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1. SUMMARY

This energy statement outlines the proposed energy conservation strategy for the residential a development at the proposed new development at Jacobs Island in Cork City.
A review of the current Irish Building Regulations for Conservation of Fuel and Energy for Dwellings and Non-domestic Buildings, (Part L 2017), and the Cork City Development Plan 2015-2021, has been undertaken.
By adopting a sustainable approach in design, construction and operation, the proposed new development at Jacobs Island aims to satisfy the requirements of the current national Regulations and local planning policy.
The energy statement focuses on energy conservation and energy efficiency, in order to maximise the overall energy performance of the proposed development.

Passive and active design measures are proposed including high insulation and air tightness standards for the building envelope, and energy-efficient mechanical, electrical and plumbing systems.

2. INTRODUCTION

The proposed development at Jacobs Island aims to satisfy the local planning requirements and national building regulations.

The proposed passive and active deign measures as outlined below, tackle the key environmental issues: energy conservation and CO2 emissions reduction.

3. ENERGY PERFORMANCE OBJECTIVES

The development has the following energy performance objectives:

3.1 RESIDENTIAL:

- To achieve full compliance with TGD Part L for dwellings (2017), and Cork City Development Plan 2015-2021
- The BER rating achieved will be a minimum of A3 dependent on NZEB.
- To achieve compliance with NZEB.

3.2 COMMERCIAL/RETAIL:

The commercial/retail area is likely to be a shell and core build initially, however the external envelope shall be designed to ensure minimum standards are met to comply with the standards noted below, and adequate provision is made for plant space to accommodate energy efficient installations including renewable technologies. These standards include:

- To achieve full compliance with TGD Part L for buildings other than dwellings (2017), and Cork City Development Plan 2015-2021
- The BER rating achieved in compliance with NZEB.
- To achieve compliance with NZEB.

The objectives for residential and commercial will be met by implementing the energy strategy summarised below.

4. ENERGY STRATEGY FOR RESIDENTIAL

4.1 LIMITING OF HEAT LOSS

Best practice fabric U-values and air tightness standards will be implemented in order to minimise heat flow/loss through the building envelope. Detailed calculations will be undertaken to assist in determining the appropriate envelope build-up, including the type, thickness and location of thermal insulation. The amount, type and location of glazing will be optimised to achieve an optimal balance between daylight quality and heat gains and losses.

4.2 PASSIVE SOLAR SHADING

To ensure that the building does not overheat, particularly in areas where there are higher levels of glazing and internal gains, adequate means of limiting summertime temperatures will be implemented. External shading in the form of window reveals and overhangs, and solar performance glazing will be incorporated into the façade design to assist in the reduction of overheating.

4.3 DIRECT AND PASSIVE SOLAR HEAT GAIN

Sunlight will be used where possible to reduce the need for heating on cold days, such as in winter when the sun cast is lower. This resource will be harnessed by allowing sunlight enter the buildings to areas with high thermal mass such as exposed concrete.

4.4 NATURAL DAYLIGHT

The design will seek to maximise the use of natural daylight through the development in order to reduce energy consumption from artificial lighting. This will be achieved through an integrated approach utilising a combination of building form, light wells, glazing systems and day-light responsive control systems.

4.5 SPACE HEATING

Space heating to each apartment for blocks 3, 4, 7, 8 & 9 will be provided by a central LPHW system which will comprise heating centre with high efficiency gas boiler, district heating network, heat interface units, and panel radiators. To meet compliance with the renewable energy requirements set out in Part L, the heating centre will be supplemented with a micro-CHP system, supplemented with PV panels if required to meet targets. Space heating to each apartment for blocks 10 will be provided by Air Source Heat Pumps and an extent of PV panels will be required in order to meet the NZEB requirements.

4.6 MECHANICAL VENTILATION

Whole-house mechanical ventilation with heat recovery, or continuous mechanical extract ventilation shall be provided for each apartment in order to minimise the annual heat demand and maximise the indoor environmental quality. This will be assessed during detailed design to ensure the optimum balance between renewables and ventilation is achieved.

4.7 ARTIFICIAL LIGHTING (INTERIOR AND EXTERIOR)

Energy-efficient lighting will be implemented throughout the development to achieve the appropriate light levels, as recommended by CIBSE. The design of lighting systems shall

ensure that lighting is only used when required, and also that only the specific area where lighting is needed.

4.8 DOMESTIC HOT WATER

Instantaneous hot water shall be provided by the district heating system via the heat interface unit in each apartment. These systems only use energy for production of hot water when required at the unit.

4.9 UTILITY METERING SYSTEM

All heat interface metering units will be fitted with thermal heat meters for billing purposes.

4.10 BUILDING MANAGEMENT SYSTEM

The district heating system including the heating centre will be controlled by a dedicated BMS system, along with centralised water distribution and energy metering as required.

4.11 BUILDING MODELLING AND DYNAMIC SIMULATIONS

Detailed modelling and dynamic simulations will be carried out during the development in order to inform, optimise, and validate the proposed building designs.
Simulations will be used to perform a detailed analysis on the areas listed below, in order to determine the suitability and effectiveness of appropriate systems:

- Natural ventilation and overheating risk
- Natural daylight distribution
- Regulatory Compliance Assessments for Part L
- Building energy use
- MEP Plant and Equipment Selections

4.12 RENEWABLE ENERGY REQUIREMENTS

We have considered all the available LZC technologies, as listed below:

- Photo voltaic system for on–site electricity use
- Solar thermal for domestic hot water and/or space heating
- Combined heat and power (CHP) for thermal and electricity generation
- Biomass for space heating and domestic hot water production
- Wind turbines for electricity generation
- Air Sourced Heat Pumps.

The energy balance for this high density residential scheme means that micro-CHP with supplemental PV would be the most practical option for meeting compliance with the regulations for blocks 3, 4, 7, 8 & 9 and the most practical option for block 10 is Air Sourced Heat Pumps and PV panels to meet the NZEB requirements. Blocks 3 & 4 will have a shared plant room and blocks 7, 8 & 9 will also have a shared plant room.

5. ENERGY STRATEGY FOR COMMERCIAL/RETAIL

5.1 LIMITING OF HEAT LOSS

Best practice fabric U-values and air tightness standards will be implemented in order to minimise heat flow/loss through the building envelope. As this is shell and core during detailed design detailed calculations will be undertaken to assist in determining the appropriate envelope build-up, including the type, thickness and location of thermal insulation. The amount, type and location of glazing will be optimised to achieve an optimal balance between daylight quality and heat gains and losses.

5.2 PASSIVE SOLAR SHADING

To ensure that the building does not overheat, particularly in areas where there are higher levels of glazing and internal gains, adequate means of limiting summertime temperatures will be implemented. External shading in the form of window reveals and overhangs, and solar performance glazing will be incorporated into the façade design to assist in the reduction of overheating.

5.3 DIRECT AND PASSIVE SOLAR HEAT GAIN

Sunlight will be used where possible to reduce the need for heating on cold days, such as in winter when the sun cast is lower. This resource will be harnessed by allowing sunlight enter the buildings to areas with high thermal mass such as exposed concrete.

5.4 NATURAL DAYLIGHT

The design will seek to maximise the use of natural daylight through the development in order to reduce energy consumption from artificial lighting. This will be achieved through an integrated approach utilising a combination of building form, light wells, glazing systems and day-light responsive control systems.

5.5 SPACE HEATING & COOLING

As the commercial area is shell and core design the space heating and cooling design will be realised during detailed design at fit-out stage. Adequate provision shall be made for plant space to accommodate energy efficient installations including renewable technologies. The system selected shall offer high COP values, and will be designed in the most appropriate manner, with realistic diversities applied to ensure the plant sizes and subsequent energy efficiency will be maximised.

5.6 MECHANICAL VENTILATION

Mechanical ventilation will be provided to meet fresh air requirements in accordance with CIBSE recommendations and TGD Part F. High-efficiency heat recovery system will be employed on appropriate air systems in order to minimise associated energy use.

5.7 ARTIFICIAL LIGHTING (INTERIOR AND EXTERIOR)

Energy-efficient lighting will be implemented throughout the development to achieve the appropriate light levels, as recommended by CIBSE. The design of lighting systems shall ensure that lighting is only used when required, and also that only the specific area where lighting is needed.

5.8 DOMESTIC HOT WATER

To limit heat loss resulting from extensive pipe runs and electricity use from secondary circulators, hot water production will be provided by local electric water storage heaters. All heaters will be controlled with 7 day 24 hour programmers to minimise standing losses outside of normal opening hours.

5.9 BUILDING MANAGEMENT SYSTEM

A BMS system shall be adopted during fit-out design to ensure adequate control is provided to minimise energy usage.

5.10 BUILDING MODELLING AND DYNAMIC SIMULATIONS

Detailed modelling and dynamic simulations will be carried out during the fit-out design phase in order to inform, optimise, and validate the proposed building designs.
Simulations will be used to perform a detailed analysis on the areas listed below, in order to determine the suitability and effectiveness of appropriate systems:

- Natural ventilation and overheating risk
- Natural daylight distribution
- Regulatory Compliance Assessments for Part L
- Building energy use
- MEP Plant and Equipment Selections

5.11 RENEWABLE ENERGY REQUIREMENTS

All the available LZC technologies, as listed below will be considered during the detailed design of the commercial/retail area.

- Photo voltaic system for on–site electricity use
- Solar thermal for domestic hot water and/or space heating
- Combined heat and power (CHP) for thermal and electricity generation
- Biomass for space heating and domestic hot water production
- Wind turbines for electricity generation
- Air Sourced Heat Pumps.