

6 x Dwellings
Greenside, London Road, Langley, Hitchin SG4 7PP

**SUSTAINABILITY STATEMENT TO DICHARGE PLANNING CONDITION 14 OF PLANNING
APPROVAL REFERENCE 24/00671/FP**

9th April 2025

Compiled by:
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Our Ref: 25045



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Planning Sustainability Statement

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1.0 EXECUTIVE SUMMARY

The proposed new development consisting of **6 x dwellings, Greenside, London Road, Langley, Hitchin** has been designed to incorporate low energy and sustainable building design features using a fabric-first approach with energy efficient building services and renewable energy generation.

This report has been prepared to demonstrate how the scheme intends to comply with **Planning Condition 14 of Planning Approval 24/00671/FP** in line with **Planning Policy D1**.

Referring to Planning Policy SP9, this appears to only be relevant to developments with 100 units or more, so this has not been considered within this report.

The dwellings have been designed to maximise the 'Fabric First' approach, using the geometry of the building design, combined with strategically placed glazing, orientated to maximise passive solar gains. **A highly insulated building envelope** provides improvements of up to **38% better than Building Regulation** values.

Renewable energy for the scheme is provided by air source heat pumps for space heating & hot water.

The **baseline CO2 emissions** to comply with Part L1 2021 of the Building Regulations for this development are **9,219 kgCO2/year**. With the improvements to the building fabric, energy efficiency and application of renewable energy technologies, there is an **annual saving of 5,763 kgCO2/year** which **reduces on-site CO2 emissions by 62.5%**.

The **baseline energy demand** to comply with Part L1 2021 of the Building Regulations for this development are **28,725 kWh/year**. With the improvements to the building fabric, energy efficiency and application of renewable energy technologies, there is an **annual saving of 5,718 kWh/year** which **reduces on-site energy demand by 62.5%**.

Internal water use will be equal to or less than **110 litres/person/day**. It is proposed to use external water butts to reduce the use of potable water for garden irrigation.

The contractor will operate a site waste management plan to manage and reduce on-site waste during construction. Recycling facilities will be provided to each dwelling to allow the occupants to sort and recycle their waste during occupation.

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2.0 INTRODUCTION

The proposed new development consisting of **6 x dwellings, Greenside, London Road, Langley, Hitchin** has been designed to incorporate low energy and sustainable building design features using a fabric-first approach with energy efficient building services and renewable energy generation.

This report has been prepared to demonstrate how the scheme intends to comply with **Planning Condition 14 of Planning Approval 24/00671/FP** in line with **Planning Policy D1**.

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The Site plan is indicated in figure 1 below:



Figure 1: Site plan

Some elements within Planning Policy D1 will not be referred to in this statement as that relates to more architectural elements. This report will set out to summarise the following criteria referring to the specific items within **Planning Policy D1: Sustainable Design**:

1. Item iii. – Reduce energy consumption and waste
2. Item vi. – Future proof for changes to technology and lifestyle.
3. Item e) Achieve 110 litres/person/day to achieve the optional water efficiency standards.

The report will be carried out by an accredited On-Construction Domestic Energy Assessor, Robert Atherton, Director of Low Carbon Box. Energy assessments will be carried out using SAP 10 using the same methodology for compliance with Part L1 2021 of the Building Regulations.

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3.0 SUSTAINABILITY STATEMENT

3.1 ENERGY EFFICIENCY – BUILDING FABRIC

The proposed dwelling will be constructed under Part L1 2021. Below is the proposed specification for the new dwellings in tables 1 and 2.:

Table 1: Input data used for the SAP Calculations

Item	Standard	Specification
Walls – 150mm cavity	0.18 W/m ² .K Kappa = 66.19 kJ/m ² .K	102.5mm brickwork; 150mm cavity with 150mm Knauf Dritherm 32 Full Fill (0.032 W/mK); 100mm Plasmor Fibolite Blockwork (0.28 W/mK, 950 kg/m ³); 12.5mm plasterboard on mortar dabs
Dormer Cheek/Attic Walls	0.16 W/m ² .K	External finish; 12mm WBP plywood; 100mm timber studs; 100mm PIR insulation (0.022 W/mK) between studs; 62.5mm insulated plasterboard (50mm PIR (0.022 W/mK) + VCL + 12.5mm Plasterboard)
Roof (ceiling)	0.10 W/m ² .K	12.5mm plasterboard; 400mm insulation consisting of 100mm Knauf Loft Roll 40 between ceiling joists; 150mm + 150mm Knauf Loft Roll 40 over ceiling joists; ventilated roof void
Roof (sloping)	0.15 W/m ² .K	Roof finish; battens; membrane; rafters at 600mm centres with; min 50mm air gap; 120mm PIR Insulation (0.022 W/mK) between rafters; 62.5mm Celotex PL4050 insulated plasterboard (50mm PIR Insulation (0.022 W/mK) VCL; 12.5mm plasterboard) below rafters
Ground Floor	0.11 W/m ² .K	75mm screed; Vapour control layer; 150mm PIR Insulation (0.022 W/mK); DPM; Beam & block Floor
Windows & Glazed doors	1.30 W/m ² .K 'g' value = 0.66	Double glazed
Front door	1.30 W/m ² .K	
Rooflights	1.30 W/m ² .K 'g' value = 0.46	Double glazed
Air test	4.50 m ³ /hr/m ²	
Accredited Details	Recognised Construction Details	

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Table 2 below compares the building fabric to current Building Regulation Standards.

Table 2: U value comparison

Element	Part L1 2021	Proposed	Improvement
	W/m2.K	W/m2.K	%
External Wall	0.26	0.18	31%
Roof (ceiling)	0.16	0.10	38%
Roof (slope)	0.16	0.15	6%
Ground Floor	0.18	0.12	33%
Windows	1.60	1.30	19%
External Door	1.60	1.30	19%
Air Test	8.00	4.50	44%

The proposed building fabric indicated in Table 1 is proposed to have improvements of between 6-38%.

Building Technology Summary

Based on the low carbon technologies, the proposed specification is indicated in Table 4 below:

Table 3: Summary of building services for SAP

Item	Standard	Specification
Heat Pump	Air source heat pump for space heating & hot water	Mitsubishi Ecodan R32 PUZ ASHP** 45 degree flow temperature
Heating Controls	Time & Temperature Zone Control	
Heating Features	Via underfloor & radiators	
Hot Water (Cylinder)	Hot water cylinder connected to ASHP	300 litres with 2.09 kWh/day losses** 3m2 heat transfer area Fully insulated primary pipework
Showers	All thermostatic showers	No electric showers
Ventilation – System 3	Natural with System 3 continuous extract with rigid ductwork	Greenwood Unity CV2 To each wet room (including utility & kitchen) and achieve minimum 0.3 litres/second/m2 background rate
Lighting	100% low energy lighting	Min 75 lumens/watt

***To be confirmed by heating engineer*

The proposed integration of the low carbon technologies delivers direct savings to the building occupants. This provides an economic benefit as well as reducing annual carbon emissions.

In the next section, we will review renewable energy technologies.

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3.2 RENEWABLE ENERGY

This section of the report conducts an appraisal of potential low carbon or renewable technologies which could be utilised at the site.

3.2.1 Wind Turbines

Wind turbines convert the power in the wind into electrical energy using rotating wing-like blades which drive a generator. Similar to PV, they can either be grid connected or used to charge batteries or on-site use.

Wind turbines can range from small domestic turbines producing hundreds of watts to large offshore turbines with capacities of 3MW and diameters of 100m. A detailed study for urban deployment should take into account wind speed and turbulence and potential noise pollution issues.

There are two main types of turbine available, horizontal or vertical axis. Horizontal axis turbines, (sometimes referred to a propeller type) range in scale from 0.5m to 100m diameter. Vertical-axis turbines rotate around a vertical axis, resulting in lower rotor tip speed and reduced noise and vibration issues.

In both cases, the output of the turbine will be dependent upon both the start-up speed of the blades and the specific gearing and generator design.

The efficiency and performance of small scale, and in particular, domestic scale wind turbines can vary, however, the most common cause of poor performance is poor siting of the turbine. The turbulent wind conditions often found in urban locations undermines the performance of horizontal scale turbines as they have to regularly rotate Yaw to face the oncoming wind.

This process reduces the proportion of energy that the turbine can capture. Vertical axis turbines are designed to avoid this issue by always having blades facing the wind.

These performance issues mean that as a general rule, horizontal turbines are better suited to less turbulent wind regimes, whilst vertical axis turbines offer potential for installation in urban environments.



Figure 3: Wind turbine

In either case, the turbine must be mounted at a reasonable height to ensure that it can 'see' the wind. For urban deployment this means that roof mounted turbines still require a mast and the structural design of the building must be developed to incorporate the additional loads and stresses.

While the site is semi-exposed, the wind turbine would not be favorable for the development and local area due to noise and biodiversity issues. **This option is NOT considered.**

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3.2.2 Biomass Heating

In the context of energy generation, the term 'biomass' can refer to any organic substance that can be processed to produce energy, either solid matter or liquid biofuel. Biomass fuels are an alternative to conventional fossil fuels and are often considered to be near carbon neutral. This is because the growing plant or tree absorbs the same quantity of CO₂ in its lifetime as is released upon energy conversion.

Biomass is a renewable form of energy as it can be replaced over a short period of time. Biomass or biofuels are currently being produced from plantations of a variety of plant types, as well as from waste materials like cooking oil and waste wood. If waste wood is used, care must be taken to maintain fuel standards and exclude wood treatments such as preservatives and paint. Biomass heating is simple and proven technology, widely used in mainland Europe, and which compares well in running cost with mains gas. It can be implemented on a variety of scales from systems for small buildings up to systems of several MW capacities, with the capital cost of larger installations decreasing per unit of heat output.

A key issue for any site considering biomass is the need for substantial storage space allocation for the fuel stock. Although not impossible, the storage requirement and the need for regular fuel deliveries can create significant complications in the development of large scale urban biomass heating systems.

Biomass boilers can achieve similar efficiencies as good quality gas boilers, providing a significantly more efficient fuel burn than open fires or wood burning stoves. Large scale biomass boilers are particularly suitable for rural use such as farms or warehousing where space constraints are less onerous.

The capital costs of biomass boilers are greater than their gas equivalents. For example, the purchase price of a 50KW log boiler alone is in the region of £4,000-£5,000 and there is a requirement for additional 'buffer' storage compared to conventional gas systems. Note however that the extra over cost compared to gas for a 15KW output can be as high as £8,000-£12,000.



Figure 4: Biomass Boiler diagram



Figure 5: Woodchip pellets

It is also not uncommon for clients to require a standard gas boiler to provide back-up. Good practice for a 50KW log boiler would be to provide 3000 litres hot water buffer storage. The additional capital cost for biomass over gas is minimal when considered in the terms of the whole project value for new buildings, but the transportation and storage of fuel requires detailed consideration from the outset of any project.

Biomass has not been considered as a feasible option for this development due to issues associated with supply and storage of fuel; but the units have the potential to connect into a future system if it were to be constructed off site. **This option is NOT considered.**

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3.2.3 Solar thermal hot water heating

Solar thermal panels collect solar radiation to heat water that can then be used for either space heating or domestic hot water. There are two types of competing solar thermal technologies; flat-plate and evacuated tube. In summary, evacuated tube collectors are more efficient and therefore require less active collector array than the equivalent output of a flat plate system. However, in general, capital costs for the two technologies are comparable.

The system consists of solar collectors that are often roof mounted. Liquid is passed through the solar collectors and then to a heat exchanger in a domestic hot water cylinder, which will also have a top-up heat source (gas, biomass, or electricity) to ensure reliability of supply.



Figure 6: Typical solar thermal panel

Solar thermal collectors can still produce energy from diffuse sunlight and are therefore less susceptible to performance reductions from orientation and angle compared to PV.

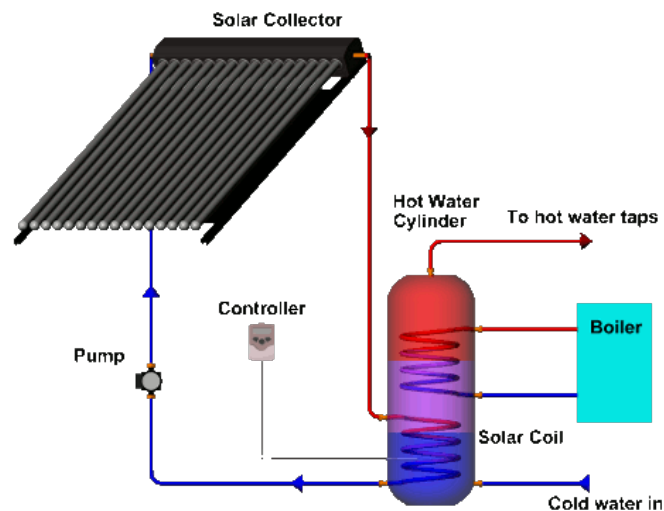


Figure 7: Solar thermal system diagram

A typical 3-4m² collector area system (area dependent on technology) is capable of providing 50% the annual domestic hot water demand for a typical 2-3 bed house. The proportion of hot water provided varies over the course of a year, with the system achieving 100% coverage during the summer months and 5% during the winter.

If properties are left during the day, or empty for periods over the summer, the hot water can recirculate through the system which can cause the panels to corrode and shorten their lifespan.

The advantages over this by using solar thermal are minimal and would add to the occupants' maintenance issues. It has been disregarded on this basis. **This option is NOT considered.**

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3.2.4 Ground Source & Air Source Heat Pumps

A ground source heat pump (GSHP) harnesses the energy from the ground and upgrades it for use within buildings. Whereas ambient air temperatures can have a large swing throughout the year the temperature of the ground a few metres below the surface stays relatively stable. This makes it possible to use the heat in the ground during the winter months to meet our heating needs. In the summer months it is also possible to cool buildings using ground temperatures that are lower than ambient air.

A typical ground system consists of a ground to water heat exchanger often called the 'ground loop' or 'ground coil', a heat pump and a distribution system. Water (or other solution) is passed round the system 'absorbing' heat from the ground and upgrading this heat via the heat pump into the building.

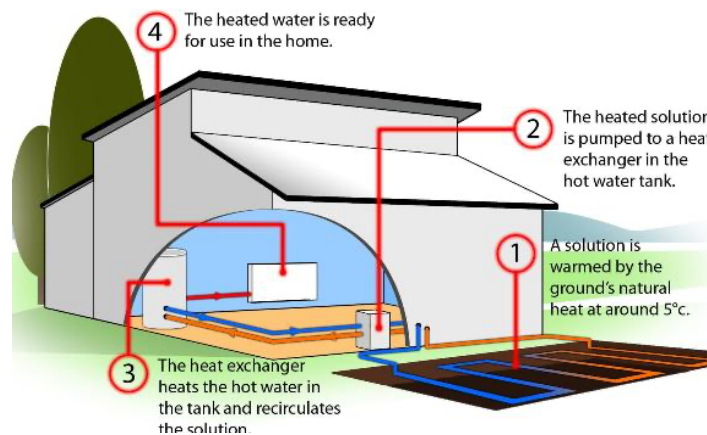


Figure 8: Ground Source Heat Pump system diagram

The heat exchanger can consist of either a vertical borehole system, where long pipes are driven deep into the ground or a horizontal trench system, which operates at shallower depths. The performance of a GSHP is measured using a COP (coefficient of performance). This defines the amount of useful energy output from the heat pump compared to the energy input. Typical systems can achieve a COP in the region of 350-400%.

The COP is maximised where the flow temperature of the heating circuit is between 35-40°C and therefore GSHP are ideally suited for connection to under-floor heating. The potential scale of GSHP is only limited by the availability of land for the ground loop and reasonable levels of energy abstraction. Typical costs for ground source heat pumps range from £800/kW for trench systems to £1,500/kW for vertical borehole systems.

Cheaper alternatives are the use of Air Source Heat Pumps. They have externally located condenser units that recover heat from the air and connect to the internal space heating & hot water system. They can be noisy, and it is important to consider the system set up to ensure the hot water immersion is not providing the space heating, causing high bills and increased carbon emissions.

On this development, it is proposed to use air source heat pumps to provide all year round space heating and hot water via renewable energy.

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3.2.5 Photovoltaics (PV)

Photovoltaic panels convert solar radiation into direct current electricity. In principle, they are an ideal source of renewable energy as they harness the most abundant source of energy on the Earth, the sun, and they produce electricity which is the most useful form of energy.

PVs are silent in operation, have no moving parts and have a long life with low maintenance levels. PV systems can be connected to the grid or battery arrays in remote locations. Grid connected systems consist of PV arrays connected to the grid through a charge controller and an inverter.



Figure 9: Typical PV installation to pitched roof

PV cells are more efficient at lower temperatures so good ventilation should be allowed around the PV modules where possible. Overshadowing and self-shading reduce energy production and in order to maximise energy output, the modules must face due south at an angle of approximately 35 degrees. Output is measured in kWp (kilowatts peak which is the maximum output a module will have under standard test conditions).

At present typical costs start in the region of £2,000-£3,000 per kWp for medium sized orders. The cost varies between systems to reflect the overall efficiency of the modules. Higher efficiency modules cost more but require less space for installation.

The developer has chosen to use air source heat pumps for renewable energy generation. Therefore, PV panels are discounted, but the home owners could add these in the future.

3.2.6 Renewable Energy Summary

It is proposed to use air source heat pumps to generate on-site renewable energy.

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3.3 CARBON EMISSIONS SUMMARY

To confirm, it is proposed to use a fabric first approach using the designed dwellings and the specification as outlined in Tables 1 & 3 together (Building Fabric + Low Carbon Technologies) and the renewable energy technologies outline in Section 3.

In order to calculate the Baseline carbon emissions and the predicted carbon emissions, we used SAP 10 and assessed each different dwelling type using the specifications and designs provided. A summary of the results are indicated in Table 4 below:

- Type – House Type
- Baseline – Total carbon emissions
- Proposed – Total predicted carbon emissions with chosen specification and design

Table 4: Carbon Emissions Summary for the Development

Plot	Type	Baseline	Proposed	Saving	Saving
		kgCO2/yr	kgCO2/yr	kgCO2/yr	%
1	HT-1	1,573	584	989	62.85%
2	HT-2B	1,463	559	905	61.82%
3	HT-2A	1,427	549	878	61.52%
4	HT-1	1,616	596	1,020	63.11%
5	HT-2A	1,566	583	983	62.74%
6	HT-1	1,573	584	989	62.85%
TOTAL		9,219	3,456	5,763	62.51%

The total predicted annual carbon emissions for the Baseline are 9,219 kgCO2/year. Using the proposed designs and specification, the revised predicted carbon emissions are 3,456 kgCO2/year for the whole development.

This is an **annual saving of 5,763 kgCO2/year (5.76 TonnesCO2/year)** resulting in a **62.51% reduction in annual carbon emissions** using a low-tech fabric first approach with increased levels of insulation, air tightness and energy efficiency and air source heat pumps.

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3.4 ENERGY DEMAND & RENEWABLE ENERGY GENERATION SUMMARY

To confirm, it is proposed to use a fabric first approach using the designed dwellings and the specification as outlined in Tables 1 & 3 together (Building Fabric + Low Carbon Technologies) and the renewable energy technologies outline in Section 3.

In order to calculate the Baseline energy demand, we used SAP 10 and assessed each different dwelling in accordance with Part L1 2021. Table 4 below confirms the predicted baseline energy demand for the development:

Table 5: Baseline Energy Demand for the 6 x dwellings

Plot	Type	Baseline	Proposed	Saving	Saving
		kWh/year	kWh/year	kWh/year	%
1	HT-1	4,951	3,895	1,056	21.33%
2	HT-2B	4,453	3,717	736	16.53%
3	HT-2A	4,281	3,658	623	14.55%
4	HT-1	5,154	3,961	1,193	23.15%
5	HT-2A	4,935	3,881	1,054	21.36%
6	HT-1	4,951	3,895	1,056	21.33%
TOTAL		28,725	23,007	5,718	19.91%

The total predicted annual energy demand for the Baseline is 28,725 kWh/year (set by the Notional Building within SAP10 which assumes gas + PV). Using air source heat pumps, this reduces the energy demand to 23,007 kWh/year. This is an **annual saving of 5,718 kWh/year** and a **19.9% reduction in annual energy demand**.

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4.0 SUSTAINABLE DESIGN & CONSTRUCTION

4.1 WASTE & RECYCLING

The proposed dwelling will be provided with a dedicated bin storage area accessible by wheelchair with level access and turning space. Internally, a small 30 litre recycling bin will be provided to allow the temporary collection or recyclable waste.



Figure 8: Typical internal recyclable waste storage unit

The scheme will use careful design and modern methods of construction to reduce on-site waste generation and divert additional waste from landfill where possible.

The construction project will operate a Site Waste management Plan. This will allow the client to minimize waste through careful design and procurement. The client will aim to divert at least 85% waste away from landfill.



Composting will be provided on site with a tap nearby to allow for regular cleaning as required.

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4.2 WATER CONSERVATION

INDOOR WATER USE

Under Part G of Building Regulations, indoor water use is restricted to 125 litres/person/day.

The target is 110 litres/person/day.

It is proposed to meet this standard with the following flow rates, batch capacity and flush volumes:

Table 7: indoor Water Calculation

Installation Type	Unit of Measure	Capacity/Flow Rate	Use Factor	Fixed Use (Litres/person/day)	Litres/person/day
WC (Single Flush)	Flush Volume (litres)		4.42	0	0.00
WC (Dual Flush)	Full Flush Volume (litres)	4	1.46	0	5.84
	Part Flush Volume (litres)	2.6	2.96	0	7.70
Taps (excluding kitchen utility)	Flow rate (litres/min)	6	1.58	1.58	11.06
Bath (where shower present)	Capacity to overflow (litres)	180	0.11	0	19.80
Shower (where bath present)	Flow rate (litres/min)	8	4.37	0	34.96
Bath only	Capacity to overflow (litres)		0.5	0	0.00
Shower only	Flow rate (litres/min)		5.6	0	0.00
Kitchen/Utility taps	Flow rate (litres/min)	6	0.44	10.36	13.00
Washing Machine	Litres/kg dry load	8.17	2.1	0	17.16
Dishwasher	Litres/Place Setting	1.25	3.6	0	4.50
Waster Disposal	Litres/use (1 = present, 0 - absent)	0	3.08	0	0.00
Water Softener	Litres/person/day	0	1	0	0.00
	5	Total Calculated			114.01
	6	Contribution Greywater			0.00
	7	Contribution Tainwater			0.00
	8	Normalisation factor			0.91
	9	Total water consumption			103.75
	10	External water use			5.00
	11	Total Water Consumption			108.75

The total predicted indoor water use is therefore 108.75 litres/person/day.

This meets the target of 110 litres/person/day.

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5 SUMMARY

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Report by	Report date:	Signature:
Robert Atherton Msc Energy & Sustainable Building Design, OCDEA Of Low Carbon Box	09.04.2025	