Energy Efficiency

It is intended to include the following elements to achieve a building that has energy efficiency properties considerably better than required through the regulations:

Insulation and fenestration

Insulation will be used in excess of recommended standards for all building elements and the use of argon gas double glazing with low emissivity glass will be used to reduce heat loss. Pilkington Profilit Plus is likely to be used which produces thermal insulation values of 1.8W/m sq K,(as opposed to the usual 2.8W/m sq K).

Heating

Much of the hot water will be preheated via solar panels (with evacuated tubes) that are coloured to blend into the roof finish and have low reflective properties.

Condensing boilers with integrated heat bank for instantaneous hws, reduces hws standing losses. Secondary source heat will be provided from a condensing boiler with the flue passing through a heat exchanger to produce a high operating efficiency. The heating fuel source will be chosen so as to minimise production of CO2 gas.

An under floor heating system will be installed which will be designed to maximise energy efficiency. Heating controls will maximise system performance and a heat recovery system will be included.

Solar Control

Summer overheating reduced by solar control coatings to glazing.

Rooflights provided with dual action 'active' glazing with self cleaning coating and solar control.

Solar control provided by the first floor overhanging the large glazed wall at ground floor on the front (south) façade.

Solar control with the use of natural planting to provide summer shade and winter sun when leaves fall.

Increased thermal mass through the use of concrete floor slabs and concrete block partitions to provide passive cooling to control summer overheating.

Lighting

The efficiency of lighting systems will be optimised using low energy light bulbs, timing and intensity controls. The enhancement of natural light will be achieved by the use of solar skylights connected to flexible tubes and light diffusers. These systems also have the option of an integrated solar panel capable of driving bathroom fans.

Ventilation

Avoidance of trickle vents (which cause heat loss) and a high level of airtightness for the envelope.

Whole house ventilation with heat recovery incorporating night purge cycles to reduce summer overheating.

The design of the house has allowed for passive stack ventilation within the building with the stairwell acting as the main stack. There will be a high level of cross ventilation in the house due to the open plan lower floors design, and the positioning of doors and windows.

Water

Rainwater storage system for plant irrigation and flushing of toilets. The reservoir will be sunk under the rear lawn.

The treatment of sewage to allow for reuse of the water content is also being considered. This water would be used for non drinking purposes, such as the flushing of toilets and irrigation.

There will be water conservation systems within the dwelling. These will include the use of dual-flush or low flush toilet systems, aerating taps, low flow shower heads, dishwashers and washing machines that use reduced volumes of water (and energy) and in the garden by the selective use of drought tolerant plants and landscaping to ensure water does not flow off the land and is wasted.

Green roof

The proposed green roof which will increase insulation, decrease overheating, reduce extent of rainwater that needs to be drained away and retains sense of green planting which is strongly evident in the area.