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Technical Note

Project Title	35 Elsworthy Road		
Subject	Sustainability Statement	**Date**	2nd April 2025
Author	Nick Sendall	**Our Ref**	1728REW-MET-00-XX-RP-M-9154-S2-P02_Sustainability Statement

1 Introduction

We understand that the Senior Planning Officers require justification of the proposed heating, cooling and ventilation services strategy, specifically the inclusion of MVHR (mechanical ventilation with heat recovery), for 35 Elsworthy Road.

This Sustainability Statement sets out our response.

Regarding the proposed inclusion of MVHR (mechanical ventilation with heat recovery), we can confirm that it is included as part of an energy saving measure to provide controlled background wintertime ventilation, without having to rely upon opening windows or trickle vents which would otherwise let in uncontrolled cold draughts. Thus, the MVHR system is an essential and commonly used system used in low energy buildings. It is not a summertime cooling device – it does not provide any active cooling benefit to the building whatsoever.

2 Planning Policy

Due to the declaration of the climate emergency, and in accordance with Local Plan Policy CC2 Adapting to Climate Change, of the Local Plan, CPG Energy Efficiency and Adaptation (EEA), and London Plan Policy SI4 Managing heat risk, we understand that we are required to review the Cooling Hierarchy in CPG EEA and use it as a basis for the proposed heating, cooling and ventilation strategy. If active cooling is proposed, then we need to provide justification through calculations and thermal modelling.

2.1 Cooling hierarchy

We understand the cooling hierarchy, as set out by CPG 10.7, to be:

10.7 All developments should follow the cooling hierarchy outlined below, to reduce the risk of overheating and subsequent reliance on active cooling:

1. Minimise internal heat generation through energy efficient design,

2. Reduce the amount of heat entering a building in summer,

3. Passive ventilation,

4. Mechanical ventilation,

5. Active cooling.

3 Proposed services strategy

We can confirm that the proposed heating, cooling and ventilation strategy complies with the cooling hierarchy as set out by CPG 10.7.

3.1 Minimise internal heat generation through efficient design

Notwithstanding that the proposed develop is a refurbishment of an existing building, meaning that there may be less opportunities to make improvements, the following strategies have been adopted to reduce the amount of internal heat generation through efficient design:

- A major overhaul and significant up-grade to fabric standards has occurred. The new fabric standards adopted are akin to modern Building Regulation requirements for new build dwellings, this means that less internal heat needs to be generated in order to maintain comfort conditions, specifically:
    - Triple glazing with excellent U-values (to prevent heatloss) and excellent G-values to prevent solar gains
    - New thermally insulated external doors
    - Thermal upgrades to existing solid masonry walls
    - New roof construction which exceeds current regulations
    - New build extensions which exceeds current regulations
    - High standard of air-tightness which exceed current regulations (with pressure testing being conducted)

- The installation of a ground source heat pump (GSHP) with low temperature heat emitters (generally underfloor heating) means that the temperature of the water circulating around the building is minimised, c40^{o}C as opposed to c70^{o}C. This means that the associated standing heatloss from circulation pipework is reduced by over 50%, thus helping to minimise unwanted internal heat gains

Please note that the Client's strong preference is for a passive, low energy consuming building, incorporating low carbon GSHP (ground source heat pump) technology, based on a fabric first approach to insulation, air tightness standards and minimising unwanted summertime solar gains.

3.2 Reduce the amount of heat entering a building during the summer

Notwithstanding that the proposed develop is a refurbishment of an existing building, meaning that there may be less opportunities to make improvements, the following strategies have been adopted to reduce the amount of heat entering the building during the summer:

- Solar controlled triple glazing has been specified (with a G-value of <0.4), this means that >60% of the incoming solar radiation is reflected. This compares against <40% reflected for standard double glazing (so the installed triple glazing provides a c50% improvement over standard double glazing)
- Each window opening is sub-divided into multiple small panes of glass held in place with window bars. This significantly reduces the overall glazed area and thus the amount solar radiation absorbed through the glazing. Compared to a single pane of glass, there is c25% less glazing, thus c25% less solar gain
- Internal shading is offered by using solar controlled blinds
- Some external shading is offered from shadows cast by trees

3.3 Passive ventilation

A passive openable window ventilation strategy is provided throughout to all rooms which have an external façade – all habitable rooms which have an external façade have an openable window, with the intention that it is opened to provide summertime ventilation.

3.4 Mechanical ventilation

Mechanical ventilation with heat recovery (MVHR) is provided to all rooms, generally extracting stale damp air from bathrooms, WCs and kitchens, and supplying to habitable rooms such as bedrooms and living spaces.

The MVHR system provides background wintertime ventilation (heat recovery ventilation) only, at minimum Building Regulation Part F fresh air rates. It is included as part of an energy saving measure to provide controlled background wintertime ventilation, without having to rely upon opening windows or trickle vents which would otherwise let in uncontrolled cold draughts. Thus, the MVHR system is an essential and commonly used system used in low energy buildings.

The MVHR unit does not provide any form of active cooling, it is not a summertime cooling device (other than perhaps helping to cool the rooms down overnight passively, when the external air temperature drops below 21°C).

3.5 Active cooling

A comprehensive set of thermal modelling was undertaken, including room-by-room detailed heatloss and heatgain calculations to BS EN 12831. As a result of this thermal modelling, some limited active cooling has been provided – some of the principal rooms have a fan coil unit in them for backup/extreme conditions use only; to only be used when passive cooling struggles against overheating in the hottest weather during peak summer conditions.

3.5.1 Ground source heat pumps and interseasonal heat transfer

As per the Client's strong preference to incorporate low carbon GSHP technology, a reversible GSHP has been specified to generate:

- Heat for hot water
- Heat for heating
- Cooling

Cooling is generated by running the same ground source heat pump used for hot water and heating in reverse. By doing this we can take advantage of the energy saving strategy known as interseasonal heat transfer.

During the winter, the GSHP generates heat for hot water and heat for space heating by circulating water through a vertical borehole array, which extracts heat out of the ground. As

the winter wears on, and the GSHP extracts more and more heat, the ground around the boreholes will start to cool down. In hot water and heating mode, GSHPs work most efficiently when the ground around the boreholes is at its warmest. This means that the GSHP will operate most efficiently at the start of winter, as at this point the ground around the boreholes will be at it warmest, and will start to tail off in efficiency towards the end of winter because the ground around the boreholes will be cooler.

Unlike ASHPS (air source heat pumps), running GSHPs in reverse for summertime cooling applications can in fact increase the overall efficiency of the GSHP installation as excess heat in the house can be collected and returned to the borehole array, warming and indeed "supercharging" the ground around the boreholes. This is akin to charging a battery. In short, collecting excess heat from the house during the summer and storing it in the borehole ground array, directly reduces wintertime heating energy demands. Ditto is true of running the heat pump during winter, as doing this directly reduces summertime cooling energy demands.

Using a reversible GSHP in this way to provide both wintertime heat generation and summertime coolth generation is known as interseasonal heat transfer. Interseasonal heat transfer helps maximise the efficiency of the heat pump by ensuring that the ground around the borehole array is warmer that it would otherwise be for the start of the wintertime heating season, and cooler than it would otherwise be for the start of the summertime cooling season, thus helping to reduce all year round GSHP energy demands.

Extensive modelling was undertaken by the GSHP specialist in order to advise on the optimum length of borehole in order to maximise the GSHP efficiency and opportunity for interseasonal heat transfer.

4 Summary

Due to the declaration of the climate emergency, and in accordance with Local Plan Policy CC2 Adapting to Climate Change, of the Local Plan, CPG Energy Efficiency and Adaptation (EEA), and London Plan Policy SI4 Managing heat risk, we have reviewed the Cooling Hierarchy in CPG EEA and used it as a basis for the proposed heating, cooling and ventilation strategy at 35 Elsworthy Road.

MVHR is included as part of an energy saving measure to provide controlled background wintertime ventilation, without having to rely upon opening windows or trickle vents which would otherwise let in uncontrolled cold draughts. Thus, the MVHR system is an essential

and commonly used system used in low energy buildings. It is not a summertime cooling device – it does not provide any active cooling benefit to the building whatsoever.

With regards to active cooling, a comprehensive set of thermal modelling was undertaken, including room-by-room detailed heatloss and heatgain calculations to BS EN 12831. As a result of this modelling, some limited active cooling has been provided – to only be used when passive cooling struggles against overheating in the hottest weather during peak summer conditions.

Active cooling is generated in a low energy efficient way by running the ground source heat pump (GSHP) in reverse, through a process known as interseasonal heat transfer. Extensive modelling was undertaken by the GSHP specialist in order to advise on the optimum length of borehole in order to maximise the GSHP efficiency and opportunity for interseasonal heat transfer.