare, W12 D962

NEAP

Calculation engine: SBEMIE

Calculation engine version: v5.6.a.0

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: 7.0.23

BRIRL compliance check version: v5.6.a.0

Client Details

Name: Name

Telephone number: Phone

Address: Street Address, Co. Kildare, Eircode

Energy Assessor Details

Name: Suraj Gaidhani

Telephone number: 01 4604968

Email: info@t5.ie

Address: Unit G1, Centrepoint Business Park, Oak Road, Dublin 12, D12 RD98

Primary Energy Consumption, CO2 Emissions, and Renewable Energy Ratio

The compliance criteria in the TGD-L have been met.

Calculated CO2 emission rate from Reference building	57.3 kgCO2/m2.annum
Calculated CO2 emission rate from Actual building	33.1 kgCO2/m2.annum
Carbon Performance Coefficient (CPC)	**0.58**
Maximum Permitted Carbon Performance Coefficient (MPCPC)	**1.15**
Calculated primary energy consumption rate from Reference building	306.7 kWh/m2.annum
Calculated primary energy consumption rate from Actual building	258.2 kWh/m2.annum
Energy Performance Coefficient (EPC)	**0.84**
Maximum Permitted Energy Performance Coefficient (MPEPC)	**1**
Renewable Energy Ratio (RER)	**0.36**
Minimum Renewable Energy Ratio	**0.1**

Heat Transmission through Building Fabric

Element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Limit}$	$U_{i\text{-}Calc}$	Surface with maximum U-value*
Walls**	0.21	0.21	0.6	0.21	L0000012_W1
Floors (ground and exposed)	0.21	0.24	0.6	0.45	L0000027_F
Pitched roofs	0.16	-	0.3	-	"No heat loss pitched roofs"
Flat roofs	0.2	0.17	0.3	0.3	L0000019_C_A1
Windows, roof windows, and rooflights	1.6	1.59	3	1.6	L000001B_W1_O0
Personnel doors	1.6	1.6	3	1.6	RF000000_W3_O0
Vehicle access & similar large doors	1.5	-	3	-	"No ext. vehicle access doors"
High usage entrance doors	3	-	3	-	"No ext. high usage entrance doors"

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [W/(m2K)]
$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [W/(m2K)]
$U_{i\text{-}Limit}$ = Limiting individual element U-values [W/(m2K)]
$U_{i\text{-}Calc}$ = Calculated individual element U-values [W/(m2K)]

* There might be more than one surface with the maximum U-value. ** Automatic U-value check by the tool does not apply to curtain walls whose area-weighted average and individual limiting standards are 1.8 and 3 W/m2K, respectively.

Air Permeability	Upper Limit	This Building's Value
m3/(h.m2) at 50 Pa	5	3

11.3. Provisional BER Certificate

Virtual Environment 7.0.23 (SBEMIE v5.6.a.0)

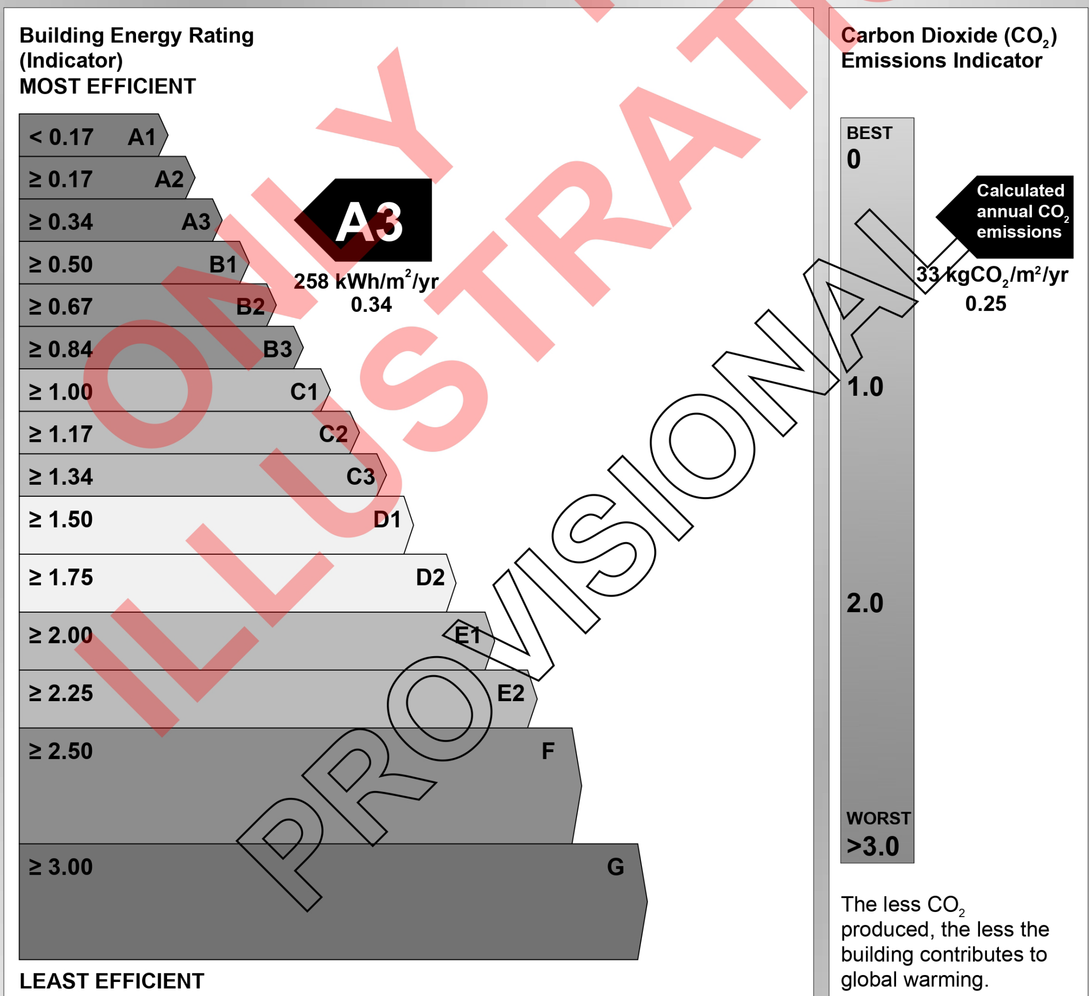
Provisional Building Energy Rating (BER)

Provisional BER for the building detailed below is: **A3**

The Building Energy Rating (BER) is an indicator of the energy performance of this building. It covers energy use for space heating and cooling, water heating, ventilation and lighting, calculated on the basis of standard operating patterns. It is accompanied by a CO_2 emissions indicator. These indicators are expressed as respective ratios of primary energy use and CO_2 emissions, relative to what would apply for a similar building generally satisfying the Building Regulations 2005. 'A' rated properties are the most energy efficient and will tend to have the lowest energy bills.

Main St,
Greatconnel
Newbridge
Co. Kildare
W12 D962

BER Number:	voidvoidvoid	**Date of Issue:**	15 Jun 2026
Useful Floor Area (m^2):	2010	**Valid Until:**	14 Jun 2028
Main Heating Fuel:	Grid Supplied Electricity	**BER Assessor No.:**	109383
Building Environment:	Heating and Natural Ventilation	**Assessor Company No.:**	109371
		Assessor Scheme:	SEAI
Building Type:	General Assembly and Leisure, Night Clubs, and Theatres		



IMPORTANT: This provisional BER is calculated on the basis of pre-construction plans and specifications provided to the BER assessor, and using the version of the assessment software quoted above. The BER assigned to this building on completion may be different, in the event of changes to those plans or specifications, or to the assessment software.