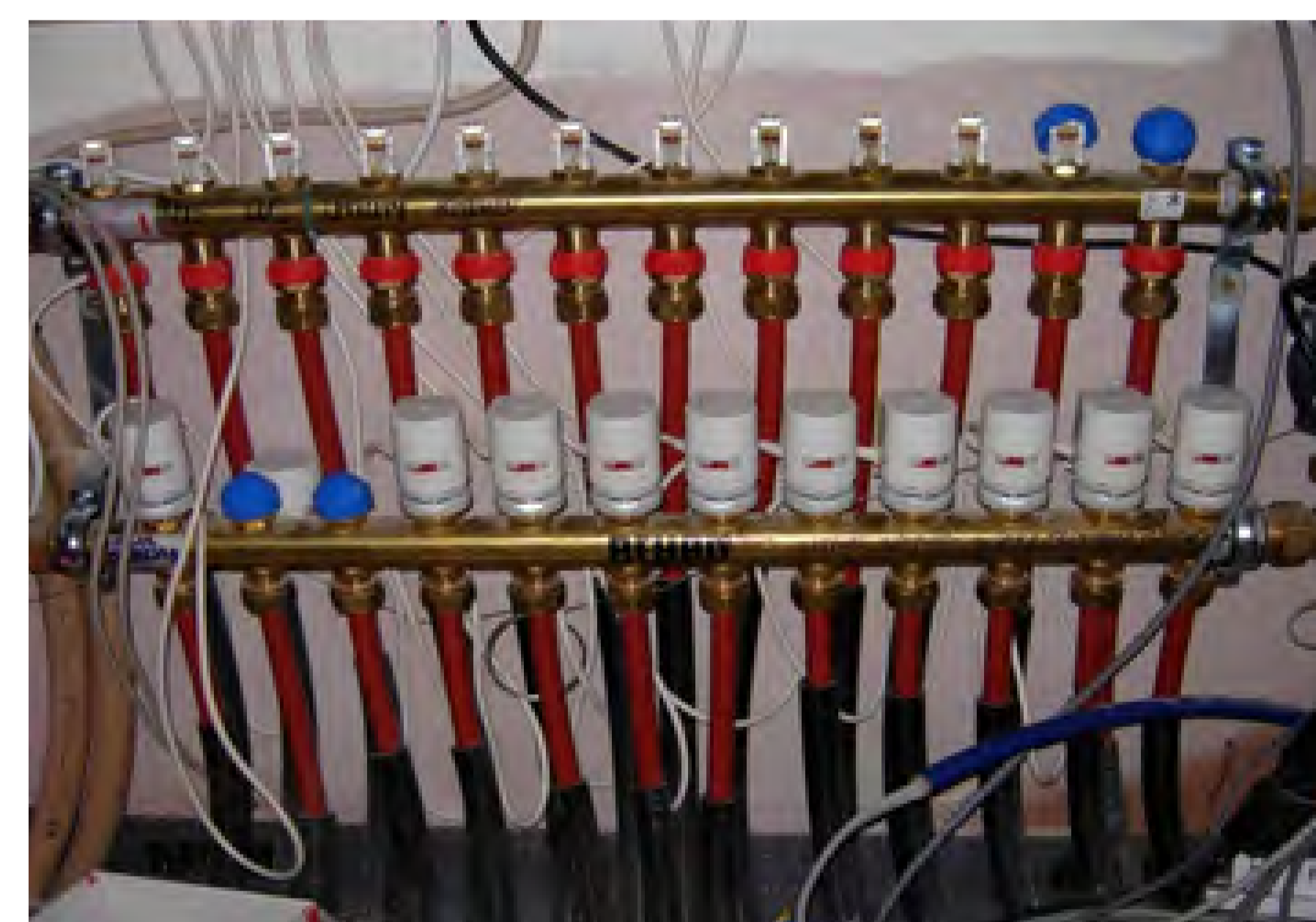
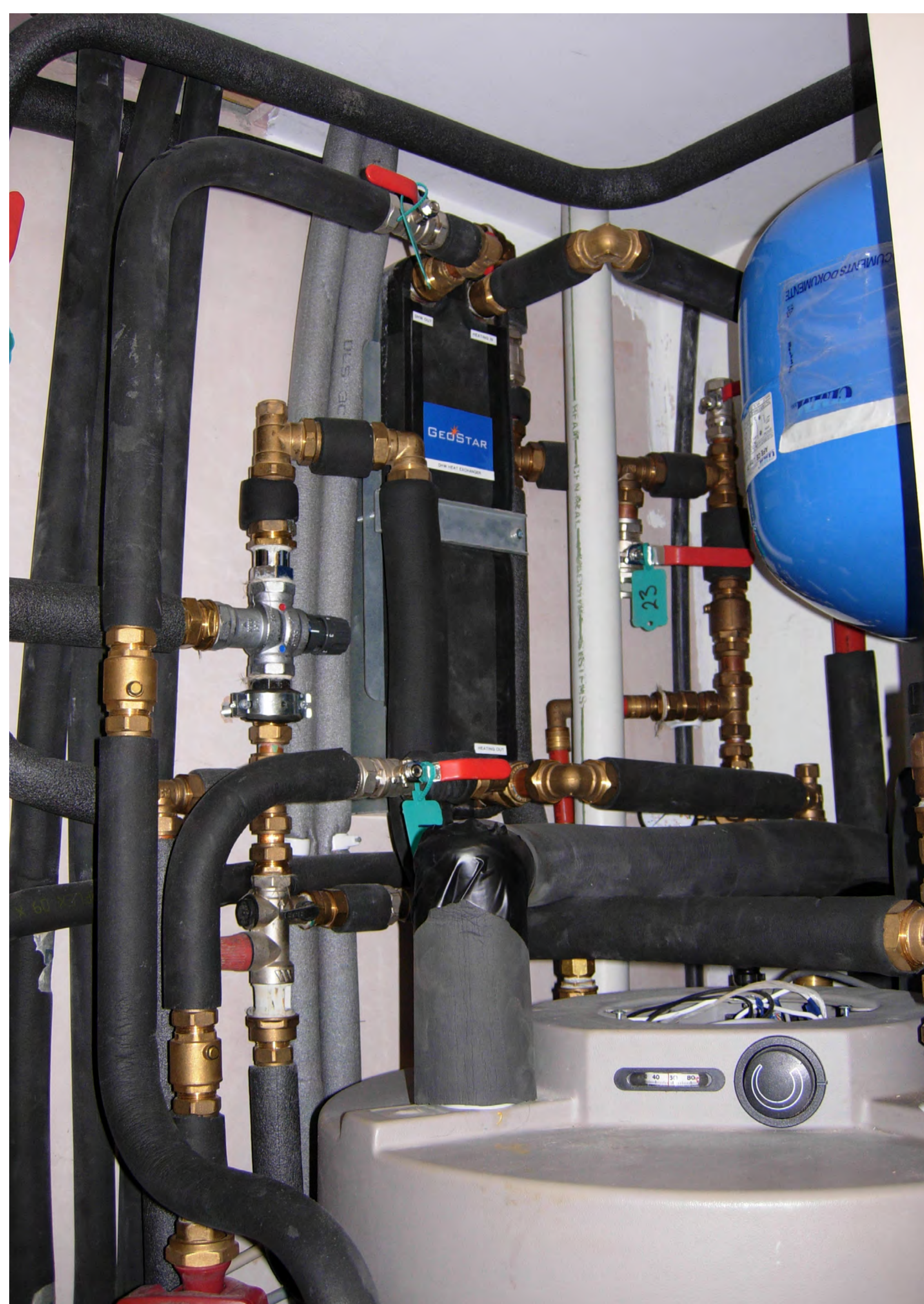
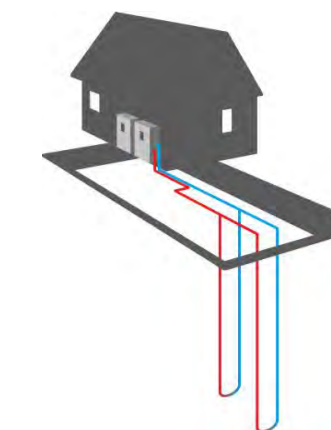


The Breacan Mooney Award for Geothermal Installation of the Year for Domestic Dwellings

Castlequin, Co. Kerry



The geothermal heating system is located in an outdoor plantroom and is connected to a field of horizontal pipe loops laid out at a depth of 1.5m. The collector has eight branch pipes connected in "reverse return" format to an ABS manifold set. The pipes are 1" normal gauge diameter, Hydrodare, each coil 150 metres in length. The collector area is 72 metres by 7 metres. The flow and return pipes from the manifolds to the plant room are 1" diameter and each pipe is 36 metres in length.

The collector is filled with a water- anti freeze mix (25% mono -propylene). The collector pressure gauge, expansion vessel and filling device are located in the plant room.

The Geostar i400 heat pump and 1000 litre buffer tank are both located in the external plantroom. The i400 is a dual set point machine. On this project the heating flow setpoint is set to a maximum of 40°. The weather compensation system monitors the outdoor ambient temperature and when appropriate it varies the flow temperature to the space heating).

A 3-port valve installed on the heat pump hot side flow pipe is normally in the open position to the buffer tank. However, on receiving a DHW

call the 3 port valve closes to the buffer tank and opens to the DHW circuit. The heat pump set point during hot water production is 50°C. The DHW cylinder is located in the utility room in the house.

Rather than a coil, a plate heat exchanger has been utilised for the transfer of heat to the domestic hot water.

To prevent legionnaire's disease the heat pump automatically activates the immersion in the DHW cylinder once a week.

The solar panels are located on the garage roof. A Resol BS Plus solar controller has been installed in the system. By using this, maximum use of the buffer tank as a heat dump has been achieved. The maximum temperature in the buffer tank has been set at 70°. Any heat in excess of 70° is automatically disposed of through a dedicated heat dump radiator located in the garage (see diagrams). All underground pipework to the house are of the pre-insulated type.

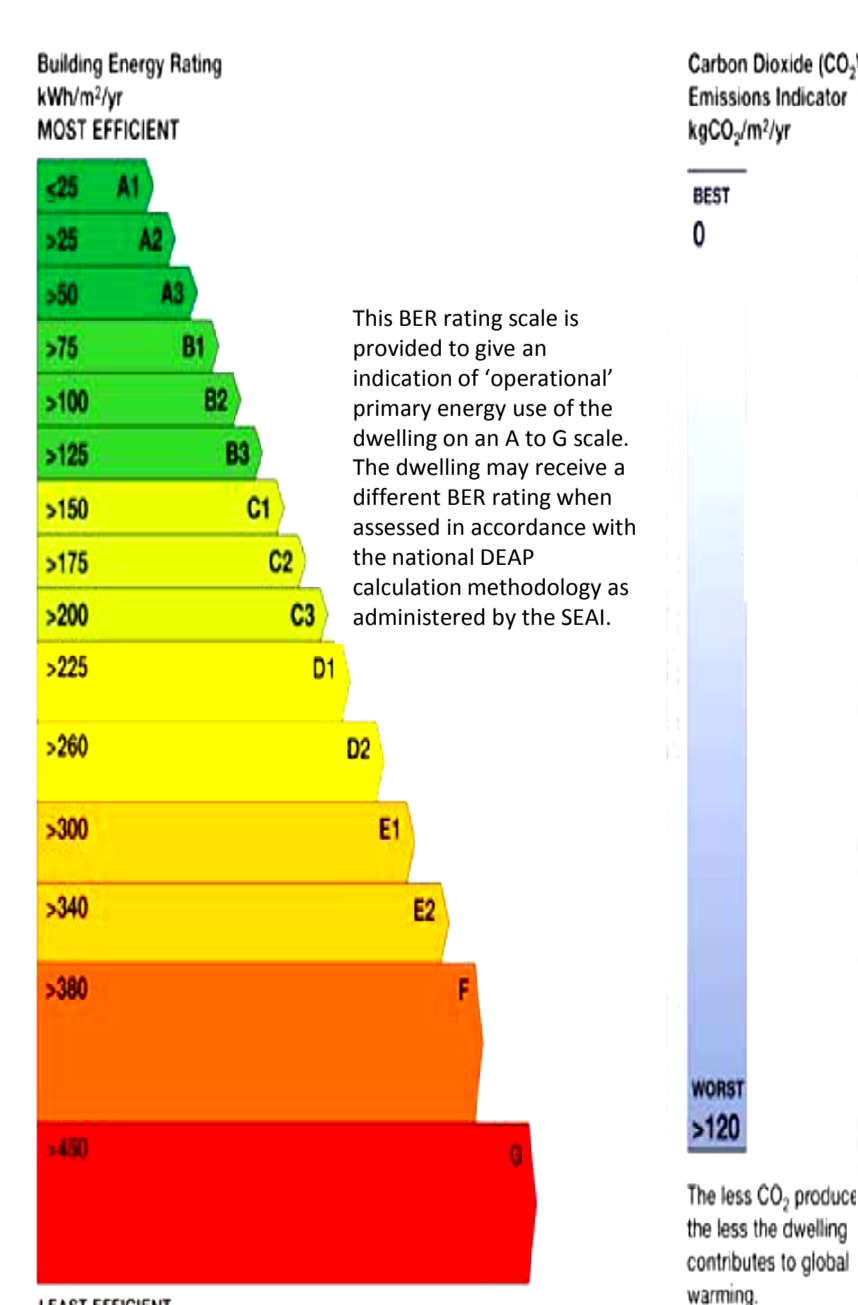
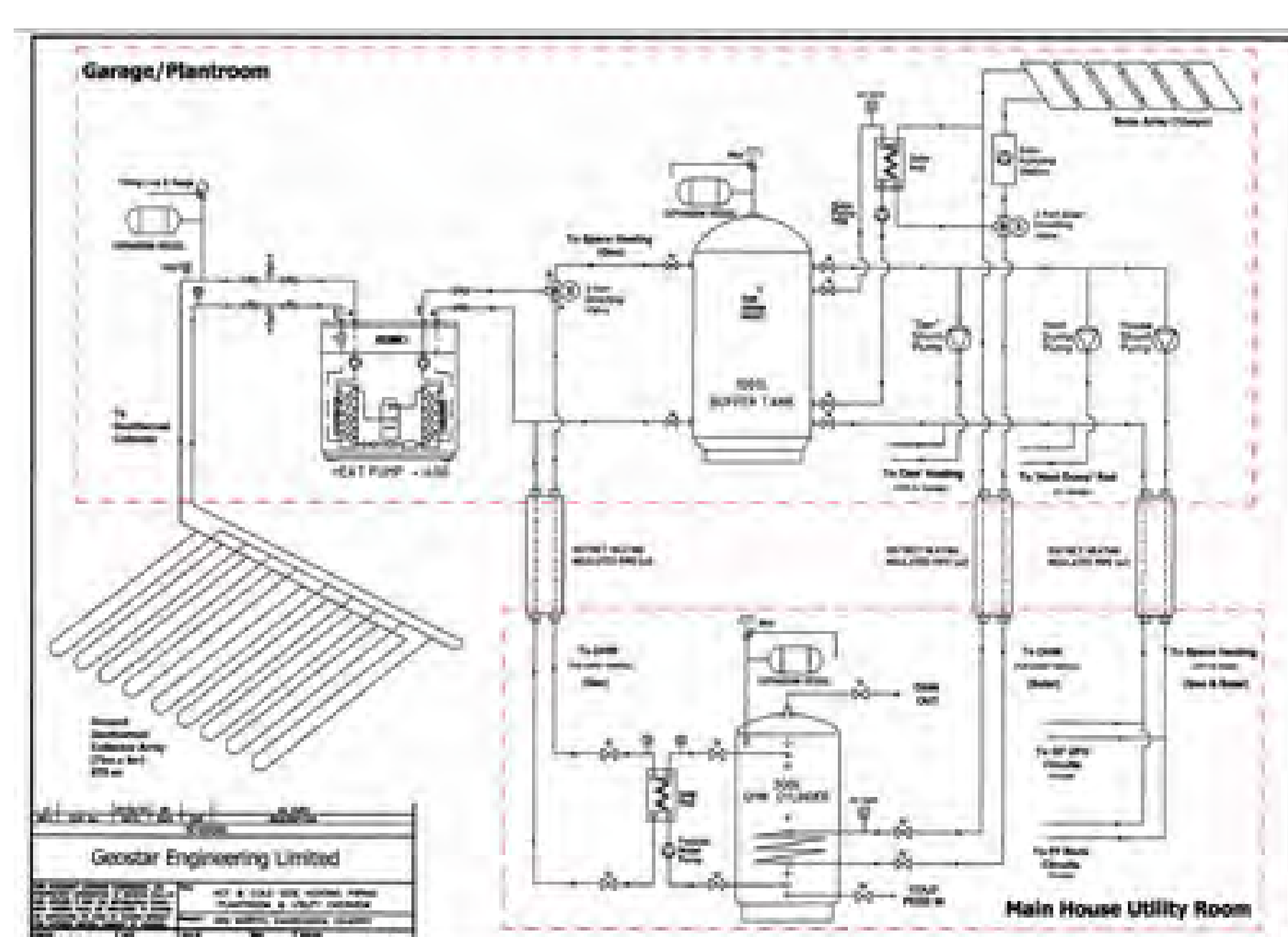
All underfloor heating zones are controlled by Heatmiser thermostats wired to a Heatmiser UHI unit. Oversized radiators are fitted to the bedrooms upstairs. The rads are controlled individually by thermostatic

radiator valves and as a zone by a Heatmiser controller. The heating- hot water system wiring panels have also been manufactured by Geostar. This ensured the seamless integration of the heating controls to the various heating sources and associated components. The control system is known as the HEAT-LOGIC system.

The Geothermal heating system is connected to the solar panel array of 12m² through a solar plate heat exchanger. The control logic utilised by the intelligent control system utilises free heat from the solar panels when the domestic hot water system is at temperature or when the solar panel temperatures are not at sufficient temperature to heat the domestic hot water.

Observation of the energy utility bills indicate that the solar panels do provide considerable heating input during the shoulder seasons. Before the heating systems are disabled for the summer months. The other point of note is that this was the only entry made where the heat pump was manufactured by an Irish company.

The following table and BER chart provides an indication of how the house performs based on data retrieved from the utility bills.



Key Data and Assumptions used in calculations:	
Year of analysis	2010
Floor Area	200 m ²
Annual Electricity Consumption	9265 kWh
Base annual elect demand excl. Htg	5456 kWh
Delivered energy intensity by floor area	46.3 kWh/m ² .yr
Primary energy intensity by floor area	102.9 kWh/m ² .yr
CO ₂ emissions per floor area	54.8 kg/m ² .yr
Geothermal Renewable Energy usage	33.9 kWh/m ² .yr
Min. Bldg. Reg. Part L renewable energy	10.0 kWh/m ² .yr
CO ₂ emissions saved against oil heating	3037 kg/yr
Night % of Total Electricity demand	43%
Period of review	19/5/10 - 18/5/11
Electricity CO ₂ intensity factor	0.533 kg/kWh
Kerosene CO ₂ intensity factor	0.257 kg/kWh
Seasonal CoP heatpump	4.0
Primary Energy Factor grid electricity	2.22
Primary Energy Factor Oil	1.1
Seasonal efficiency oil boiler	0.85

