Part 8
Sustainability

Design and Access Statement

SUSTAINABILTY STATEMENT

Passive systems underpin the basic design philosophy of the building.

Given the site specific external impositions and the building usage, a degree of active environmental design will also be required, but wherever possible such intervention has been designed out.

The primary structure has been designed to give a significant degree of thermal mass. It has then been wrapped around with a highly insulated skin. This strategy provides a significant heat store during the colder months, whilst helping to mediate between the internal and external environments during the heat of the summer.

Supporting this strategy, the building envelope evidences a high degree of air tightness, which is then supported by a continuous fresh air ventilation strategy that makes full usage of heat exchange technology.

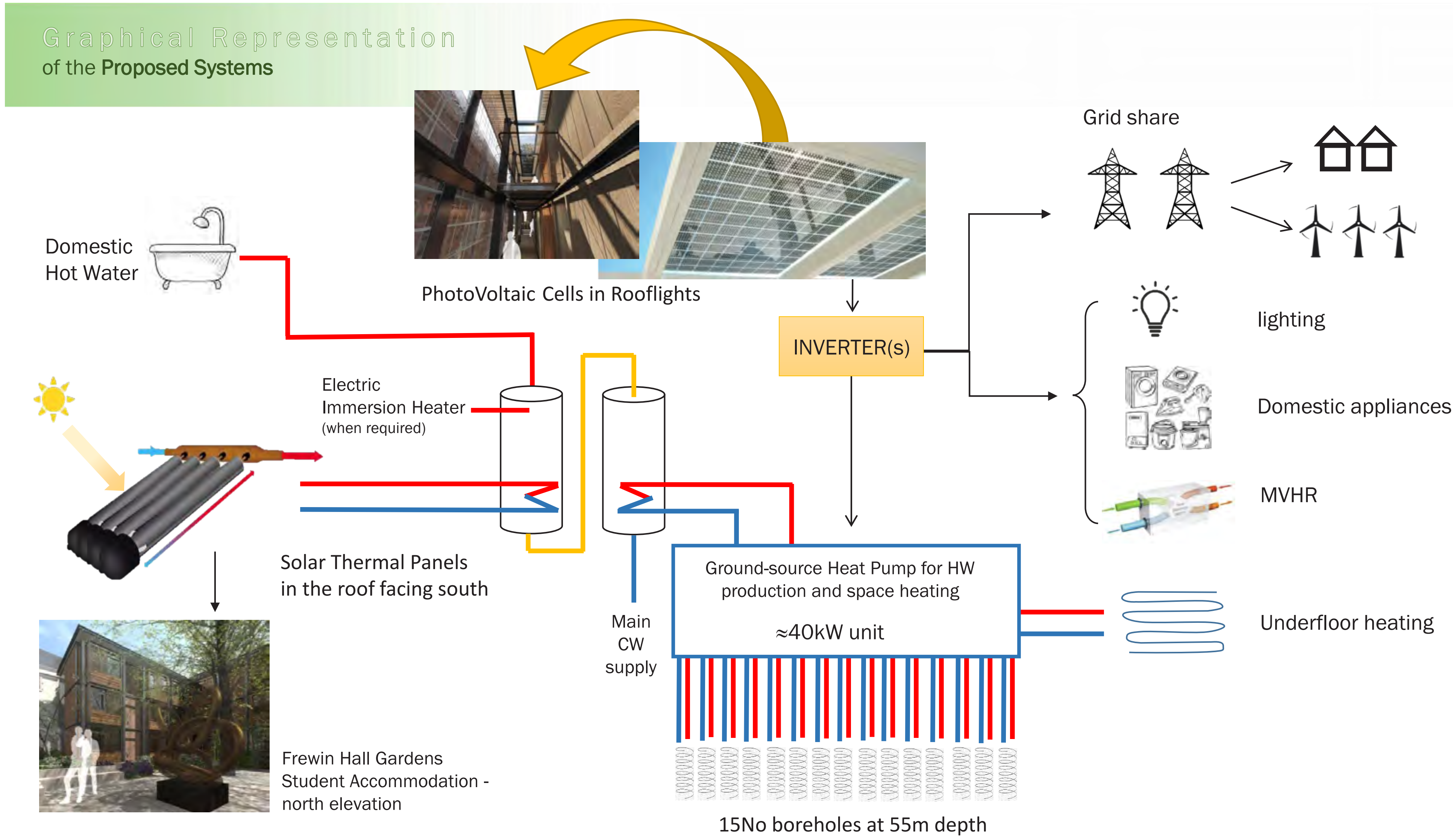
High levels of natural daylight are provided to all habitable rooms via large areas of high performance glazing. All glazing has been located on the east/west/north facades avoiding the glare and solar gain of the south facade. Solar shading where required is provided by decorative movable privacy screens, allowing the individual user to adjust levels of both ventilation and shading.

The heating strategy for the building makes use of ground source heat pumps, which drive a low temperature high efficiency under floor heating system. This system has thermostatically regulated control on a room by room basis via the building management system. The heat pumps can be switched over to hot water generation during the warmer months when heating is no longer required.

Solar thermal panels are located on the roof of the building providing pre heating for the hot water load of the building. Photo voltaic panels form the glazing to the roof light sections of the roofs, providing both solar shading and an element of on site micro generation.
All lighting within the building is provided by low energy long life LED fittings. These are operated automatically within the communal and circulation areas, via the Building Management System and respond directly to daylighting levels.

Boost heating for the hot water is currently via electric immersion utilising a renewable source of supply. The boost system has been designed to allow future replacement by a more efficient/environmentally advantageous system as and when this is developed, without impacting upon the wider building systems.

All building materials have been specified using sustainable or recycled sources. Where ever possible materials will be sourced within a 150 mile radius of the site.



ENVIRONMENTAL ENGINEER'S STATEMENT

The building has been designed foremost with energy conservation and sustainability at its core. Low energy via good spatial design, passive environmental control, high quality construction and detailing has been employed.

The Design Team's initial goal is for 20% of the building's energy to be provided from on-site renewable or low zero carbon technology. A hierarchal approach to the reduction of carbon and energy consumption has been taken through firstly considering passive design principles to reduce demand, then applying system efficiency measures to meet end use energy demand efficiently, before finally considering the use of renewable technologies.

High levels of insulation have been used along with a very air-tight construction to reduce the requirement for space heating.

Ventilation

With such as an airtight building, mechanical ventilation with heat recovery will provide constant and controlled fresh air. The design of the external façade which combines large opening windows with a shallow floor plate provides an effective air-change rate to achieve both the fresh air requirements and to help preventing overheating.

Space Heating

Ground Source Heat Pumps connected to vertical bore holes will provide a space heating system with an efficiency of 280% or more.

Hot water

Hot water will be pre heated from the energy produced by the GSHP, with a large 30m2 solar thermal array boosting the temperature of the hot water when solar energy is available. Electric immersion heaters will be used to increase the temperature of the hot water when the GSHP and solar thermal are unable to do so.

On site electrical generation

The employment of fritted glazing with PV will be used to provide both solar shading and the production of on-site electricity.

Daylighting

The building will benefit from good levels of daylight so that reliance on artificial lighting during daytime occupancy will be minimised. The windows are designed to achieve a good average daylight factor throughout the habitable rooms

Building performance

Incorporating of the above solutions the building will achieve an average of 32.9% CO2 reduction saving when compared BER/TER. The proposed strategy will also provide an average of 20.7% reduction of the energy demand via on site renewable technology.

Building Element	ADL2A 2013 min. required values	Notional Building	Proposed Specification	% improvement over the 2013 minimum requirements
External Wall	0.35	0.26	0.15 & 0.20 (for the basement)	57.1%
Floor	0.25	0.22	0.15	40%
Roof	0.25	0.18	0.10 & 0.20 (for the basement)	60%
Windows, Rooflights	2.2	1.6	1.5 (double glazing) & 1.8 (rooflights)	31.8%
Doors	2.2	2.2	2.2	-
Internal floors	1.23- 1.25	-	1.23- 1.25	-
Air Permeability (NCM for notional)	10.0	3.0*	3.0	-
Low Energy Lighting	100%	100%	100%	-

*Note that for a building that has 250m² < GIA ≤ 3,500m² area and it is side-lit or unlit on a heating only mode the maximum air-permeability is 3 m³/(h*m²)