



Life Cycle Report for Mechanical and Electrical Services

For

Kavco Group

At

Kilgobbin Road



Energy and Carbon Emissions

The following are an illustration of the energy measures that are planned for the units to assist in reducing costs for the occupants.

Measure	Description	Benefit
BER Certification	A Building Energy Rating (BER) certificate will be provided for the development which will detail the energy performance of the building. A BER is calculated through energy use for space heating, water heating, ventilation, air conditioning, lighting and occupancy. It is Proposed to target a high rating for the development to comply with non-domestic NZEB requirements as laid out in Part L of the building regulations. This will equate to an energy indicator of less than 0.5 and a CO2 emissions indicator of less than 0.5.	Higher BER rating grades reduce energy consumption and running costs but also lead to reduced carbon emissions.
Fabric Energy Efficiency	<p>The U-values being assessed will be in line with the requirements set out by the current regulatory requirements</p> <p>Technical Guidance Document Part L – Conservation of Fuel and Energy.</p> <p>The proposed minimum air permeability of the building structure is 5m3/hr.m2 @ 50 Pa which would result in an infiltration rate of 0.15 ACH (air changes per hour) or better.</p> <p>Thermal bridging at junctions between construction elements and at other locations will be minimised in accordance with Part L thermal bridging details of the building regulations to achieve a thermal bridging factor of 0.08 W/m2.K or better.</p>	By providing good levels of insulation, air tightness and thermal bridging detailing throughout the fabric of the building envelope will minimise the heat losses of the building, lower energy consumption and thus reduce carbon emissions to the environment whilst reducing the cost to run the building.
External Lighting	<p>The proposed lighting scheme will comply with the latest standards and technologies to achieve the following:</p> <p>Low Level Lighting</p> <p>Minimal Upward Lighting</p> <p>Low voltage LED lights</p>	The site lighting will be designed to provide a safe environment for pedestrians, cyclists and moving vehicles, to deter anti-social behavior and limit the environmental impact of artificial lighting on the area.

Table 1 Maximum elemental U-value (W/m²K)^{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	0.16	0.3
- Insulation on slope	0.16	
Flat roof	0.20	
Walls	0.21	0.6
Ground floors ³	0.21	0.6
Other exposed floors	0.21	0.6
External doors, windows and rooflights	1.0 ⁴	3.0

	<p>Pre-Approved by Local Authority</p> <p>Each light fitting shall be controlled via photoelectric control units (PECU). The operation of the lighting shall be on a dusk to dawn profile.</p>	
Internal Lighting	<p>The internal lighting of the development shall be low energy LED lighting controlled via occupancy PIRs and daylight lux level sensing. The lighting shall comply with Part L non-domestic energy usage requirements and shall not exceed 8W/m2 or 65 lumens/circuit Watt.</p>	<p>The provision of low energy consuming lighting fixtures in combination with daylight sensing and occupancy controls significantly minimise running cost whilst reducing carbon emissions.</p>

The following Low Energy Technologies are being considered for the development. During the design stage a combination of the below systems will be specified in order to achieve compliance with the building regulations and to achieve a non-domestic NZEB building.

Measure	Description	Benefit
Heat Pump Heat Recovery Mechanical Ventilation	<p>The building will be mechanically ventilated to meeting part F of the building regulation to provide fresh air via and air handling unit with heat recovery and heat pump renewable energy and VSD on the fan motors.</p>	<p>The benefits associated with heat recovery is the recuperation of existing energy within the building. The heat pump element of the AHU allows for the use of renewable energy to supplement the energy required to temper the fresh air entering the building. AHUs typically require large amounts to provide fresh air for occupants in office environments therefore by utilising the best technology for AHUs the energy usage of the ventilation system will be significantly reduced and minimise environmental impact over life cycle.</p>
Central Extract Ventilation (Demand controlled)	<p>For "wet" rooms like toilets etc. a central extract ventilation system on demand control will be considered to provide adequate ventilation to eliminate odours and eliminate condensation with low energy use.</p>	<p>Central extract ventilation provides continuous ventilation from multiple zones with low energy use. It operates at a low speed continuously using low amounts of energy. By using demand control the system can be boosted during periods of high humidity thus reducing overall energy use.</p>

Heating via Condensing Boilers	Condensing boiler are being considered to provide a central heating scheme to the development. The typical efficiency of these types of boilers is over 92%. The central approach allows for the boilers be cascaded and fully modulating and provide heating and hot water and zoned via a BMS therefore only providing heating to the area when required.	By centralising the boilers in cascade the system can achieve full modulation and adequate provision of heating whilst minimising the requirement for individual boilers to each unit and therefore reducing the environmental impact of plant disposal over life cycle. The use of the BMS allows for full heat zoning of the building therefore reducing the energy requirements. The Boilers are more efficient than standard central plant boilers and therefore will use less fuel and reduce carbon emissions.
Gas Absorption Heat Pumps	Gas absorption heat pumps are being considered to supplement the traditional heating system and are renewable energy devices that use natural gas technology with air source heat pump technology to provide high efficiency heating at normal heat emitter temperature s that suit both traditional systems and hot water heating.	These units can be used to provide the bulk of the heat requirements annually in a bivalent system at higher efficiencies than a traditional gas condensing boiler thus reducing fuel requirements and carbon emissions. The units are also contributing as a renewable source of energy and can be centralised thus negating the requirement for individual heat pumps to be used for each cluster of occupants.
PV Solar Panels	PV (Photovoltaic) Solar Panels are being looked at for the development. These solar panels provide convert renewable solar energy into DC Electricity then into AC electricity. Typically the panels are mounted at roof level at a orientation to gain the maximum solar irradiation. The electricity provided from the system can be used directly by the development or can be exported to the Electrical Grid.	The free energy/electricity produced by this system can offset the electrical energy that the development would have needed or directly offset a portion of the electricity the Electrical Grid would have needed to produce with other carbon based fuels. Therefore reducing the building running cost whilst reducing carbon emissions.
CHP – Combined Heat and Power	CHP is a technology being considered. This type of system generates electricity and utilises the waste heat as a by-product of generating the electricity. The heat can then be used throughout the development for space heating and/or hot water heating whilst the electricity generated can be used by the development.	CHP can achieve energy efficiencies by using the waste heat from the unit that is providing electricity to the development it would have need from the Electrical Grid. As the unit is providing electricity on-site it also

		saves and transmission losses/inefficiencies in the Electrical Grid.
ECAR Charging Points	ECAR charging points are being considered for the development. The space for this system in the local distribution board and infrastructure of ducting to allow for future installation of ECAR charging points within the car park to cater for E-car demand of occupants. This system operates on a single charge point access card. A full recharge can take up to 8 hours using a standard charge point.	Providing the option of E-car charging points will allow occupants to avail of ever-improving efficient electric car technologies.