

## **Water, energy and resource efficiency measures.**

This is a brief statement intended to establish the proposed approach to sustained construction and energy and water demand reduction to be delivered at the development.

It is proposed that the dwelling will be constructed to meet, and exceed where possible, the current Building Regulations, with insulation standards, thermal bridging and air leaking all improved beyond the minimum compliance levels. In addition consideration will be given to building design, passive solar design and energy efficiency site layouts where possible.

The following sections will set out the design considerations which will be applied to the scheme in order to deliver a low energy, comfortable and affordable dwelling.

### **Base line construction specification:**

- Floor 0.18W/m<sup>2</sup>K
- Walls 0.18W/m<sup>2</sup>K
- Pitched roof (Flat ceiling) 0.15W/m<sup>2</sup>K
- Pitched roof (Vaulted ceiling) 0.15W/m<sup>2</sup>K
- Windows 1.4W/m<sup>2</sup>K
- External doors >60% 1.4W/m<sup>2</sup>K Band C
- Other external doors 1.4W/m<sup>2</sup>K Band B
- Roof lights 2.2W/m<sup>2</sup>K

### **Minimisation of carbon emissions and running costs:**

The new dwelling will be energy efficient with user friendly technologies and low running costs. The proposal takes this into consideration and the specification intends to meet many of these demands.

Listed below are some of the measures that will be incorporated into the detailed design:

- The construction specification of the home will include high levels of insulation on the ground floor, external walls, and roof spaces. This will lessen heat loss.
- The house design will incorporate the thermal bridging guidance produced by Constructive Details and the Government, thereby reducing a significant source of heat loss.

- The property will be naturally ventilated using efficient extract fans on timers to ensure the internal living environment will be healthy and comfortable. Occupants can also ventilate their home via trickle vents to and openable windows during summer homes to prevent overheating. As part of the Building Regulations assessment the proposed house will show a low risk of summer overheating.
- The house design includes sufficient glazing in the principal living rooms, thereby allowing each home to take advantage of passive solar gains. This will reduce the space heating and lighting requirement.
- The new dwelling will utilise LED lighting throughout as Part L1A of the Building Regulations. PIR sensors will be fitted to all external lighting to ensure that only lights required for a particular area are in use and will switch off again when that activity has ceased.
- The new dwelling will incorporate double glazed windows and composite doors throughout. The windows are positioned to allow sufficient daylight into the dwellings.

**Provision to ensure the development is zero carbon ready:**

To support the aspiration to be Carbon Neutral a review has been carried out on what retrofit measures could be implemented and the possible costs. It has been identified that PV panels would achieve the best results, provide the most benefit to the end user and if they were to be retrofitted would have least impact on the future residents. It has been identified that on average if 3.00kW of PV panels were installed this would allow the dwellings to have net zero carbon emissions.

In addition to the above where specified, appliances provided will be A+ or A rated. The dwelling will have use of an external drying space. 100 percent of internal light fittings will be energy efficient.

**Heating:**

The low-carbon and renewable energy solutions applicable to this development have been considered and their assessments summarised below

The following are considered a technically viable option on this development:

Air Source Heat Pumps (ASHP). ASHPs extract heat from the external air and condense this energy to heat a smaller space within a dwelling. A pump circulates a refrigerant through a coil to absorb energy from the air. This refrigerant is then compressed to raise its temperature which can then be used for space heating and domestic hot water. They can feed either low-temperature radiators or underfloor heating and often have electric immersion heater back-up for the winter months.

ASHPs are considered a technically viable option for this development scheme for the following reasons:

- Heat pumps are a mature technology and provide a highly efficient way of producing heat from electricity.
- ASHPs provide a good sustainable alternative to oil and gas for providing heating and hot water to well-insulated, low heat loss dwellings.

The new dwelling will provide heating and hot water via an Air Source Heat Pump linked to radiators at ground & first floor level with TRVs. The system will be zoned accordingly to provide low carbon efficient heating throughout. Each zone will be thermostatically controlled with an option for smart controls via remote mobile technologies.

### **Building materials and construction:**

The building materials specified will be assessed against the BRE Green Guide to Specification; an environmental rating scheme based on life cycle assessments (LCA), using BRE's Environmental Profiles Methodology 2008. 'A' rated building materials will be aimed for and 'D' rated elements will be avoided.

Materials specified for the dwellings include:

- Bricks
- Blocks
- Plasterboard
- Timber
- Cement fibre or concrete roof tiles
- uPVC windows
- Composite door

Where possible, materials will be locally sourced, from certified and accredited suppliers. 100 percent of timber used on site will come from a legal source, as defined by the UK Government. Insulating materials will be selected with a low global warming potential (GWP).

### **Water Reduction**

Water consumption will be in compliance with Part G of the current Building Regulations, meeting the requirement of 125 litres per person per day.

To reduce the consumption of potable water, the dwelling will be provided with flow restrictors on taps, efficient appliances (where provided), and dual-flush systems for the WCs. The specification of water fittings will be identified at the detailed design stage. However, the following preliminary sanitary ware specification is proposed to reduce internal water usage:

- Dual flush toilets, with 4.5 litre full flush and 3 litre part flush
- Maximum water flow of 6 litres/minute through taps (combined flow rate from hot and cold supplies)
- Bath – 185L overflow capacity
- Maximum water flow of 8 litres/minute through kitchen sink taps (combined flow rate from hot and cold supplies)
- Maximum water flow of 10 litres/minute through shower (combined flow rate from hot and cold supplies) – to be achieved by installing flow regulators

Alternative component consumption rates are available which can achieve the required water consumption. The rates provided above are representative only.

A water meters on the mains water supply will facilitate water consumption management and monitoring to reduce the impacts of inefficiencies and leakage.

A suitably sized rainwater butt will be installed to the side or rear gardens of the dwelling. The rainwater collected can be used for gardening and reduces the need to use potable water. The water taken from a water butt is also more beneficial to plants as the natural rainwater does not contain the chemicals, minerals and salts found in domestic tap water. The water butt will be fitted with a lockable lid and a tap. It should be connected to the down pipe and be fitted with an overflow device into the conventional drainage system. The water butt should also be detachable from the down pipe to provide ease of access for cleaning.

#### **Waste:**

Construction site activities will be monitored, and targets set to reduce the impact on the environment at the build stage. The site will also be managed to best practice in accordance with the Considerate Constructors Scheme.

Potential forms of pollution arising from the construction of the proposed development will be prevented through the use of sustainable construction methods and good site practices.

Occupants of the dwelling will be encouraged to reduce their waste through the provision of internal and external waste recycling bins for the collection of at least three types of recyclable waste in addition to general non-recyclable waste storage. A compost bin will be provided.

#### **Electric charging infrastructure:**

The dwelling will be provided with an electric vehicle charging point. This will enable the use of sustainable low and zero emissions vehicles in accordance with government policy.

**Conclusion:**

The proposed development aspires to provide a sustainable environment for the benefit of the new occupants helping the occupants save money, improve the occupants comfort and help the environment. By incorporating various measures, it will enhance the occupants wellbeing by being safe, energy efficient and promoting a healthy lifestyle.