FALLON DESIGN
M&E ENGINEERING

SUSTAINABILITY & ENERGY REPORT

MECHANICAL & ELECTRICAL
MIXED RESIDENTIAL DEVELOPMENT
AT SWORDS, COUNTY DUBLIN.

Project: 2507

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Project Details

Project:

Proposed Mixed Residential Development at Forest Road, Swords, County Dublin.

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Document Details:

Version	Issue Date	Title	Issue
Rev 0	12.06.2025	Energy Report	Planning

1. Introduction

The following report will set out the mechanical and electrical strategy including Part L compliance for the proposed residential development at Forest Road, Swords, County Dublin. The compliance will be in accordance with the latest Part L: Conservation of Fuel & Energy – Dwellings.

2. Project Description

Golden Port Homes Limited intend to apply for planning permission for a Large-Scale Residential Development (LRD) on lands at Forest Road, Swords, Co. Dublin. The proposed development will consist of a total of 109 No. residential units (42 No. duplex units; 41 No. apartments; 26 No. Houses) as follows:

(i) 42 No. Duplex units within 3-storey buildings comprising 21 No. 1 bed units at ground level and 21 No. 3 bed units over first and second floor levels with balconies/terraces, private and communal open space.

(ii) 41 No. Apartments within 2 blocks. Block A will be a 4 storey building with 14 No. Apartments (4 No. 1 bed units and 10 No. 2 bed units) with balconies/terraces to the north, south and west elevations, and bin, bicycle parking and plant at ground floor level and PV panels at roof level; Block B will be a 5 storey building with 27 No. Apartments (13 No. 1 bed and 14 No. 2 bed units) with balconies/terraces to the east and west elevations and bin, bicycle parking and plant at ground floor level and PV panels at roof level;

(iii) 26 No. houses (comprising 5 No. 2 bed, 2 storey terrace houses; 6 No. 3 bed, 2 storey terrace houses; 4 No. 3 bed, 2 storey semi-detached houses; and 11 No. 4 bed, 3 storey houses);

(iv) 96 No. Surface level car parking spaces and 4 No. Surface level motorcycle parking spaces as well as bike parking stores and spaces; and bin stores.

(v) 1 No. ESB substation.

(vi) Landscaping, including the provision of new public open spaces with play areas and a MUGA; footpaths and cycle paths, new vehicular access/egress from Forest Road; public lighting; boundary treatment and all associated site, drainage and development works necessary to facilitate the proposed development.

3. Houses Mechanical Solution:

Air Source Heat Pump & Mechanical Extract Ventilation

The heating and hot water strategy to be designed for the houses in this development shall be in accordance with the 2019 Part L of the building regulations and compliance demonstrated with the latest edition of the DEAP software.

3.1 Element 51 – Heating Centre

The proposed heating solution for the houses shall be an air source heat pump with superior high efficiency hot water generation capacity. The heat pump efficiency provides the required renewable contribution in the DEAP software for Part L compliance. No additional renewable technology shall be required with the coefficient of performance of the heat pump.

The heat pump outdoor units shall be located discreetly in the landscaped rear gardens and mounted on a concrete plinth. As the outdoor units are fan assisted units, sensitivity in locating them is required so as not to disrupt any patio area with the cold air stream.

The indoor all-in-one units shall generally be located in a ground floor utility room with ducted underground access to the outdoor unit for pipework and power. These indoor heat pump units shall occupy a full (600 x 750) space in a utility room concealed with a full height kitchen gable to the ceiling.

3.2 Element 56 – Space Heating

The units will be heated with steel, horizontal panel radiators in each room of the units and designed for the operating temperature of the air source heat pump.

Each unit shall have two heating zones, the first zone will be the main open plan kitchen / living room and the second zone will be the bedrooms.

Heating control in the kitchen / living room will be with a 2-port valve and the room thermostat. Heating control in the master bedroom will be with a 2-port valve and thermostat. TRV's will control the space temperature in all other bedrooms.

3.3 Element 57 – Ventilation

The ventilation for the houses shall be a mechanical system with central extract and operating on the principle of Demand Control Ventilation (DCV) or Central Mechanical Extract Ventilation (CMEV).

The ventilation system shall have a centrally located extract unit located typically within the roof space c/w power supply and maintenance assess. All air inlets shall be with Ø100mm humidity-controlled wall ventilators and fire rated grilles to maintain the fire integrity of the ceiling.

The fan operates on a low watt DC motor and meets the required targets of the energy performance directive. The operation of this fan is pressure dependent and constantly matching air volume to actual demand ensuring high efficiency.

4. Apartments Mechanical Solution:

Exhaust Air Heat Pump (EAHP) & Mechanical Extract Ventilation (MEV)

The heating and hot water strategy shall be used for the apartments in the development in accordance with current Part L of the building regulations and compliance demonstrated with the latest edition of the DEAP software.

4.1 Element 51 – Heating Centre

The proposed heating and hot solution for the apartments shall be designed as an exhaust air heat pump. An Exhaust Air Heat Pump (EAHP), is an energy recycling system. It extracts energy from the warm air as it leaves the home via the ventilation system and uses it to heat the radiators and Domestic Hot Water (DHW).

The installation of an EAHP is self-contained within each apartment and only requires an ESB connection and standard mains water connection.

An exhaust air heat pump can satisfy the heating requirements of a well-insulated apartment in some of the coldest conditions. When working efficiently, it can reduce energy consumption of heating by up to 50% when compared to conventional heating systems.

If there is an extended period of cold weather the heat pump will call on a suitably sized back up heater to assist in meeting the apartment's requirement.

The extracted air from the wet rooms is passed through the ducting into the heat pump. At this point, if there is a heat or hot water demand, the air passes through the heat pump's evaporator, which transfers the heat into the heat pump's refrigerant circuit.

The cooled air is then discharged from the unit and exhausted outside. Meanwhile, the vapour compression cycle of the heat pump raises the temperature of the refrigerant and transfers the extracted heat into a water-based system that can either heat the domestic hot water via a coil in an indirect cylinder or heat the building via radiators.

The EAHP is controlled with a touchscreen wall controller in each apartment with a phone app function as standard.

A local 200 litre hot water storage cylinder shall be located in a hot press of each apartment and meets the demands of the resident's hot water. An electric immersion shall be installed for boost and fast recovery of the cylinder if required.

4.1.1 Element 56 – Space Heating

The units will be heated with steel, horizontal panel radiators in each room of the units and designed for the operating temperature of the heat pump.

Each unit shall have two heating zones, the first zone will be the main open plan kitchen / living room and the second zone will be the bedrooms.

Heating control in the kitchen / living room will be with a 2-port valve and the room thermostat. Heating control in the master bedroom will be with a 2-port valve and thermostat. TRV's will control the space temperature in all other bedrooms.

4.1.2 Element 57 – Apartment Ventilation

The ventilation for the apartments shall be provided by the EAHP and be classed as mechanically ventilated. The central extract shall operate on the principle of mechanical extract ventilation (MEV).

MEV will be commissioned with two dedicated extract flow rates for the unit, one for background ventilation and one for boost ventilation.

- The background ventilation rate will be maintained 24/7 in order to ventilate the unit and maintain the heat pump operation volume flow rate.
- The boost ventilation will be activated by a drop-in air or water temperature and raise the volume flow rate to a maximum pre-set value.
- Passive wall inlet vents are required in all habitual rooms.

5. Electrical Services

5.1 Element 61- Mains Distribution

A new ESB electrical supply will be brought to each unit in accordance with ETCI and ESB standards. An ESB meter enclosure shall be provided with direct access from the public road for each unit including a communication ETU.

5.2 Element 63 – Lighting Services

Low energy LED lighting shall be designed and specified in accordance the BER requirements in each unit and in the landlord areas in accordance with Part L.

Low energy LED public lighting shall be designed in accordance with CIBSE lighting guide and local County Council public lighting standards.

6. Electric Vehicle (EV):

6.1 Element 62- General Services

With introduction of new guidelines from the Irish government and the growing demand for alternative sources of fuel, the publics need for EV charging options is ever increasing in popularity.

The proposed EV allowance for the development shall be 10% of all spaces installed and operational at handover, including 100% of all car park spaces enabled for EV to be installed in the future.

7. Proposed Building Fabric Summary:

7.1 Construction Method:

The proposed construction method for the scheme shall be in accordance with the engineer's drawings and façade finishes as per the Architectural specification. The following shall outline the back-stop thermal performance achieved as part of the detailed design stage in accordance with the current Part L 2019 requirements achieving nearly energy zero standards;

- Floor 0.15 W/m^{2}K
- Wall 0.18 W/m^{2}K
- Roof:
  - Type No. 1 0.14 W/m^{2}K
  - Type No. 2 0.16 W/m^{2}K
- Main Door 1.2 W/m^{2}K
- Windows 1.4 W/m^{2}K

7.2 Air Tightness:

Air tightness Target: < 3m^3/hr/m^2 at 50 Pascals

Air tightness Method: Airtight membrane with internal plaster

7.3 Thermal Bridging:

Thermal Bridging Factor: 0.15 W/m^{2}K

Key junction details will meet or improved on ACD standards. The relevant construction drawings to be signed off by the developer, builder, site engineer & project Architect in compliance with the requirements of SEAI and B(C)AR.

Glossary of Terms:

- HP Heat Pump
- CH & DHW Central Heating & Domestic Hot Water
- kWh's Kilowatt Hours
- EAHP Exhaust Air Heat Pump
- MEV Mechanical Extract Ventilation
- TRV Thermostatic Radiator Valve
- DCV Demand Control Ventilation