SUSTAINABILITY & ENERGY REPORT
MECHANICAL & ELECTRICAL

ST. JOSEPH'S HOUSE AND ASSOCIATED PROPERTIES AT BREWERY ROAD AND LEOPARDSTOWN ROAD, DUBLIN 18.

St. Joseph's House and Associated Properties

at

Brewery Rd & Leopardstown Rd,

Dublin 18

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Contents:

1. Introduction 4

2. Project Description 4

3. Apartments – Mechanical Solution 5
3.1 Exhaust Air Heat Pump (EAHP) & Mechanical Extract Ventilation (MEV) 5
3.2 Element 51 – Heating Centre 5
3.2.1 Element 56 – Space Heating 6
3.2.2 Element 57 – Ventilation 6

4. Electrical Services 7
Element 61- Mains Distribution 7
Element 63 – Lighting Services 7

5. Electric Vehicle (EV): 8
Element 62- General Services 8

6. Proposed Building Fabric Summary: 9
6.1 Construction Method: 9
6.2 Air Tightness: 9
6.3 Thermal Bridging: 9

Project Details:

Project:	St. Joseph's House and Associated Properties at Brewery Road and Leopardstown Road, Dublin 18
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1. Introduction

The following report will set out the mechanical and electrical strategy including Part L compliance for the proposed 2nd phase of the residential development at St. Joseph's House and Associated Properties at Brewery Road and Leopardstown Road, Dublin 18. The compliance will be in accordance with the latest 2019 Part L: Conservation of Fuel & Energy – Dwellings.

2. Project Summary

The development will consist of a new residential and mixed use scheme to include apartments, residential amenity space, a café and a childcare facility as follows:

- The demolition of 10 no. properties and associated outbuildings at 'Madona House' (single storey), 'Woodleigh' (2 storeys), 'Cloonagh' (2 storeys), 'Souk El Raab (2 storeys), 'Welbrook' (2 storeys), 'Calador' (2 storeys), 'Alhambra' (2 storeys), 'Dalwhinnie' (2 storeys), 'Annaghkeen' (2 storeys) and 'The Crossing' (single storey) (combined demolition approx. 2,291.3 sq m GFA)
- The refurbishment, separation and material change of use of Saint Joseph's House (a Protected Structure, RPS No. 1548) from residential care facility to residential use and a childcare facility; and the construction of a new build element to provide for an overall total of 463 no. residential units, residential amenity space and a café as follows:
    - Block A (5 storeys) comprising 49 no. apartments (13 no. 1 bed units, 33 no. 2 bed units and 3 no. 3 bed units);
    - Block B (4 - 7 storeys) comprising 88 no. apartments (28 no. 1 bed units, 57 no. 2 bed units and 3 no. 3 bed units);
    - Block C (5 - 7 storeys) comprising 115 no. apartments (26 no. studio units, 26 no. 1 bed units and 57 no. 2 bed units and 6 no. 3 bed units);
    - Block D (5 - 10 storeys) comprising 157 no. apartments (36 no. studio unit, 40 no. 1 bed units and 81 no. 2 bed units), residential amenity areas of approx. 636 sq m and a café of approx. 49 sq m;
    - Block E (St. Joseph's House) (2 storeys) comprising 9 no. apartments (8 no. 2 bed units and 1 no. 3 bed units) and a childcare facility of 282 sq m with associated outdoor play areas of approx. 130 sq m;
    - Block F (3 - 6 storeys) comprising 45 no. apartments (23 no. studio units, 10 no. 1 bed units; and 12 no. 2 bed units);
- Open Space (approx. 9,885 sq m)
- 259 no. car parking spaces (232 no. at basement level and 27 no. at surface level)
- 968 no. bicycle spaces (816 no. at basement level and 152 no. at surface level)
- 10 no. motorcycle spaces (all at basement level)
- Vehicular Access
- Basement Areas
- Substations and Switch Rooms
- All associated site development works

3. Apartments – Mechanical Solution

3.1 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.

3.2 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 apartments heating 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 pumps 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.

3.2.1 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.

3.2.2 Element 57 – 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.

4. Electrical Services

Element 61- Mains Distribution

A new ESB electrical supply will be brought to each apartment in accordance with ETCI and ESB standards. A centrally located meter enclosure shall be provided with direct access from the public road.

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.

5. Electric Vehicle (EV):

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 following allowance will be included in the development for EV charging.

Apartments:

Electric car park spaces shall be provided with EV charging points for the development as per the drawings. The remainder of the apartment car park spaces shall be enabled for 3rd party management company operated EV charging points. This will be managed with pre-paid open access for all residents and the number and points can be added as demand from the residents increases.

Visitor / Public Spaces:

Visitor spaces shall be supplied and installed with EV points to allow the visitors of the apartments charge their electric cars. The supplies will be located around the development in the dedicated visitors' spaces and ducted to ESB mini-pillars for installation and operation by a third party.

6. Proposed Building Fabric Summary:

6.1 Construction Method:

The proposed construction method for the building 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 1.3 W/m^{2}K

6.2 Air Tightness:

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

Air tightness Method: Air tight membrane with internal plaster

6.3 Thermal Bridging:

Thermal Bridging Factor: 0.08 W/m^{2}K

Key junction details will meet ACD standards. The relevant construction drawings will 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