CLIMATE ACTION ENERGY STATEMENT

FOR

FORD CORK LRD,

CO. CORK

Project:	Ford Cork LRD, Co. Cork
Client:	Marina Quarter Limited
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1.0 INTRODUCTION

This document provides an overview of the development's energy strategy and relates to the sustainability and energy targets proposed for the project. The development must approach the energy design in an efficient manner that reduces energy demand initially through passive strategies such as an efficient envelope which in turn reduces the energy demands relating to items such as the heating system. This initial approach in reducing the energy demand significantly aids the project in obtaining the required energy goals. Performance criteria relating to the development's envelope are set out in the following document.

The energy systems design must also focus on specifying energy efficient equipment to ensure the day to day running of the energy systems is optimized to further enhance energy savings and the related energy cost. Specifications relating to efficient heating, lighting and auxiliary equipment are set out in the document.

The report sets out to demonstrate a number of methodologies in Energy Efficiency, Conservation and Renewable Technologies that will be employed in part or in combination with each other for this development. These techniques will be employed to achieve compliance with the building regulations Part L and NZEB standards currently in public consultation.

2.0 PROPOSED DEVELOPMENT

The proposed development is at a site with a total area of 0.84 hectares principally located at the former Ford Distribution Site, Centre Park Road, Co. Cork. The proposed development is located adjacent to the Marina Quarter SHD scheme, also located on the grounds of the former Ford Distribution site. This scheme is holistically designed to create a new urban neighborhood. The site is generally Located to the south of the River Lee, the site is part of the Polder Quarter and sits adjacent to areas of considerable natural and man-made amenity, including Páirc Uí Chaoimh to the southeast, The Marina promenade to the north and Marina Park to the southwest.

The proposed development principally consists of Two Blocks. The proposed Blocks A and B were carefully positioned on site to not only complete Centre Park Road in terms of scale and massing, but also to provide connections to the plaza proposed in the neighboring approved SHD application. The number of units proposed is 176 units with a gross floor area 7728 square meters in Block A and 8462 square meters in Block B. As requested, the proposed scheme offers an improved unit mix, including 1, 2, and 3 bed apartments. The breakdown is in line with the provisions of the Cork City Development Plan 2022 – 2028. The dwellings include 62 No. 1-Bed, 4 No. 2-Bed, 78 No. 2-Bed and 32 No. 3-Bed.

The site benefits from an excellent frontage on to Centre Park Road and the infrastructure locally is expected to improve with the development of the Monahan Road extension to the southeast, and future bridge immediately to the northeast. It is also envisaged that the site will be adjacent to the future Light Rail Transit route along Centre ark Road. At present buses 202, 202a and 212 all pass in close proximity to the site and plentiful transport links are available within a short walk. The site is ideally suited to cycling and walking routes to the city centre and beyond and will benefit from upgrades ongoing throughout the South Docks area.

The development also proposes:

- Internal roads and footpaths;
- 56 No. car parking spaces;
- 427 No. Cycle parking spaces;
- Hard and soft landscaping, including public open space and communal amenity space;
- Boundary treatments;
- Public lighting;
- All other associated site and development works above and below ground.

3.0 BUILDING ENERGY RATING

As of 2006 all domestic buildings that were newly built and existing buildings that are for sale or rent require a BER (Building Energy Rating) certificate. The actual building energy rating is based on the primary energy used for one year and is classified on a scale of A1 to G with A1 being the most energy efficient. It also gives the anticipated carbon emissions for a year's occupation based on the type of fuel that the systems use. In order to identify Primary energy consumption of the building, the BER assesses energy consumed under the following headings:

- Building type (house, apartment etc.)
- Building orientation
- Thermal envelope (insulation levels of the façade, roofs, ground floor etc.)
- Air Permeability (how much air infiltrates into the building through the façade)
- Heating systems (what type of heat source is used and how efficient)
- Ventilation (what form of ventilation is used. Natural vent, mixed mode mechanical ventilation)
- Fan and pump efficiency (how efficient are the pumps and fans)
- Domestic hot water generation (is a high efficiency boiler used)
- Lighting systems (how efficient is the lighting in the building

Through the specification of an energy efficient façade and HVAC systems, the energy consumption of the building will be reduced compared to a set baseline. This ensures the environmental and economic impact of the operation of the building is reduced. The key philosophy of this plan is to reduce energy consumption by firstly limiting the energy needed by improving the buildings insulation. The second step is to utilise energy in the most efficient way through the selection and installation of energy efficient plant and equipment. The final step is to introduce energy from renewable sources to reduce the burden on Fossil Fuels.

4.0 UTILITIES

Initial discussions have taken place with the ESB regarding existing infrastructure in the locality. The preliminary loading for the site is estimated to be in the region of 300 kVA. (This is subject to change dependent on final renewable considerations etc. Preliminary design estimates would indicate an MV substation and additional unit sub stations will be required.

5.0 STRUCTURE AND BUILDING ELEMENTS

While the construction works will incur an initial investment, the lifetime running cost of the buildings must be considered to reduce water, fuel and electrical energy consumption. To that end methods will be explored to further improve the building's energy rating and reduce the carbon emissions. This includes decreasing the thermal conductivity (heat losses) of the building fabric, take advantage of passive solar gain to reduce the heating demand in the space and increase day lighting to reduce artificial lighting. Natural ventilation may be employed or if deemed as a requirement mechanical ventilation and heat recovery techniques will be employed to recover energy in the exhausted air. The following are some outline u-value specifications which will achieve the required energy specification:

5.1 Fabric 'U' Values Dwelling Apartments

- Walls - 0.18 W/m^2.K
- Window - 1.2 W/m^2.K (solar fraction (g factor) of 0.7, frame factor of 0.7 or better)
- Roof - 0.16 W/m^2.K (Flat roof)
- Doors - 1.4 W/m^2.K (This is to include frame)
- Ground Floor slab - 0.18 W/m^2.K
- Thermal Bridging - Factor of 0.15

5.2 Air Permeability (Air Tightness against infiltration)

One of the most significant heat loss factors in any buildings is through controlled and uncontrolled ventilation through the introduction of ambient/outside air into the heated space. The apartments are to be constructed with a high degree of air tightness to a possible value of 3m^3/m^2/hr or 0.15 Air Changes with a permeability test conducted post construction to demonstrate this level in accordance with the TGD's.

Dwelling houses are expected to achieve an air permeability level of 0.25 m^3/hr/m^2 or less.

5.3 Secondary Heat Source

The dwellings do not contain a secondary heat source therefore this is not applicable.

6.0 BUILDING SERVICES (M&E) OVERVIEW

6.1 Heating & Ventilation systems apartments

It is proposed to consider various options for Apartments to include air to water heat pumps or exhaust air heat pumps.

Air source heat pumps utilize low grade heat from external ambient air and transfer heat to heating system pipework. These systems operate with very high efficiencies (>400%) which provides significant carbon reductions in comparison to a traditional boiler system.

Exhaust air heat pumps utilise an exhaust air heat pump type system for heating, hot water and ventilation of the apartment units. This will re-cycle the heat from your house's ventilation system. These machines are ideal for apartments and more compact air-tight low energy or passive homes. Air is drawn through ducts to the heat pump from the bathrooms, utility and kitchen areas. The cold waste air is discharged to outside through another duct, and condensation to a drain. Additional heat generated internally from lighting, people and domestic appliances is also utilised through heat recovery.

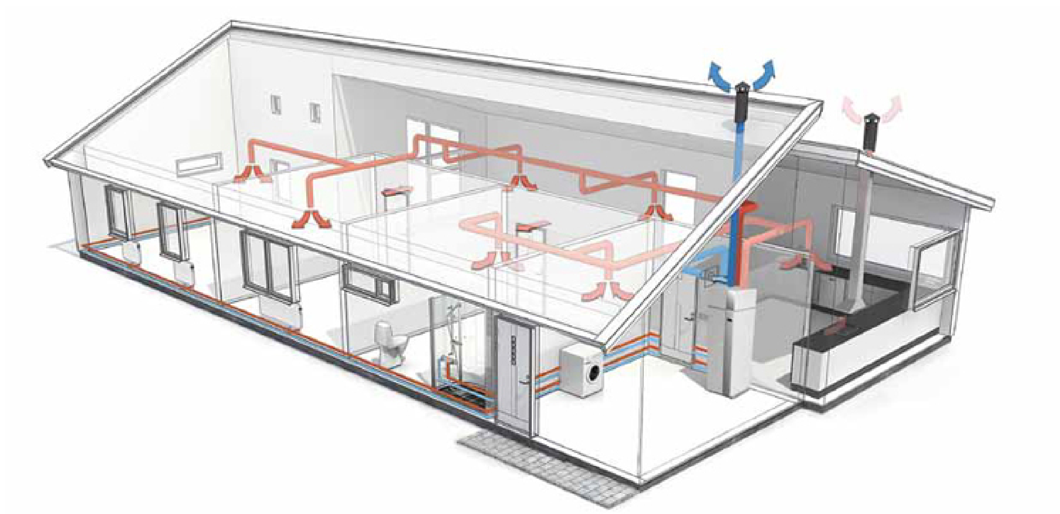

Figure 1: Typical Exhaust Air Source HP arrangement

For every unit of electricity used to operate the heat pump, up to four to five units of heat are generated. Therefore, for every unit of electricity used to generate heat, 4-5 (400-500%) units of heat are produced. Efficiencies in order of 600% may also be achieved depending on ambient conditions.

It is proposed to utilise radiator heating in the apartment units as heating emitters. These can be employed with heat pumps which utilise the low heating temperature from the heat pump. A central time clock and separate time and temperature controls for each zone are to be provided (e.g. via 2-port valves). Such zones may consist of:

- Living areas,
- Bedrooms
- Domestic Hot water

6.2 Heating & Ventilation systems dwellings

The heating option that is under consideration for the dwelling units is an air to water heat pump and exhaust air heat pump.

Air source heat pumps utilize low grade heat from external ambient air and transfer heat to heating system pipework. These systems operate with very high efficiencies (>400%) which provides significant carbon reductions in comparison to a traditional boiler system.

Figure 2: Typical Photovoltaic Arrangement

Photovoltaic panels are best suited to sites which have an unobstructed southerly and south-easterly elevations. PV is particularly suitable due where there is a simultaneous requirement for heating, hot water and electrical demand. The on-site generation of electricity can supplement the electrical requirement for lighting, motors, etc & reduce the electrical demand and from the grid.

Applying this to each dwelling would considerably reduce the demand from the grid and consequently reduce losses and emissions from power stations. Such is the benefit of on site or distributed generation, the DEAP model determines that each kWh offset from PV equates to circa 2.5 times the thermal equivalent and reduces CO2 emissions by some 0.47Kg/kWh generated.

Figure 3: Roof Mounted Photovoltaics

6.3 Lighting

All lighting to be energy efficient with provision made for low energy lamps such as Compact Fluorescent Lamps (CFLs) which use 80% less electricity and last up to 10 times longer than ordinary light bulbs in the dwellings.

Table 1: Summary of Part L compliance for apartment units

	Typical Ground floor Apartments	**Typical Mid & Top floors Apartments**
U-values		
	W/m².K]	[W/m².K]
Floor [Max, Part L 2019 = 0.18]	0.18	N/A
	Floor to have minimum 100mm PIR with thermal conductivity of 0.022 W/m.K	
Roof [Max, Part L 2019] = 0.2 [Flat Roof]	N/A	0.16
	Flat roof insulation to be minimum 130mm Xtrodeck with thermal conductivity 0.021 W/m.K	
Wall [Max, Part L 2019 = 0.18]	0.18	0.18
	Wall insulation to comprise 110mm PIR board with thermal conductivity 0.022 W/m.K	
Door [Max, Part L 2019 = 1.4]	1.4	1.4
Window [Max Av, Part L 2019 = 1.4], solar factor 0.73	1.2	1.2
	Windows to south façade to have minimum solar factor of 0.5	
Mechanical plant		
Heating source	Exhaust air source heat pump.	Exhaust air source heat pump.
Heating controls	Time and temperature control of heating/hot water with individual heating zones	Time and temperature control of heating/hot water with individual heating zones
Heat emitters	Oversized radiators with mean water temperature 40 Deg C	Oversized radiators with mean water temperature 40 Deg C
Solar requirements	Up to 1 No. 450W PV panel per unit dependent on orientation	Up to 1 No. 450W PV panel per unit dependent on orientation
Hot water cylinder	180 litre cylinder	180 litre cylinder

Ventilation	Centralised ducted extract system serving heat pump. Specific fan power 0.33 W/L/s minimum	Centralised ducted extract system serving heat pump. Specific fan power 0.33 W/L/s minimum
Additional requirements		
Lighting	100% energy efficient lighting	100% energy efficient lighting
Air permeability	Air permeability @ 3 $m^3/hr/m^2$	Air permeability @ 3 $m^3/hr/m^2$
Thermal bridging	Factor of 0.15 - Default	Factor of 0.15 - Default
Secondary heating	N/A	N/A
BER results	25 -49 (A2)	25 -49 (A2)
EPC [MPEPC = 0.3]	<0.3	<0.3
CPC [MPCPC = 0.35]	<0.35	<0.35
Renewable contribution [RER]	>0.2	>0.2