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ENERGY STATEMENT

Proposed Residential Development at 142 Muswell Hill Broadway,
London N10 3RY

| Planning | March 2024

Report reference CB-70



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Revision	Date	Revision Description	Prepared by
<i>First Issue</i>	<i>27/03/2024</i>	-	<i>CM</i>

1.0. Executive Summary

1.1 About the Scheme

This Energy Statement has been prepared for Vivendi Architects Ltd on behalf of their clients, to support the planning application for the redevelopment of commercial premises to create 5no. Flats by conversion at 142 Muswell Hill Broadway, London N10 3RY.

The Flats are to be located on the first, second and third floors. The premises on the ground floor are outside the scope of this report.

The development is in the London Borough of Haringey and has a total Gross Internal Habitable Area of approximately 348 m².

The design has been developed to address the energy performance policy requirements of the The London Borough of Haringey and, where relevant, the policies of the London Plan 2021. It is the aim to achieve target CO₂ reductions that are substantially better than Building Regulations minimum standards, through the application of the energy hierarchy.

1.2 Planning Policy

In accordance with the Policies of the London Borough of Haringey and London Plan Policy SD 1 *Minimising greenhouse gas emissions*, new build dwellings are required to achieve a minimum 35% reduction in carbon emissions (beyond Part L 2021).

This Development comprises Flats created by conversion, and it is assumed that no carbon reduction targets will be imposed although it is the client's intention to provide CO₂ savings beyond Part L minimum standards subject to the limitations and constraints of this site.

The scheme complies with the 2021 Building Regulations Part L and the minimum energy efficiency targets in the following documents have been followed:

- Dwellings created by conversion – Approved Document L (2021) of the Building Regulations

1.3 Haringey Local Plan Policies

The London Plan is key to London Borough of Haringey's Council planning policy and should be considered with every planning application.

The London Borough of Haringey has the following policies regarding sustainable development which are applicable to this development:

- Haringey Climate Change Action Plan
- Haringey Strategic Policies 2013 - 2026

1.3.1 . Haringey Climate Change Action Plan

The Action Plan was published in March 2021 and is essentially an Action Plan towards meeting Net Zero Carbon. It focuses on core activities that have a vital role in delivering a lower carbon environment.

- The Council
- Housing
- Non-Domestic Building and Workplace Emissions
- Transport
- Energy
- Community
- National and Regional Lobbying
- Delivering the Ambition

Regarding housing, the Plan reaffirms the commitment that new homes will need to meet the Zero Carbon Standard to avoid requiring a further retrofit in the next 10 years.

1.3.2 . Haringey Strategic Policies 2013 - 2026

The Haringey Strategic Policies 2013 - 2026 were published in 2013.

As set out in Policy SP4-Working towards a Low Carbon Haringey, of the Haringey Local Plan Strategic Policies, the Council will promote and require all new developments to take measures to reduce energy use and carbon emissions during design, construction and occupation. A minimum of 25% reduction in total (regulated) CO₂ emissions is required for all new residential developments. However, it is suggested that this requirement has been superseded by changes to Part L in 2021 and the London Plan but this will need to be confirmed in due course. The Council will promote low and zero-carbon energy generation through the following measures:

- Requiring all developments to assess, identify and implement, where viable, sitewide and area-wide decentralised energy facilities including the potential to link into a wider network;
- Establishing local networks of decentralised heat and energy facilities by requiring developers to prioritise connection to existing or planned networks where feasible;
- Working with neighbouring boroughs and other partners to explore ways of implementing sub-regional decentralised energy networks including the potential in the Upper Lee Valley Opportunity Area; and
- All new developments are required, where viable, to achieve a reduction in predicted carbon dioxide emissions of 20% from on site renewable energy regeneration, which can include connections to local sources of decentralised renewable energy.

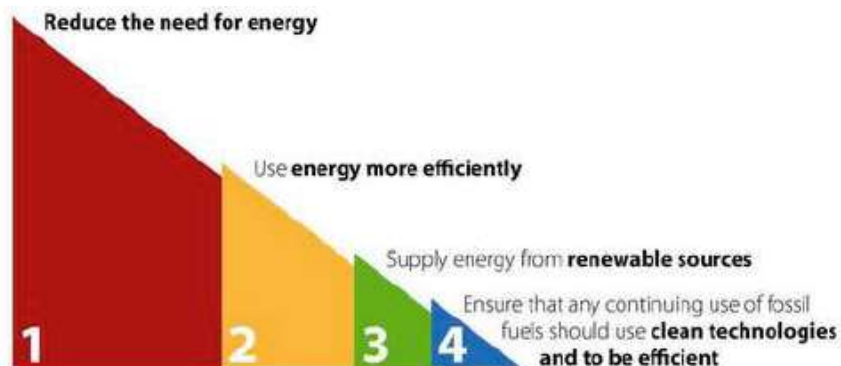
According to Development Management Haringey Policy DM21: Sustainable Design Layout and Construction, all new development, including building and landscape works, will be expected to consider and implement sustainable design, layout and construction techniques. Proposals should:

- Apply the energy hierarchy to minimise energy use in order to meet, and if possible exceed, minimum carbon dioxide reduction requirements.
- Apply the cooling hierarchy to reduce the potential for overheating and limit reliance on mechanical air conditioning systems.

- Maximise opportunities to enhance biodiversity on-site, including through appropriate landscaping, Sustainable Drainage Systems, living roofs and green walls; and
- Wherever possible, use building materials with high environmental performance ratings; and seek opportunities for locally sourced labour.

1.4 The Energy Hierarchy

The proposed scheme has followed the energy hierarchy that is illustrated below in respect of the new-build dwelling.



The resulting energy savings are shown below in accordance with the GLA's Energy Hierarchy:

Table 1 - Regulated Carbon Emissions - All Flats

	Carbon Dioxide Emissions (Tonnes CO ₂ per annum)
Baseline Part L 2021 of the Building Regulations	9.9
After energy demand reduction (be lean)	8.7
After heat network connection (be clean)	8.7
After renewable energy (be green)	8.3

Table 2 - Regulated Carbon Emissions Savings - All Flats

	Regulated carbon dioxide savings	
	(Tonnes CO ₂ per annum)	(%)
Savings from energy demand reduction	1.2	12%
Savings from heat network / CHP	0.0	0
Savings from renewable energy	0.4	4%
Cumulative on-site savings	1.6	16%

2.0. Introduction

2.1. Aim of this Report

The purpose of an energy assessment is to demonstrate that climate change mitigation measures comply with London Plan & Haringey energy policies, including the energy hierarchy.

2.2. Methodology

The methodology followed in this report follows the guidance set out by the Greater London Authority (GLA) for developing energy strategies as detailed in the document “ENERGY PLANNING: Greater London Authority guidance on preparing energy assessments (June 2022))” Under the GLA’s guidance and Haringey SP4 and DM21 policies, applications for major developments should be accompanied by an energy statement. The energy statement should provide information demonstrating how the energy hierarchy has been followed i.e. ‘Lean, Clean, Green’, including consideration of passive design and decentralised energy options such as CHP/Community CHP.

This report has followed these documents and comprises the following components:

- **BASELINE:** A calculation of the Part L 2021 Building Regulations complaint CO₂ emission baseline using approved software. The baseline assumes a gas boiler would provide heating, and any active cooling would be electrically powered. The Baseline performance for dwellings created by conversion is in accordance with the Notional Specification for existing buildings contained in Appendix 3 of Greater London Authority guidance on preparing energy assessments as part of planning applications (2022).
- **LEAN:** A calculation of the impact of demand reduction measures. For example, passive design measures, including optimising orientation and site layout, natural ventilation and lighting, thermal mass and solar shading, and active design measures such as high efficacy lighting and efficient mechanical ventilation with heat recovery.
- **COOLING HIERARCHY:** in accordance with Policy S1 2 of London Plan, measures that are proposed to reduce the demand for cooling have been set out such as minimisation of solar and internal gains and night cooling strategies.
- **CLEAN:** in accordance with Policy S1 2 of London Plan, this report has demonstrated how the scheme has selected heating, cooling and power systems to minimise carbon emissions. This comprises an evaluation of the feasibility of connecting to existing low carbon heat networks, planned networks, site-wide and communal heat networks and CHP.
- **GREEN:** in accordance with Policy S1 2 of the London Plan, this report has conducted a feasibility assessment of renewable energy technologies. This comprised a site specific analysis of the technologies and if applicable how they would be integrated into the heating and cooling strategy for the scheme.

2.3. The Development

The site occupies a corner plot at 142 Muswell Hill Broadway, London N10 3RY in the London Borough of Haringey. The existing site is predominantly for commercial use.

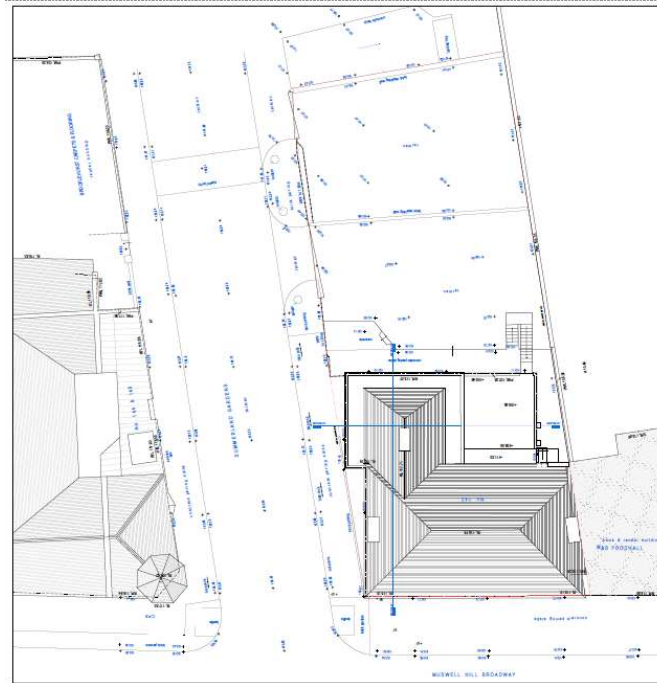


Figure 1 – Site Location



Figure 2 – Proposed Front Elevation

2.4. Schedule of Accommodation

The accommodation proposed is shown in Table 1.

Table 3 – Schedule of Accommodation

Description	Total Internal Floor Area (m²)
Flat 1 - First Floor	80
Flat 2 - First Floor	54
Flat 3 - Second Floor	80
Flat 4 - Second Floor	54
Flat 5 - Third Floor	80
Total Area	348

3.0. Establishing the Carbon Emissions

3.1. Establishing the Baseline Carbon Emissions

The regulated CO₂ emissions of the dwellings created by conversion have been modelled using Building Regulations compliance software (SAP) to determine a baseline DER against which CO₂ savings can be measured at each stage of the energy hierarchy.

The baseline calculations are based on buildings that are the same size and shape as the proposed new dwelling and have the same exposed facades.

The Baseline performance is in accordance with the Notional Specification for existing buildings contained in Appendix 3 of Greater London Authority guidance on preparing energy assessments as part of planning applications (2022).

Table 4 – Baseline U-values

Element	Baseline Specification
Ground floor U-value	n/a
External wall U-value - upgraded	0.30
External wall U-value - new	0.18
Roof U-value – flat and sloping roofs	0.15
Windows U-value	1.4
Door U-value	1.4
Roof light U-value	2.2
Air permeability - Default	15.0 m ² /h.m ³
Thermal bridging	Y=0.20
% Low energy lighting	100%
Gas combi boiler efficiency	90%
Heating controls	Programmer, thermostat and TRVs.

4.0. 'Be-Lean'; Demand Reduction Measures

4.1 Building Fabric - Passive Design Measures

Enhancing the thermal performance of the building envelope helps to future-proof the structure and yields the greatest CO₂ savings. Adding renewable technology will then yield maximum carbon reductions with lower long-term costs for the developer.

The new-build dwelling will achieve compliance with Approved Document L (2021) of the Building Regulations.

The following energy-efficient design measures are proposed:

Table 4 - Proposed energy efficiency measures

Element	Limiting U -values	Proposed U-values
External wall U-value – upgraded	0.30	0.27
Roof U-value – flat and sloping roofs	0.15-0.16	0.13
Windows U-value	1.4	1.4
Door U-value	1.4	1.2
Air permeability	15.0 m ² /h.m ³	15.0 m ² /h.m ³
Thermal bridging	Y=0.20	Y=0.05

4.2 Building Fabric – Thermal Bridging

The dwellings created by conversion assume a default y-value of 0.2 W/m²K.

4.3 Building Fabric – Thermal Mass

The Thermal mass of the new-build dwelling has been indicatively modelled as 125 kJ/m²K (low thermal mass).

4.4 Building Fabric – Airtightness

The dwellings created by conversion assume a default air permeability of 15 m³/(hr.m²) @ 50 pa. This will require attention to two key areas:

- Structural leakage
- Services leakage

Structural leakage occurs at joints in the building fabric and around window and door openings, loft hatches and access openings. There will also be some diffusion through materials such as cracks in masonry walls typically this is caused by poor perpends in blockwork inner leafs. Structural leakage is hard to remedy retrospectively. Good detailing at the design stage is therefore a prerequisite.

Services leakage occurs at penetrations from pipes and cables entering the building. These can be sewerage pipes, water pipes and heating pipes. As well as electricity cables there

may also be telecommunication cables. Attention, therefore, needs to be paid to sealing all penetrations during the construction stage.

For dwellings created by conversion, a default air permeability of $15 \text{ m}^3/(\text{hr.m}^2) @ 50 \text{ pa}$ is assumed, but the principles of attention to detail to avoid unnecessary heat loss also apply.

4.5 Energy Efficient Services

Having reduced energy demand through improvements to the fabric, this development shall seek to reduce energy consumption further through the specification of mechanical and electrical systems with efficiencies that surpass the requirements of the Domestic Building Services Compliance Guide:

- **Heating:**
Heating will be provided by individual gas boilers with efficient heating controls.
- **Ventilation:**
Mechanical extract ventilation will be provided to wet rooms.
- **Air Conditioning:**
No cooling system has been specified for the dwellings. Natural ventilation through openable windows will be used as a passive cooling measure.
- **Lighting:**
High efficiency lightings have been specified for all dwellings. LED lighting will be specified with a lumen per circuit watt figure of 75 lm/W

5.0. 'Be-Clean': Heating Infrastructure & CHP

5.1. Heating Infrastructure including CHP

Once demand for energy has been minimised, schemes must demonstrate how their energy systems have been selected in accordance with the order of preference in Policy S1 2 of London Plan. This has involved a systematic appraisal of the potential to connect to existing or planned heating networks and on site communal and Combined Heat and Power (CHP) systems

5.2. Heating Infrastructure

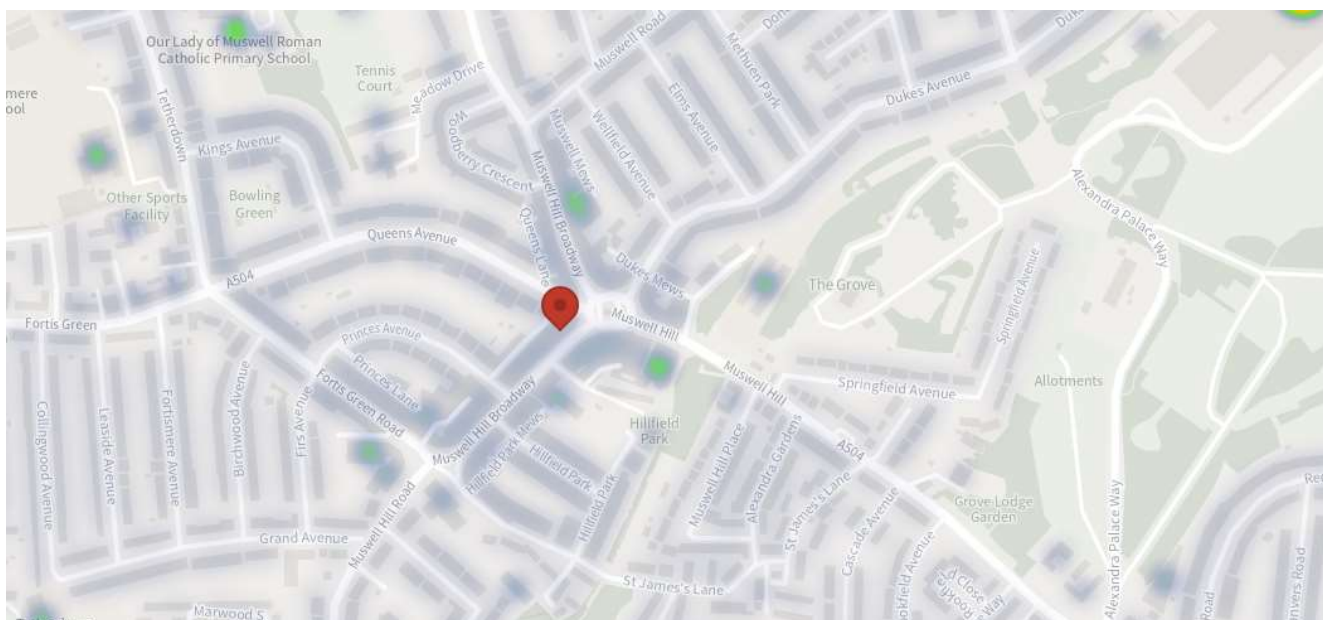
Reference has been made to the The London Heat Map (shown below) to establish the possibility of connecting to heating infrastructure.

In a district heating network heat is supplied from one or more central energy centres to multiple buildings within the network. Supply to multiple buildings guarantees high year-round local heat demand which in turn allows the use of low carbon technologies within the energy centre, such as combined heat and power systems. Large plant and aggregated demand allows systems within the energy centre to run more efficiently.

Hot water is distributed within the network via highly insulated pipes. To connect to the network individual boilers are replaced with separately metered heat exchangers.

5.3. Connection to existing and Planned Networks

London Plan Policy S1 2 requires new developments to connect to an existing district heating network if one is available. Where there is no existing network, but potential for a future network has been identified; major developments should incorporate the infrastructure required to connect to the network. This may include installing centralised heating plant connected to individual heat exchangers within each dwelling. In this context, the development at 142 Muswell Hill Broadways is considered a minor development.



Having reviewed the London Heat Map there are no existing or potential networks within the vicinity of the scheme, therefore a connection is not possible. However, according to Haringey Local Plan, there is a potential network within the vicinity of the scheme.

As set out in Haringey Policy DM22: Decentralised Energy, where there is a future DE network:

- All major development located within 500 metres of a planned future DE network, which is considered by the Council likely to be operational within 3 years of a grant of planning permission, will be expected to secure connection to that network.
- All minor new-build development located within 25 metres of a DE network 'connection zone' should be designed for connection to a DE network.

The potential decentralised network is located over 500m away from the development. Therefore, a connection to the future network is not a requirement.

6.0. 'Be-Clean': Site Wide Network's & CHP

6.1. Site-wide Heat Networks

Combined heat and power (CHP) systems use relatively cheap and clean fuels (such as natural gas) to generate heat and electricity on site. A typical CHP system uses combustion of natural gas to drive a turbine that produces electricity. The heat generated is captured and used to produce hot water.

As losses are minimised the carbon footprint of the energy generated is very low. However this is dependent on there being sufficient year-round local heat demand to fully utilise the heat generated by the CHP plant. An example would be developments of at least 500 dwellings, universities or hospitals.

Due to its size, this development is not suitable for combined heat and power.

6.2. Combined Heat and Power (CHP)

Combined heat and power (CHP) systems use relatively cheap and clean fuels (such as natural gas) to generate heating accordance with the GLA guidance for Energy Planning where connection to an area wide heat network will not be available in the foreseeable future i.e. 5 years following completion, or the development is of such a scale that it could be the catalyst for an area wide heat network, applicants should evaluate the feasibility of on-site CHP.

GLA guidance stipulates that small, or purely residential developments of less than 350 dwellings will not be expected to include on-site CHP. This Developments comprises only 5 no. dwellings.

CHP systems are best utilised where there is a consistent and high demand for heat. Because of the small electricity supplies and demand of this scheme, a CHP installed to meet the base heat load would typically require the export of electricity to the grid. The administrative burden of managing CHP electricity sales at a small scale without an active energy service companies (ESCOs) is prohibitive for smaller operators of residential developments.

The heat demand profile of this residential development is not suitable to CHP. The implemented fabric improvements from the 'Be Lean' scenario have also reduced the energy demand from space heating to hot water. For CHP systems to be economically viable they need to run for at least 5,000 hours per year. Therefore, a CHP system would most likely be oversized, and as a result less efficient and economic.

7.0. 'Be-Clean': Cooling

7.1. Overheating and Cooling

Policy S1 4 of the London Plan requires measures to be taken to reduce the impact of the urban heat island effect in London and encourage the design of spaces to avoid overheating and excessive heat generation, and to mitigate overheating due to the impact of climate change.

Where design measures and the use of natural and/or mechanical ventilation are not enough to guarantee the occupant's comfort, in line with the cooling hierarchy the development's cooling strategy must include details of the active cooling plant being proposed, including efficiencies, and the ability to take advantage of free cooling and/or renewable cooling sources.

Where appropriate, the cooling strategy should investigate the opportunities to improve cooling efficiencies through the use of locally available sources such as ground cooling and river/dock water-cooling.

7.2. The Cooling Hierarchy

Major developments should reduce potential overheating and reliance on air conditioning systems and demonstrate this with the Cooling Hierarchy:

- 
- 1) Minimise internal heat generation through energy efficient design
 - 2) Reduce the amount of heat entering the building in summer (e.g. shading and fenestration)
 - 3) Manage the heat within the building through thermal mass, room height and green roofs
 - 4) Passive ventilation
 - 5) Mechanical ventilation
 - 6) Active cooling systems (ensuring the lowest carbon option)

In this context, the Development at 142 Muswell Hill Broadway is a minor developments so mitigating measures will be proportionate.

7.3. Avoiding Overheating Measures Proposed

The following measures have been taken in accordance with the cooling hierarchy to reduce overheating and the need for cooling:

1) Minimise internal heat generation through energy efficient design

Internal heat gains have been minimised where possible. Energy Efficient appliances will help reduce internal heat gain and reduce the cooling requirement. Energy efficient lighting will also be specified.

2) Reduce the amount of heat entering the building in summer (e.g. shading and fenestration)

Direct solar gains will be controlled in the following ways:

- Solar control – all methods controlling solar gain to within tolerable limits have been considered. The existing building form including openings, places limitations on what can realistically be achieved. New openings on the top floor will have solar gain factors from low emissivity windows with a g-value in accordance with an overheating assessment as required for Building Regulations.
- Light-coloured curtain/roller blinds will be specified to limit solar gain.

Heat transfer and infiltration has been controlled in the following ways:

- Insulation levels have been maximised and the resulting u-values in accordance with Part L of the Building Regulations. The build-ups therefore prevent the penetration of heat as much as practically possible. See the 'Be Lean' section of this report for target U-values
- For the new-build Flat, a reduced air permeability rate of $4.0 \text{ m}^3/(\text{hr.m}^2) @ 50 \text{ pa}$ has been targeted to minimise uncontrolled air infiltration. This will require attention to detailing and sealing. See 'Be Lean' section of this report for details of how this will be achieved.

3) Manage the heat within the building through thermal mass, room height and green roofs.

The following measures have been specified to manage heat accumulation within the building:

- High thermal mass – the dwellings created by conversion have solid brick external walls which will help to moderate internal heat gains. High density materials such as bricks act as a 'thermal store'; they absorb heat gains during the day when the building is occupied and 'store' it for an extended period, thereby helping to stabilise daytime temperatures. At night this heat can be dissipated, which 'resets' the heating cycle. However, the need to thermally upgrade the existing walls will somewhat limit the thermal mass potential.

LED lighting will be specified and a lumen per circuit watt figure of 75lm/W will be targeted.

8.0. 'Be' Green' - Low and zero carbon energy sources

8.1. Photovoltaics

Solar photovoltaics (PV) capture the sun's energy using photovoltaic cells. The cells convert sunlight into electricity, which can be utilised on site or transferred into the National Grid. PV cells are made from layers of semi-conducting material, usually silicon. When light shines on the cell it creates an electric field across the layers. The stronger the sunshine, the more electricity is produced. Groups of cells are mounted together in panels or modules that can be mounted on a roof.



Fig. 3 - Typical solar photovoltaic array

The power of a PV cell is measured in kilowatts peak (kWp). This is the rate at which the cell generates energy at peak performance in full direct sunlight.

Photovoltaics offer high CO₂ savings, are simple to install and suitable for most buildings. The only limiting factor for PV is the availability of suitable roof space.

However, in the context of this development, the use of PV is not required to provide an uplift in energy performance.

8.2. Heat pumps

Heat pumps collect low temperature heat from renewable sources (such as the air or ground) and concentrate the heat to a usable temperature via a reverse refrigeration cycle. Useable heat is transferred to the dwelling via a heat exchanger and can be used for low temperature central heating and domestic hot water, though an immersion top-up may be required for DHW.



Fig. 4 - Typical air source heat pump

Heat pumps have some impact on the environment as they generally use grid supplied electricity to run the pumps. It is common for heat pumps to have a coefficient of performance of three, meaning that for every 1kWh of electricity used, over 3kWh of heat can be generated. The renewable component of the output is therefore taken as the difference between the output energy and the input energy, in this scenario the heat pump will be deemed to have delivered 2kWh of renewable energy.

Ground source heat pumps require external horizontal ground loops, or as is more likely in built-up environments, vertical loops fed into bore holes. The application of ground source heat pumps is therefore constrained by site ground conditions and available space.

Air source heat pumps have a slightly lower seasonal efficiency than ground source heat pumps, but require less space. Noise and space considerations should be assessed when determining an appropriate site for external condensing units.

Heat pumps are a very good option for sites not connected to the gas network, or as a replacement of existing electric or oil-fired heating systems. When assessed against a gas central heating system on cost verses potential CO₂ savings a heat pump will perform less favourably¹. For Flats, heat pumps are not ideally suited, in terms of cost-effectiveness and the noise disturbance if outside units have to be installed.

8.3. Solar thermal

Solar thermal systems use free heat from the sun to warm domestic hot water. A conventional boiler or immersion heater can be used to make the water hotter, or to provide hot water when solar energy is unavailable.

Solar thermal systems are most appropriate for buildings with high year-round domestic hot water demand. For this development, the hot water demand is anticipated to be relatively low.

Although a typical solar thermal system will be able to meet half the annual domestic hot water demand for a dwelling, many will use electricity to run pumps within the system. This means the resultant CO₂ and cost savings in a home with a gas boiler will be relatively low.

8.4. Wind turbines

Wind turbines use blades to catch the wind. When the wind blows, the blades are forced round, driving a turbine which generates electricity. The stronger the wind, the more electricity produced.

There are two types of domestic-sized wind turbine: Pole mounted and building mounted. Pole mounted turbines are free standing and are erected in a suitably exposed position, and are often about 5kW to 6kW in size. Building mounted turbines are smaller and can be installed on the roof of a home where there is a suitable wind resource. Often these are around 1kW to 2kW in size.

Large scale turbines, in exposed locations offer one of the best financial returns of all renewable energy systems as the payback of the system increases dramatically with the size of the turbine. However small- scale systems offer much lower levels of performance and recent studies have questioned the viability and output from such systems, particularly in

urban environments. Solar thermal systems use free heat from the sun to warm domestic hot water. A conventional boiler or immersion heater can be used to make the water hotter, or to provide hot water when solar energy is unavailable.

8.5. Biomass

Biomass heating systems, burn wood pellets, chips or logs to provide warmth in a single room or to power central heating and hot water boilers. The carbon dioxide emitted when wood is burned is the same amount that was absorbed over the months and years that the plant was growing. The process is sustainable as long as new plants continue to grow in place of those used for fuel. There are some carbon emissions caused by the cultivation, manufacture and transportation of the fuel, but as long as the fuel is sourced locally, these are much lower than the emissions from fossil fuels.

When specifying biomass heating systems is important to consider the potential technical issues surrounding delivery and storage of fuel.

Although the CO₂ savings from biomass are substantial, the high levels of NO_x emissions can make biomass systems unsuitable for urban environments.

8.5 Analysis of Low Carbon and Renewable Energy Technologies

The suitability of low carbon technologies have been analysed and the results shown in Table 5, ranked 1 (most suitable) to 4 (least suitable).

Table 5 - Analysis of Low Zero Carbon Technologies

Technology	Feasibility	Rank
Photovoltaic (PV) Panels	Solar panels can generate electricity, which can then be used in the dwellings, or exported back to the national grid. The latest carbon emission rates featured in SAP 10 have reduced the attractiveness of solar panels in meeting Part L energy targets, but they can make a worthwhile contribution towards the reduction in carbon emissions. Nevertheless, their use will contribute to carbon reductions. Either roof mounted or building integrated systems (solar slates) can be used. Systems should be installed in a south or near south orientation and be free from over-shading.	1
Air Source Heat Pumps (ASHP)	ASHP is an alternative renewable technology. ASHP perform very well in terms of Building Regulation compliance and benefits from decarbonizing of the national grid resulting in low carbon emissions from electrical based heating systems. Heat pumps are available that can be sited within a dwelling as well as outside the dwelling.	1
Solar Thermal Hot Water (SHW)	Solar thermal hot water systems are a proven and mature technology in the UK and well suited to year-round domestic demand for hot water. Systems are restricted to only meeting a proportion of domestic hot water demand (typically in the region of 60%). This does limit the technologies' ability to achieve high levels of carbon emission reduction. Their use is unlikely to meet the carbon reduction targets required for this development, nor is solar hot water suited to use in Flats.	2
Ground Source Heat Pumps (GSHP)	Ground source heating systems are not suitable for this development. The use of the ground floor to accommodate the heat pump is not within the scope of this development.	4
Wood Burning Fuels	The low carbon emission associated with biomass and wood as a fuel for space and water heating will result in potential reductions in carbon emissions. However, their use depends on the availability of a local source of wood pellets and would require storage facilities for the wood pellets. In practical terms, for this Development – an existing site in a urban area, biomass is not feasible or practical.	4
Wind Turbines	The wind speed at this Site is estimated at 4.6m/s at 10m above ground level through to 6.1m/s at 45m above ground level, which is relatively modest and not conducive to a very high energy yield. Further, the associated landscape and visual impact implication, given the site's location, would restrict inclusion of larger scale wind turbines (>1MWe).	4
Combined Heat and Power (CHP) and CHP District Heating	Although natural gas CHP or cogeneration is an efficient method of generating and utilising electricity and heat, the increased thermal efficiency due to fabric efficiency of new homes prohibits the application of domestic Micro-CHP systems such as the Baxi Whispergen. The number of units proposed and the relatively low thermal density from residential dwellings would conspire to discount the viability of district heating and the effective operation of any communal CHP engine.	4

8.6. Proposed low and zero carbon energy sources

The small scale and urban location of the site limits the type of low and zero carbon sources that can be realistically incorporated. It is proposed that this development will incorporate an array of solar photovoltaic panels, approximately 3.5kWp, to help reduce the carbon emissions on this development.

9. Results: Carbon Emissions & Carbon Savings

9.1. London Plan policy S1 2: Regulated CO₂ savings

The total carbon emission for the Development have calculated using SAP 10 software.

The results are shown in Table 6

The carbon savings at each stage of the energy hierarchy are shown in Table 7.

Table 6 - Regulated Carbon Emissions - All Flats

	Carbon Dioxide Emissions (Tonnes CO ₂ per annum)
Baseline Part L 2021 of the Building Regulations	9.9
After energy demand reduction (be lean)	8.7
After heat network connection (be clean)	8.7
After renewable energy (be green)	8.3

Table 7 - Regulated Carbon Emissions Savings - All Flats

	Regulated carbon dioxide savings	
	(Tonnes CO ₂ per annum)	(%)
Savings from energy demand reduction	1.2	12%
Savings from heat network / CHP	0.0	0
Savings from renewable energy	0.4	4%
Cumulative on-site savings	1.6	16%

The Development proposes to deliver a 16% reduction in CO₂ emissions compared to a baseline performance calculated in accordance with the Notional specification for existing buildings given in the London Plan energy assessment guidance.

10.0. Conclusions

The proposed development is considered to be a minor development in terms of both the London Plan and the London Borough of Haringey's Local Plan. Therefore, the scheme as such is not required to comply with London Plan sustainability and energy policies.

It is considered reasonable that the scheme falls within this definition but noting that the development wishes to incorporate energy measures that result in carbon emissions savings when compared to Building Regulations minimum standards.

As this development is classified as a material change of use, a baseline performance has been established based on the Notional specification for existing buildings provided by the London Plan energy assessment guidance.

Energy improvements are compared against the baseline performance.

The proposed development features improved fabric insulation standards when compared against the compliance requirements of Approved Document L1 of the Building Regulations (2021). In addition, this proposed development will incorporate a mechanical and electrical specification that surpasses the requirements of the Domestic Building Services Compliance Guide.

An assessment has been carried out to determine the potential for renewable energy systems to reduce CO₂ emissions further. In this case there is limited scope to introduce renewable energy systems. However, it is also proposed to install an array of solar photovoltaic panels with an output of 3.6kWp.

These combined energy efficiency measures lead to a reduction in CO₂ emissions of approximately 16% above the energy baseline.

Part G Compliance Report

PROJECT DETAILS

Project Reference: CB-70- Part G- Flat 1
Client: Ameva Properties
Property: Flat 1
142 Muswell Hill Broadway
London N10 3RY

Local Authority: london Borough of Haringey
Agent: Vivendi Architects Ltd

Assessor: Colin Marshall
Address: Therm Energy Ltd
Contact:
Software: G-Calc 2015 version 3.0.2
Prepared on: 05-Apr-24

RESULT SUMMARY

By following the Government's national calculation methodology for assessing water efficiency in new dwellings this 2 bed dwelling, as designed, achieves a water consumption of 110 litres per person per day.

Compliance with Building Regulation 36(1) has been demonstrated.

Table 1: The Water Calculator for New Dwellings

Installation Type	Unit of measure	Value	Use factor	Fixed use	litres/person/day
WC(single flush)	Flush volume (litres)		4.42	0.00	0
WC(dual flush)	Full flush vol.	4.5	1.46	0.00	6.57
	Part flush vol.	2.8	2.96	0.00	8.29
WC(multiple fittings)	Average effective Flush vol. (litres)	0	4.42	0.00	0
Taps(excl. Kitchen)	Flow rate (litres/min)	4.5	1.58	1.58	8.69
Bath (shower also present)	Capacity to overflow (litres)	160	0.11	0.00	17.6
Shower (bath also present)	Flow rate (litres/min)	9	4.37	0.00	39.33
Bath only	Capacity to overflow (litres)		0.50	0.00	0
Shower only	Flow rate (litres/minute)		5.6	0.00	0
Kitchen sink taps	Flow rate (litres/minute)	6.5	0.44	10.36	13.22
Washing Machine	litres/kg dry load	8.17	2.1	0.0	17.16
Dishwasher	litres/place setting	1.25	3.6	0.0	4.5
Waste disposal	litres/use	0	3.08	0.0	0
Water softener	litres/person/day	0	1.0	0.0	0
Total calculated use (litres/person/day)					115.36
Contribution from greywater (litres/person/day)					-
Contribution from rainwater (litres/person/day)					-
Normalisation factor					0.91
Total Water Consumption. Code for Sustainable Homes (litres/person/day)					105
External water use					5.0
Total Water Consumption. (36(1)) (litres/person/day)					110

Summary of fitting types "As Designed"			
Type	Description	Flow rates, volumes etc.	Qty
Taps	Bathroom	4.5 litres/min	1
Baths	Bathroom	160 litres to overflow	1
Dishwashers		1.25 litres/place	1
Washing Machines	Default	8.17 litres/kg	1
Showers	Shower	9 litres/min	1
WC's	W.C	4.5 / 2.8 litres flush vols.	1
		/ litres flush vols.	1
		litres flush vols.	1
Kitchen/Utility taps	Kitchen	6.5 litres/min	1

The lower section of this table is to be filled in by the builder prior to completion. The descriptions, values and quantities should represent the 'as built' specification. Please note the values above represent design values and should not be exceeded without prior consultation with the agent/designer (Vivendi Architects Ltd).
The completed table should be returned to the assessor: Colin Marshall.

Declaration of fitting types "As Built"			
Type	Make and Model	Flow rates, volumes etc.	Qty
Taps			
Baths			
Dishwashers			
Washing Machines			
Showers			
WC's			
Kitchen/Utility taps			

Project ref: CB-70- Part G- Flat 1 - Flat 1

The above declaration of fittings, values and quantities is a true reflection of those installed on this project.

Name: Signature: Date:

-----End of Report-----

Part G Compliance Report

PROJECT DETAILS

Project Reference: CB-70- Part G- Flat 2
Client: Ameva Properties
Property: Flat 2
142 Muswell Hill Broadway
London N10 3RY

Local Authority: london Borough of Haringey
Agent: Vivendi Architects Ltd

Assessor: Colin Marshall
Address: Therm Energy Ltd
Contact:
Software: G-Calc 2015 version 3.0.2
Prepared on: 05-Apr-24

RESULT SUMMARY

By following the Government's national calculation methodology for assessing water efficiency in new dwellings this 1 bed dwelling, as designed, achieves a water consumption of 107.4 litres per person per day.

Compliance with Building Regulation 36(1) has been demonstrated.

Table 1: The Water Calculator for New Dwellings

Installation Type	Unit of measure	Value	Use factor	Fixed use	litres/person/day
WC(single flush)	Flush volume (litres)		4.42	0.00	0
WC(dual flush)	Full flush vol.	4.5	1.46	0.00	6.57
	Part flush vol.	2.8	2.96	0.00	8.29
WC(multiple fittings)	Average effective Flush vol. (litres)	0	4.42	0.00	0
Taps(excl. Kitchen)	Flow rate (litres/min)	4.5	1.58	1.58	8.69
Bath (shower also present)	Capacity to overflow (litres)	160	0.11	0.00	17.6
Shower (bath also present)	Flow rate (litres/min)	9	4.37	0.00	39.33
Bath only	Capacity to overflow (litres)		0.50	0.00	0
Shower only	Flow rate (litres/minute)		5.6	0.00	0
Kitchen sink taps	Flow rate (litres/minute)	0	0.44	10.36	10.36
Washing Machine	litres/kg dry load	8.17	2.1	0.0	17.16
Dishwasher	litres/place setting	1.25	3.6	0.0	4.5
Waste disposal	litres/use	0	3.08	0.0	0
Water softener	litres/person/day	0	1.0	0.0	0
Total calculated use (litres/person/day)					112.5
Contribution from greywater (litres/person/day)					-
Contribution from rainwater (litres/person/day)					-
Normalisation factor					0.91
Total Water Consumption. Code for Sustainable Homes (litres/person/day)					102.4
External water use					5.0
Total Water Consumption. (36(1)) (litres/person/day)					107.4

Summary of fitting types "As Designed"			
Type	Description	Flow rates, volumes etc.	Qty
Taps	Bathroom	4.5 litres/min	1
Baths	Bathroom	160 litres to overflow	1
Dishwashers		1.25 litres/place	1
Washing Machines	Default	8.17 litres/kg	1
Showers	Shower	9 litres/min	1
WC's	W.C	4.5 / 2.8 litres flush vols.	1
		/ litres flush vols.	1
		litres flush vols.	1
Kitchen/Utility taps	Kitchen	0 litres/min	1

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The completed table should be returned to the assessor: Colin Marshall.

Declaration of fitting types "As Built"			
Type	Make and Model	Flow rates, volumes etc.	Qty
Taps			
Baths			
Dishwashers			
Washing Machines			
Showers			
WC's			
Kitchen/Utility taps			

Project ref: CB-70- Part G- Flat 2 - Flat 2

The above declaration of fittings, values and quantities is a true reflection of those installed on this project.

Name: Signature: Date:

-----End of Report-----

Part G Compliance Report

PROJECT DETAILS

Project Reference: CB-70- Part G- Flat 3
Client: Ameva Properties
Property: Flat 3
142 Muswell Hill Broadway
London N10 3RY

Local Authority: london Borough of Haringey
Agent: Vivendi Architects Ltd

Assessor: Colin Marshall
Address: Therm Energy Ltd
Contact:
Software: G-Calc 2015 version 3.0.2
Prepared on: 05-Apr-24

RESULT SUMMARY

By following the Government's national calculation methodology for assessing water efficiency in new dwellings this 2 bed dwelling, as designed, achieves a water consumption of 110 litres per person per day.

Compliance with Building Regulation 36(1) has been demonstrated.

Table 1: The Water Calculator for New Dwellings

Installation Type	Unit of measure	Value	Use factor	Fixed use	litres/person/day
WC(single flush)	Flush volume (litres)		4.42	0.00	0
WC(dual flush)	Full flush vol.	4.5	1.46	0.00	6.57
	Part flush vol.	2.8	2.96	0.00	8.29
WC(multiple fittings)	Average effective Flush vol. (litres)	0	4.42	0.00	0
Taps(excl. Kitchen)	Flow rate (litres/min)	4.5	1.58	1.58	8.69
Bath (shower also present)	Capacity to overflow (litres)	160	0.11	0.00	17.6
Shower (bath also present)	Flow rate (litres/min)	9	4.37	0.00	39.33
Bath only	Capacity to overflow (litres)		0.50	0.00	0
Shower only	Flow rate (litres/minute)		5.6	0.00	0
Kitchen sink taps	Flow rate (litres/minute)	6.5	0.44	10.36	13.22
Washing Machine	litres/kg dry load	8.17	2.1	0.0	17.16
Dishwasher	litres/place setting	1.25	3.6	0.0	4.5
Waste disposal	litres/use	0	3.08	0.0	0
Water softener	litres/person/day	0	1.0	0.0	0
Total calculated use (litres/person/day)					115.36
Contribution from greywater (litres/person/day)					-
Contribution from rainwater (litres/person/day)					-
Normalisation factor					0.91
Total Water Consumption. Code for Sustainable Homes (litres/person/day)					105
External water use					5.0
Total Water Consumption. (36(1)) (litres/person/day)					110

Summary of fitting types "As Designed"			
Type	Description	Flow rates, volumes etc.	Qty
Taps	Bathroom	4.5 litres/min	1
Baths	Bathroom	160 litres to overflow	1
Dishwashers		1.25 litres/place	1
Washing Machines	Default	8.17 litres/kg	1
Showers	Shower	9 litres/min	1
WC's	W.C	4.5 / 2.8 litres flush vols.	1
		/ litres flush vols.	1
		litres flush vols.	1
Kitchen/Utility taps	Kitchen	6.5 litres/min	1

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The completed table should be returned to the assessor: Colin Marshall.

Declaration of fitting types "As Built"			
Type	Make and Model	Flow rates, volumes etc.	Qty
Taps			
Baths			
Dishwashers			
Washing Machines			
Showers			
WC's			
Kitchen/Utility taps			

Project ref: CB-70- Part G- Flat 3 - Flat 3

The above declaration of fittings, values and quantities is a true reflection of those installed on this project.

Name: Signature: Date:

-----End of Report-----

Part G Compliance Report

PROJECT DETAILS

Project Reference: CB-70- Part G- Flat 2
Client: Ameva Properties
Property: Flat 2
142 Muswell Hill Broadway
London N10 3RY

Local Authority: london Borough of Haringey
Agent: Vivendi Architects Ltd

Assessor: Colin Marshall
Address: Therm Energy Ltd
Contact:
Software: G-Calc 2015 version 3.0.2
Prepared on: 05-Apr-24

RESULT SUMMARY

By following the Government's national calculation methodology for assessing water efficiency in new dwellings this 1 bed dwelling, as designed, achieves a water consumption of 110 litres per person per day.

Compliance with Building Regulation 36(1) has been demonstrated.

Table 1: The Water Calculator for New Dwellings

Installation Type	Unit of measure	Value	Use factor	Fixed use	litres/person/day
WC(single flush)	Flush volume (litres)		4.42	0.00	0
WC(dual flush)	Full flush vol.	4.5	1.46	0.00	6.57
	Part flush vol.	2.8	2.96	0.00	8.29
WC(multiple fittings)	Average effective Flush vol. (litres)	0	4.42	0.00	0
Taps(excl. Kitchen)	Flow rate (litres/min)	4.5	1.58	1.58	8.69
Bath (shower also present)	Capacity to overflow (litres)	160	0.11	0.00	17.6
Shower (bath also present)	Flow rate (litres/min)	9	4.37	0.00	39.33
Bath only	Capacity to overflow (litres)		0.50	0.00	0
Shower only	Flow rate (litres/minute)		5.6	0.00	0
Kitchen sink taps	Flow rate (litres/minute)	6.5	0.44	10.36	13.22
Washing Machine	litres/kg dry load	8.17	2.1	0.0	17.16
Dishwasher	litres/place setting	1.25	3.6	0.0	4.5
Waste disposal	litres/use	0	3.08	0.0	0
Water softener	litres/person/day	0	1.0	0.0	0
Total calculated use (litres/person/day)					115.36
Contribution from greywater (litres/person/day)					-
Contribution from rainwater (litres/person/day)					-
Normalisation factor					0.91
Total Water Consumption. Code for Sustainable Homes (litres/person/day)					105
External water use					5.0
Total Water Consumption. (36(1)) (litres/person/day)					110

Summary of fitting types "As Designed"			
Type	Description	Flow rates, volumes etc.	Qty
Taps	Bathroom	4.5 litres/min	1
Baths	Bathroom	160 litres to overflow	1
Dishwashers		1.25 litres/place	1
Washing Machines	Default	8.17 litres/kg	1
Showers	Shower	9 litres/min	1
WC's	W.C	4.5 / 2.8 litres flush vols.	1
		/ litres flush vols.	1
		litres flush vols.	1
Kitchen/Utility taps	Kitchen	6.5 litres/min	1

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The completed table should be returned to the assessor: Colin Marshall.

Declaration of fitting types "As Built"			
Type	Make and Model	Flow rates, volumes etc.	Qty
Taps			
Baths			
Dishwashers			
Washing Machines			
Showers			
WC's			
Kitchen/Utility taps			

Project ref: CB-70- Part G- Flat 2 - Flat 2

The above declaration of fittings, values and quantities is a true reflection of those installed on this project.

Name: Signature: Date:

-----End of Report-----

Part G Compliance Report

PROJECT DETAILS

Project Reference: CB-70- Part G- Flat 5
Client: Ameva Properties
Property: Flat 5
142 Muswell Hill Broadway
London N10 3RY

Local Authority: London Borough of Haringey
Agent: Vivendi Architects Ltd

Assessor: Colin Marshall
Address: Therm Energy Ltd
Contact:
Software: G-Calc 2015 version 3.0.2
Prepared on: 05-Apr-24

RESULT SUMMARY

By following the Government's national calculation methodology for assessing water efficiency in new dwellings this 3 bed dwelling, as designed, achieves a water consumption of 110 litres per person per day.

Compliance with Building Regulation 36(1) has been demonstrated.

Table 1: The Water Calculator for New Dwellings

Installation Type	Unit of measure	Value	Use factor	Fixed use	litres/person/day
WC(single flush)	Flush volume (litres)		4.42	0.00	0
WC(dual flush)	Full flush vol.	4.5	1.46	0.00	6.57
	Part flush vol.	2.8	2.96	0.00	8.29
WC(multiple fittings)	Average effective Flush vol. (litres)	0	4.42	0.00	0
Taps(excl. Kitchen)	Flow rate (litres/min)	4.5	1.58	1.58	8.69
Bath (shower also present)	Capacity to overflow (litres)	160	0.11	0.00	17.6
Shower (bath also present)	Flow rate (litres/min)	9	4.37	0.00	39.33
Bath only	Capacity to overflow (litres)		0.50	0.00	0
Shower only	Flow rate (litres/minute)		5.6	0.00	0
Kitchen sink taps	Flow rate (litres/minute)	6.5	0.44	10.36	13.22
Washing Machine	litres/kg dry load	8.17	2.1	0.0	17.16
Dishwasher	litres/place setting	1.25	3.6	0.0	4.5
Waste disposal	litres/use	0	3.08	0.0	0
Water softener	litres/person/day	0	1.0	0.0	0
Total calculated use (litres/person/day)					115.36
Contribution from greywater (litres/person/day)					-
Contribution from rainwater (litres/person/day)					-
Normalisation factor					0.91
Total Water Consumption. Code for Sustainable Homes (litres/person/day)					105
External water use					5.0
Total Water Consumption. (36(1)) (litres/person/day)					110

Summary of fitting types "As Designed"			
Type	Description	Flow rates, volumes etc.	Qty
Taps	Bathroom	4.5 litres/min	1
Baths	Bathroom	160 litres to overflow	1
Dishwashers		1.25 litres/place	1
Washing Machines	Default	8.17 litres/kg	1
Showers	Shower	9 litres/min	1
WC's	W.C	4.5 / 2.8 litres flush vols.	1
		/ litres flush vols.	1
		litres flush vols.	1
Kitchen/Utility taps	Kitchen	6.5 litres/min	1

The lower section of this table is to be filled in by the builder prior to completion. The descriptions, values and quantities should represent the 'as built' specification. Please note the values above represent design values and should not be exceeded without prior consultation with the agent/designer (Vivendi Architects Ltd).
The completed table should be returned to the assessor: Colin Marshall.

Declaration of fitting types "As Built"			
Type	Make and Model	Flow rates, volumes etc.	Qty
Taps			
Baths			
Dishwashers			
Washing Machines			
Showers			
WC's			
Kitchen/Utility taps			

Project ref: CB-70- Part G- Flat 5 - Flat 5

The above declaration of fittings, values and quantities is a true reflection of those installed on this project.

Name: Signature: Date:

-----End of Report-----