

Sustainability Report - Planning Stage

On

Proposed Renovation of Kilkenny Abbey Quarter Squash Court

for

Kilkenny County Council

at

The Abbey Quarter, Irishtown, Kilkenny, Co. Kilkenny

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1. Executive Summary

Sustainability and Energy Efficiency Considerations:

For the major renovation of an existing commercial building in Kilkenny, an integrated approach has been adopted from the outset of the design process, involving all members of the design team and focusing on a holistic approach to sustainable design. The goal is to deliver a building designed in an environmentally sensitive manner while meeting the required comfort conditions for its occupiers. This approach aligns with the requirements of Part L of the Building Regulations, which emphasize the conservation of fuel and energy. As the renovation qualifies as a "major renovation"—affecting more than 25% of the building envelope's surface area—the building's energy performance will be upgraded to meet cost-optimal levels, provided it is technically, functionally, and economically feasible. The design team intends to continue this approach throughout the detailed design process to ensure the sustainability targets identified in this report are achieved.

Our aim is to provide an NZEB development in full compliance with Building Regulations Part L 2022 by utilising the following:

Key strategies include:

1. Retaining and upgrading existing building fabric to improve energy performance.
2. Introducing advanced insulation techniques and air-tightness measures.
3. Installing energy-efficient Ventilation and lighting systems tailored to the building's use as a rehearsal and office space.
4. The building's energy performance will be upgraded to meet cost-optimal levels, provided it is technically, functionally, and economically feasible.
5. Electric heating will be utilised throughout.

2. Introduction:

The project involves the renovation of the former squash court building on the Abbey Quarter (former Smithwick's Brewery) site for re-use as a rehearsal space for local theatrical groups, with associated office and welfare facilities. This redevelopment aims to preserve the historical integrity of the site while ensuring it meets modern standards of sustainability and energy efficiency.

This report outlines the sustainability strategy for the renovation of the Kilkenny Abbey Quarter Squash Court. The project will comply with the Conservation of Fuel and Energy regulations under Building Regulations Part L 2022, ensuring a cost-optimal performance energy upgrade.

Building Regulations Part L 2022:

The regulations emphasize:

- Minimizing energy use and CO2 emissions.
- Incorporating renewable energy sources where possible.
- Achieving higher insulation and thermal performance standards.
- Utilizing energy-efficient systems for heating, cooling, and ventilation.

The renovated building will incorporate the latest sustainable technologies, including both active and passive system elements, and will utilize a combination of these systems as outlined later in this report.

The Building Regulations Part L Conservation of Fuel and Energy is the regulatory framework through which the minimum performance standards for energy consumption and carbon emissions are set for the renovation of existing buildings. The requirements focus on upgrading the building envelope, improving the efficiency of mechanical and electrical systems, and implementing effective control strategies to enhance energy performance.

3. Application of the Regulations

General

The aim of Part L of the Second Schedule to the Building Regulations is to limit the use of fossil fuel energy and related carbon dioxide (CO₂) emissions arising from the operation of buildings, while ensuring that occupants can achieve adequate levels of lighting and thermal comfort. Buildings undergoing renovation should be designed and upgraded to achieve this aim as far as is practicable and reasonable, considering the nature of the works.

The guidance in this document applies to works related to existing non-domestic buildings. Guidance for dwellings can be found in a separate Technical Guidance Document L - Dwellings.

Existing Buildings

For existing non-domestic buildings undergoing major renovations, the following key issues should be addressed to ensure compliance:

Energy Performance Upgrades

- **Primary Energy Consumption and CO₂ Emissions:** Reduce the building's primary energy consumption and related CO₂ emissions, as calculated using an appropriate assessment method (e.g., NEAP - Non-Domestic Energy Assessment Procedure).
- **Building Fabric Efficiency:** Improve the thermal performance of the building envelope (e.g., walls, roofs, floors, windows, and doors) to limit heat loss and thermal bridging, in accordance with the fabric performance standards in Part L.

Building Services Performance

- **Heating and Cooling Systems:** Ensure the installation or upgrade of efficient heating, ventilation, and cooling systems. Systems should meet the minimum energy efficiency requirements and be controlled effectively to reduce energy demand.
- **Lighting Systems:** Replace existing lighting systems with energy-efficient options, ensuring adequate lighting levels for the intended use while minimizing energy consumption.
- **Insulation of Building Services:** Insulate pipes, ducts, and vessels used for heating, cooling, and hot water to limit heat loss or gain, in compliance with Part L standards.

Renewable Energy Contribution

Incorporate renewable energy technologies where feasible.

Air Tightness and Ventilation

- Air Tightness: Improve air tightness to reduce infiltration, ensuring compliance with specified air permeability standards.
- Ventilation Systems: Provide adequate ventilation, ensuring that mechanical ventilation systems (if installed) achieve reasonable energy performance levels while maintaining indoor air quality.

Building Operation and Design Criteria

Weather Data: Utilize appropriate climate data (e.g., CIBSE Dublin weather file) for energy modeling and performance simulations.

3.1 Building Use

Fabric Design

The upgraded building will achieve thermal performance in line with existing building requirements under Part L. These will be targeted for all Material alterations.

Target U-values include:

- External walls: 0.35 W/m²K
- Roof: 0.20 W/m²K for pitched roofs, 0.25 W/m²K for flat roofs
- Floors: N/A, floor is not being replaced.
- Windows and doors: 1.6 W/m²K
- Roof lights: 2.0 W/m²K

Active Design

Heating

- Electrical heating throughout.

Hot water

- Point-of-use hot water with a compact insulated tank, providing a ready supply of hot water while maintaining energy efficiency and reducing wait times for heating.

Ventilation

- Not exceeding Fan power 0.28 [W/(l/s)]

Lighting

- High efficiency LED light fittings.

Controls

- Central time control
- Optimum start/stop control
- Space Heating to incorporate zone, timing and temperature controls, each functional area is maintained at the required temperature only during the period when it is occupied.

Please note that this report relates to Building Services only, and does not deal with architectural items, such as insulation and glazing specifications.

3.2 Electrical Installation

Lighting Installation

LED Lamps

All light fittings in the development shall be specified as LED lights

Lighting Controls

Occupancy Linked Control Systems – Presence Detection

These systems use presence detection to control the lighting system. These will switch on the lighting once presence is detected and switch it off when no presence has been detected for a set period of time. These controls are best suited to spaces where people are generally only present for a short period of time.

Ecology

To avoid light spill, we confirm that there are no windows facing the river, ensuring no light emissions from the building in that direction. The rear wall light will only be operated manually via an internal switch when needed, and it will be a downward-casting fixture specifically designed to prevent any light from projecting towards the river.

Motor Specification

Electric Motors

Motors and Variable Speed Drives (VSD's) used in this development will be specified as high efficiency type. Pumps for the distribution of water and for use in heating circuits, as well as fans for the distribution of air, can use a significant amount of energy. Therefore, specifying a suitably sized, high efficiency motors and VSD's can result in significant cost savings.

High Efficiency Motors: These motors use more copper, iron, and steel in their construction to reduce inherent losses of energy and save 3% – 4% on energy usage compared to standard motors

Variable Speed Drives: These allow pumps or fans to ramp up and down by varying the motor speed to meet the momentary requirement. This is the most efficient control system available.

3.3 Public Lighting

The public lighting is deemed adequate and sufficient; therefore, no adjustments are intended in this phase of the development. However, a future phase of the development is planned to include upgrades to the lighting system.

3.4 Electric Vehicle (EV) Car Charging

It is not intended to provide on-street electric charge points in this phase of the development.