369-377 Kentish Town Road
Planning Statement Section 106 Response

Reason for Issue	Planning condition response	Author	Adrian Holmes
Date	11th March 2020	Checked	John Pengilly
Issue	Planning	Approved	M. Humphries

Executive Summary

Site Address 369-377 Kentish Town Road, London.NW5 2TJ

Planning application number 2019/0910/P Ward Kentish Town

Planning Officer: - David Peres DaCosta

This is a RIBA Stage 2 Concept of Design Document for the purpose of answering the planning conditions listed by the Planning Officer in Draft Decision Notice (8th August 2019- Section 27, 28 and 29). The information provided shows the design intent and is subject to change with alternative manufacturers of similar products.

London Borough of Camden Section 106 Clause 4.11 and Clause 4.19 require the submittal of *"Energy Efficiency Renewable Energy Plan"* and *"Sustainability Plan"* with particular reference to the following:

Energy Efficiency Renewable Energy Plan

i. Confirmation of the proposed heating strategy;

ii. Improved $C0_2$ reduction (CO_2 reduction as close to 35% reduction as feasible); and

iii. Demonstrate feasibility of increased renewable energy capacity.

Sustainability Plan

i. Confirmation of sustainable construction and design principles from Policy CC2 and CPG 'Energy Efficiency and Adaptation';

ii. Demonstrate feasibility of green roof compatible with solar PV; and

iii. Confirmation that the active cooling functions of the MVHR and ASHP systems are permanently and irreversibly removed or disabled.

Energy Efficiency and Renewable Energy Plan

The design is based on a proposed new heating system in which the mechanical extract ventilation systems and air source heat pump are combined into a single unit delivering heating and hot water.

Air source heat pumps are included in the third tier (Be Green) of the GLA Energy Hierarchy. See Table 1. When applied to the LBC requirements the energy emissions reduction beyond baseline of 49% as shown in Table 1 & 2 figure 1 & 2 and tables 3 & 6 give tabular data of the energy hierarchy of emissions and reduction as required by the GLA energy guidance assessment.

An air quality assessment submitted with the Planning Application identified that site is located in poor air quality area, and recommended that air fresh air supply should be taken from above the 6m street zone.

A clean, tempered fresh air supply is provided to the flats from a central roof top air handling plant. The high-level air is cleaner than the street level air and is within acceptable limits. The heated fresh air supply is required to reduce the building heat loss and to improve the performance of the exhaust air heat pumps.

Exhaust air heat pumps are designed to only provide heating and hot water, but have limited capacity. The larger fifth / sixth floor Duplex apartment requires an additional heat source to cover the peak heating load. It is therefore proposed to install a separate supplementary domestic air source heating pump for the sixth-floor living area.

There is no proposal for active cooling design to maintain a specified thermal comfort level.

The London Borough of Camden (LBC) and Greater London Authority (GLA) standard energy assessment energy tables and graphs are shown below.

Stage	Heating	Saving
Be Lean	Domestic boiler - standard heating with improved thermal fabric values	3%
Be Clean	Domestic boiler – no change to system, no CHP or district heating	0%
Be Green	Renewable Energy - Exhaust Air Heat Pumps and PV	49%

Table 1 Summary GLA Energy Modelling.

	New build commercial (includes major refurbishments assessed under Part L2A)		New build residential (includes major refurbishments assessed under Part L1A)		Overall area weighted reductions	
	Total tCO_2	% reduction at each stage	Total tCO_2	% reduction at each stage	Total tCO_2	% reduction at each stage
Baseline	10 tCO2	N/A	18 tCO2	N/A	27 tCO2	N/A
Be Lean	8 tCO2	14%	17 tCO2	3%	25 tCO2	7%
Be Clean	8 tCO2	0%	17 tCO2	0%	25 tCO2	0%
Be Green	8 tCO2	0%	9 tCO2	47%	17 tCO2	31%
TOTAL	1 tCO2	14%	8 tCO2	49%	10 tCO2	64%
Shortfall (Offset)	2 tCO2	61 tCO2	9 tCO2	272 tCO2	11 tCO2	333 tCO2

Table 2 LBC Carbon Reductions Calculations for the Energy Assessment

	Regulated domestic carbon dioxide savings	
	(Tonnes CO_2 per annum)	Percentage Savings (%)
Savings from energy demand reduction	0	3%
Savings from heat network / CHP	0	0%
Savings from renewable energy	8	46%
Cumulative on site savings	8	49%
Annual savings from off-set payment	9	-
	(Tonnes CO_2)	
Cumulative savings for off-set payment	272	-
Cash in-lieu contribution (£)	£16,301	

Table 3 Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for domestic buildings

	Regulated non-domestic carbon dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Savings from energy demand reduction	1	14%
Savings from heat network / CHP	0	0%
Savings from renewable energy	0	0%
Total Cumulative Savings	1	14%

Table 4 Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for non-domestic buildings

	Annual Shortfall (Tonnes CO_2)	Cumulative Shortfall (Tonnes CO_2)
Total Target Savings	3	-
Shortfall	2	61
Cash-in lieu contribution	£3,685	-

Table 5 Shortfall in regulated carbon dioxide savings

	Total Regulated Emissions (Tonnes CO_2 / Year)	CO_2 Savings (Tonnes CO_2 / Year)	Percentage Savings (%)
Part L 2013 baseline	27.3		
Be lean	25.4	1.9	7%
Be clean	25.4	0.0	0%
Be green	17.5	8.0	29%
	-CO_2 savings off-set (Tonnes CO_2)		36%
Off-set	-	333	-

Table 6 Carbon Dioxide Emissions after each stage of the Energy Hierarchy for Site (Domestic + Non-domestic)

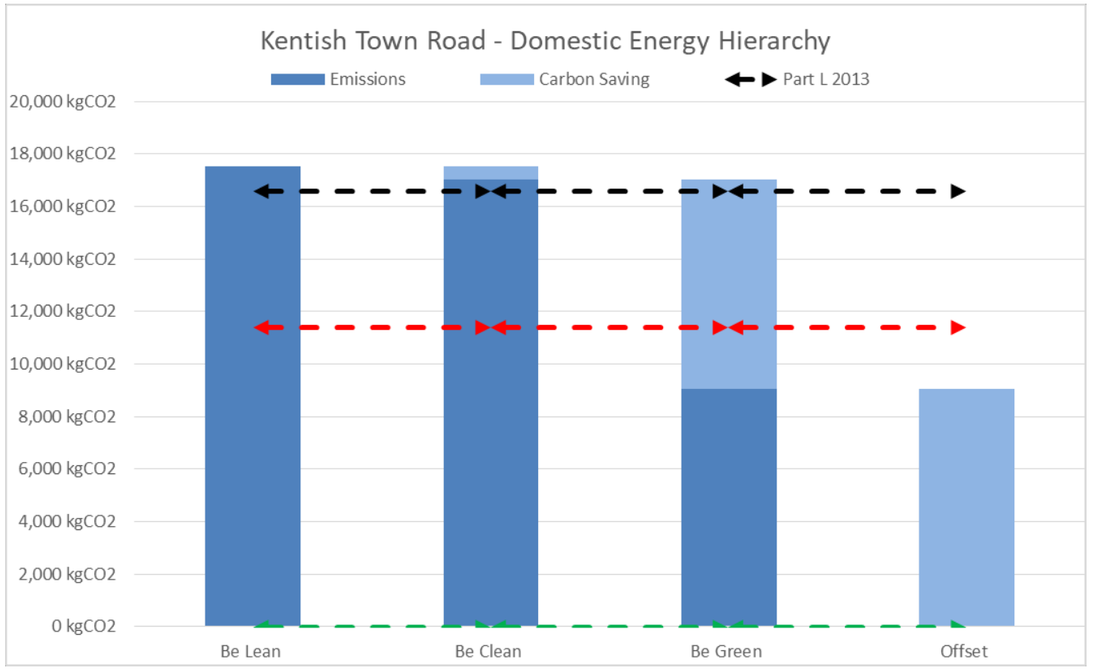


Figure 1 Domestic Energy Hierarchy.

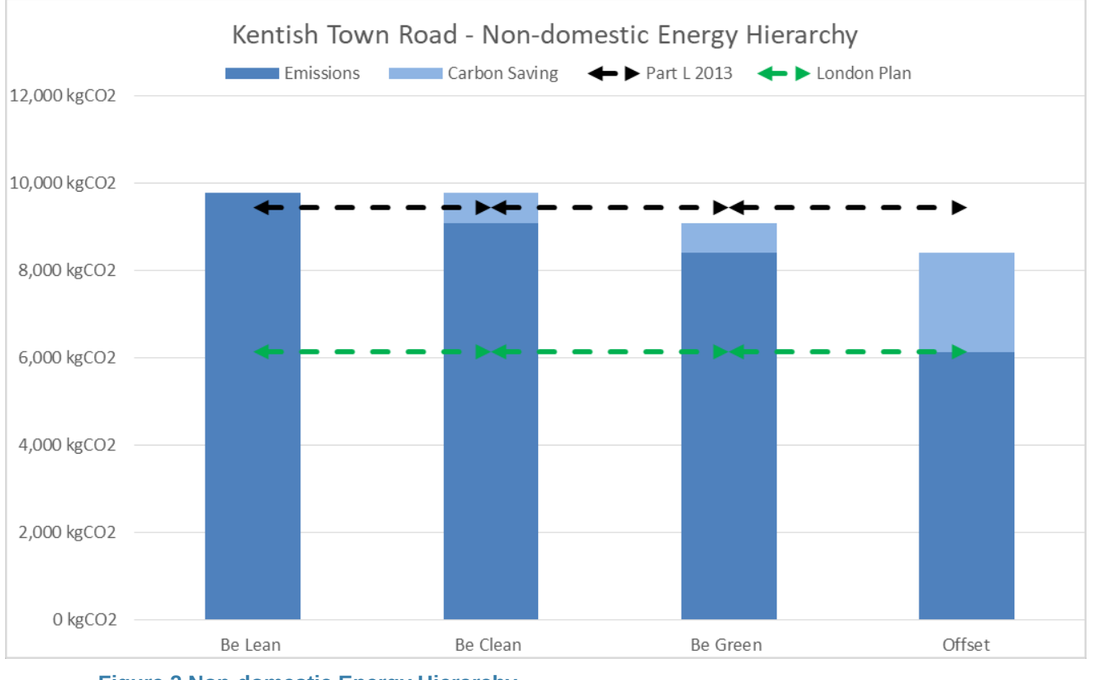


Figure 2 Non-domestic Energy Hierarchy.

Green Roof and Solar PV

The nature and orientation of the site means that the roof can only accept a limited amount of PV once the PV is in place there is a limited space in addition to achieve acceptable attenuation to the rainwater discharge a “Blue Roof” is necessary. It is therefore proposed that the roof will be a “Green Roof”.

Therefore, the proposal is to use a low-profile lightweight PV racking system on the sixth-floor roof design to work within the proposed building structural weight limits. Additional biodiversity planters can be installed in-between the fifth floor roof mechanical plant areas.

Sustainable Plan

Confirmation of sustainable construction and design principles from Policy CC2 and CPG 'Energy Efficiency and Adaptation is given below.

A check list in line with Camden Planning Guidance Energy Efficiency and Adaptation is provided in section 5. It confirms that sustainability design principles have been followed to reduce the energy use and to reduce 20% site energy emission from onsite energy generation.

The design proposal includes rain water attenuation using a blue permeable paving system on the perimeter paths, see Price & Myers. Lead Local Flood Authority Comments April 2019 for calculation details. The scheme has been revised and updated. See Documents “*Flood Risk Assessment and Surface Water Drainage Study Report (V3) March 2020*”: -

1. All discharge from main roof and permeable party is attenuated
2. The total discharge from the site is limited to 1.8L/S.

M&E Systems proposed are for heating only using an exhaust air heat pump system as the primary heat source in all apartments. The heating capacity of the exhaust air heat pump is limited to 6kW and in the sixth-floor duplex apartment a supplementary heat source from a standard air source heat pump unit is needed. The unit will be selected so it does not to provide active cooling in line with the GLA Energy Assessment Guidance (2018).

2 Introduction

Site Address 369-377 Kentish Town Road, London.NW5 2TJ

Planning application number 2016/0910/P

Ward Kentish Town

Officer David Peres DaCosta
Proposal:

Redevelopment including change of use from car wash (Sui Generis) and erection of part six and part seven storey building plus basement to provide 14 flats (10 x 2-bed units and 4 x 1-bed) (Class C3) at 1st floor and above (with terraces at 5th floor rear and 6th floor level (north elevation); and retail (Class A1) or restaurant (Class A3) use at ground and basement level incorporating widened pavement to Kentish Town Road.

Section 106 comments

Clause 4.11 On or prior to the Implementation Date submit to the Council for approval the Energy Efficiency and Renewable Energy Plan

Clause 4.19 On or before the Implementation Date to submit to the Council for approval the Sustainability Plan

3 Energy Efficiency and Renewable Energy Plan

Section 106 - Requirement

Clause 4.11 On or prior to the Implementation Date submit to the Council for approval the Energy Efficiency and Renewable Energy Plan

Planning Officers Committee report 5th September 2019

27 Revised energy statement

Prior to discharge of the S106 Energy Efficiency & Renewable Energy Plan, a revised energy statement shall be submitted to and approved in writing by the local planning authority. The revised energy statement shall include the following:

I. Confirmation of the proposed heating strategy;
ii. Improved $C0_2$ reduction (CO_2 reduction as close to 35% reduction as feasible); and
iii. Demonstrate feasibility of increased renewable energy capacity.

Reason:

For the avoidance of doubt and to secure the appropriate energy and resource efficiency measures and on-site renewable energy generation in accordance with policies C1, CC1, CC2 and CC4 of the London Borough of Camden Local Plan 2017.

28 *Solar PVs*

Prior to discharge of the S106 Energy Efficiency and Renewable Energy Plan, drawings and data sheets showing the location, extent and predicted energy generation of photovoltaic cells, heat pumps and associated equipment to be installed on the building shall have been submitted to and approved by the Local Planning Authority in writing. The measures shall include the installation of meters to monitor the energy output from the approved renewable energy systems. A site-specific lifetime maintenance schedule for each system (including safe roof access arrangements) shall be provided. The equipment shall be installed in full accordance with the details thus approved and permanently retained and maintained thereafter.

Reason:

To ensure the development provides adequate on-site renewable energy facilities in accordance with the requirements of policy CC1 of the London Borough of Camden Local Plan 2017

Renewable Energy Options

Possible

Photovoltaics' – the recommend renewable energy option

Air Source Heat pumps – GLA Energy Assessment Guidance October 2018 defines air source as a renewable energy option in the Be Green element of the energy Hierarchy.

Not Possible

Biomass – The site an at risk air quality zone and biomass boiler would not be acceptable.

Combined Heat Power – This is generally only considered suitable for larger developments with over 100 dwellings. CHP like gas boilers emit NOx gases which not acceptable in high risk air pollution areas.

Solar Thermal - There is limited available south facing roof area. PV array will generate and offset a greater quantity of CO_2 emission compared to the equivalent area of solar thermal panels.

Wind Turbines – not suitable in an urban location with turbulent airflow around buildings.

GLA Energy Assessment Guidance October 2018/

11.5. For the avoidance of doubt, heat pumps are categorised under this third and final element of the energy hierarchy (not the first element, "be lean").

The Revised Energy Efficiency Strategy

In response to the London Borough of Camden's expectation for zero air polluting heating systems in locations at risk of reduced air quality the design team have revised the proposed heating system to include residential heat pumps.

The current proposal is to utilise Exhaust Air Heat Pump systems which has the advantage of being a contained heat pump system using mechanical extract ventilation and 180 litre hot water cylinder. With this type of heat pump system there is no requirement of external plant.

Residential Heating

An Exhaust Air Heat Pump is part of a new generation of heat pumps, designed to supply inexpensive and environmentally friendly heating and hot water (only). The distinguishing feature of the exhaust air heat pump is there is no external condensing unit. The condensing unit is contained within the appliance and heat is extracted from the dwelling extract air. This air is at higher temperature than the outside air, making the unit more efficient than conventional systems and reducing the size of the condenser. The whole system is contained in a single unit which is located in the dwelling kitchen. The exhaust air heat pump emits no more noise than a domestic freezer unit.

The exhaust air heat pump produces economical, non-air polluting heat, in a compact unit containing an integrated hot water cylinder heater, with immersion heater, circulation pumps and control system. The exhaust air heat pump is connected to an optional low temperature heat distribution system. E.g. radiators, convectors or underfloor heating.

The exhaust air heat pumps are equipped with a smart controller for remote monitoring and control by the residents through their mobile phones and internet. The future proofed controller is designed to be used with smart grid variable electricity tariffs; ensuring heating is only energised at times of the day with the lowest electricity cost. With the increasing use of electric car charging the development of Smart Grid technology becomes more important.

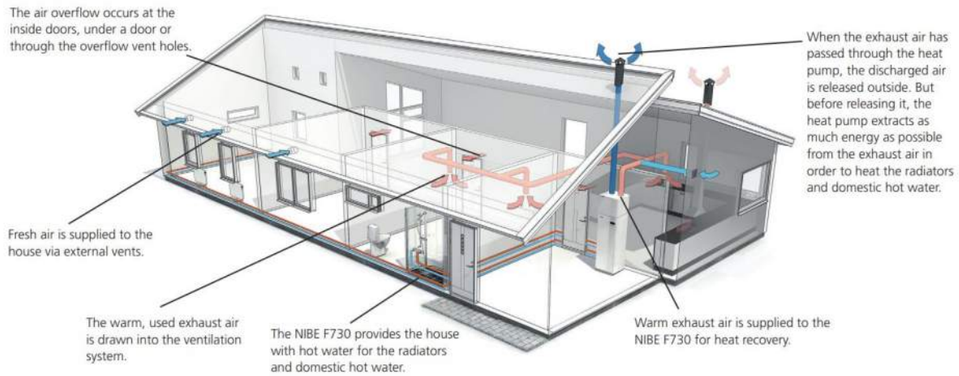


Figure 3 Exhaust Air Heat Pump (NIBE F730). Manufacturers data

Ground Floor and Basement Commercial Areas

No change to the heating strategy for the ground floor and basement speculative retail areas. The proposal is to provide the plant space for the future occupier to install the building services equipment required to meet the use of the space. The commercial space is designed for a range of uses including office, retail or restaurant with kitchen extract discharge at roof level.

GLA Energy Hierarchy

The site energy is remodelled using the SAP 2012 for residential units and SBEM 5.3a

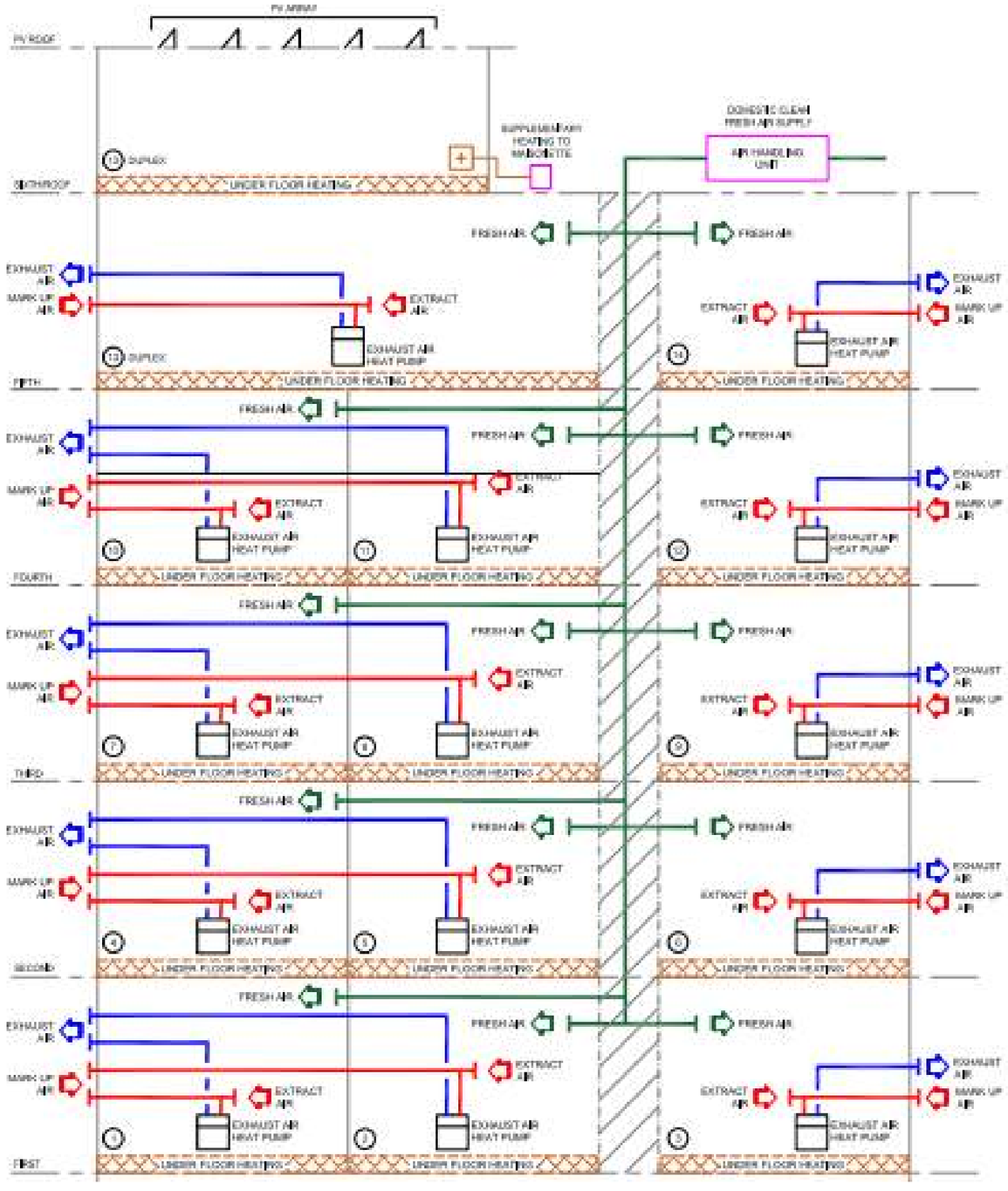


Figure 4 Simplified Heating Schematic

4 Photovoltaics

28 Solar PVs

Prior to discharge of the S106 Energy Efficiency and Renewable Energy Plan, drawings and data sheets showing the location, extent and predicted energy generation of photovoltaic cells, heat pumps and associated equipment to be installed on the building shall have been submitted to and approved by the Local Planning Authority in writing. The measures shall include the installation of meters to monitor the energy output from the approved renewable energy systems. A site-specific lifetime maintenance schedule for each system (including safe roof access arrangements) shall be provided. The equipment shall be installed in full accordance with the details thus approved and permanently retained and maintained thereafter.

Reason:

To ensure the development provides adequate on-site renewable energy facilities in accordance with the requirements of policy CC1 of the London Borough of Camden Local Plan 2017

GLA Policy 5.7 Renewable Energy

There is a presumption by the GLA that all major development proposals will seek to reduce carbon dioxide emissions by at least 20% by on-site renewable energy generation wherever feasible. Development proposals should seek to utilise renewable energy technologies such as biomass heating; cooling and electricity; renewable energy from waste; photovoltaics; solar water heating; wind and heat pumps. The Mayor encourages the use of a full range of renewable energy technologies, which should be incorporated wherever site conditions make them feasible and where they contribute to the highest overall and most cost-effective carbon dioxide emissions savings for a development proposal.

a. Photovoltaics array

The proposal is to utilise all the available roof space for Photo Voltaic (PV) array.

PV is the only reliable renewable energy option that will guarantee emission reduction.

PV is the most practical renewable energy technology that results in the best financial return with help from Feed in Tariffs. 1kWp of PV generally generates around 700kWh in an average year. The variation from the norm is generally around 100kWh/annum, making PV a very predictable renewable energy source. The only limitation is the available roof space.

Floor	Dwelling type	PV (peak)	Energy Produced
1	Unit 1 1B2P 50m²	0.3 kW	206 kWh
1	Unit 2 2B4P	0.3 kW	206 kWh
1	Unit 3 2B4P	0.3 kW	206 kWh
2	Unit 1 1B2P 50m²	0.3 kW	206 kWh
2	Unit 2 2B4P	0.3 kW	206 kWh
2	Unit 3 2B4P	0.3 kW	206 kWh
3	Unit 1 1B2P 50m²	0.3 kW	206 kWh
3	Unit 2 2B4P	0.3 kW	206 kWh
3	Unit 3 2B4P	0.3 kW	206 kWh
4	Unit 1 1B2P 50m²	0.3 kW	206 kWh
4	Unit 2 2B4P	0.3 kW	206 kWh
4	Unit 3 2B4P	0.3 kW	206 kWh
5	Unit 4 2B3P	0.3 kW	206 kWh
5 & 6	Unit 5 2B3P Duplex	0.3 kW	206 kWh
	Total	**4.2 kW**	**2,882 kWh**

Table 7: Proposed allocation of Photovoltaics

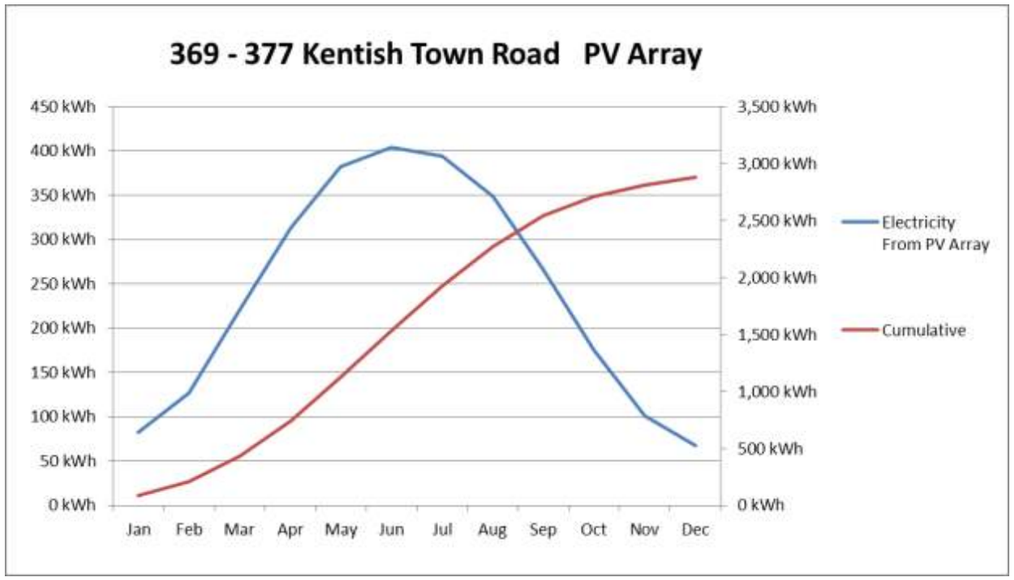


Figure 5: Predicted Energy from Roof level PV.

Financial Inputs		Financial Inputs	
System Size	4.2 kW	FiT	£510.69
System Cost	£5,946.4	Exported	£53.61
RPI	3.00%	Saving	£195.25
Fuel inflation	0.25%	Total income	£759.55
Number of years	20 years	Yield	12.77%
Feed in Tariff	17.72 p/kWh	Payback (years)	8 years
Cost of Electricity	14.00 p/kWh	PV Variables	
Export Price	3.72 p/kWh	Location	Thames
Electricity Exported	50.00%	**Direction**	SE/SW
Electricity Used in-House	50.00%	**Panel Angle**	30°
Generated Electricity	2,882 kWh	Shading Factor	None or very little
Export	1,441 kWh	Array Sizes	4.2 kW
Used	1,441 kWh	Annual electricity	2,882 kWh
Return after 20 year	£12,757.64	Size of array	33 m²

Table 8: Financial Payback for PV

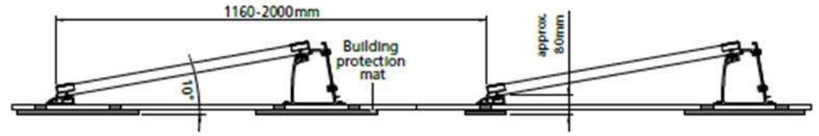


Figure 6: Proposed Low Angle and Light PV Racks

	Energy	Emission
Site Regulated Energy	75,463 kWh	21,763 kgCO_2
Photo Voltaic	-2,882 kWh	-1,496 kgCO_2
Percentage generated on site	4%	7%
Domestic	58,943 kWh	13,189 kgCO_2
Non Domestic	16,183 kWh	8,399 kgCO_2

Table 9: Renewable Energy Generated on Site.

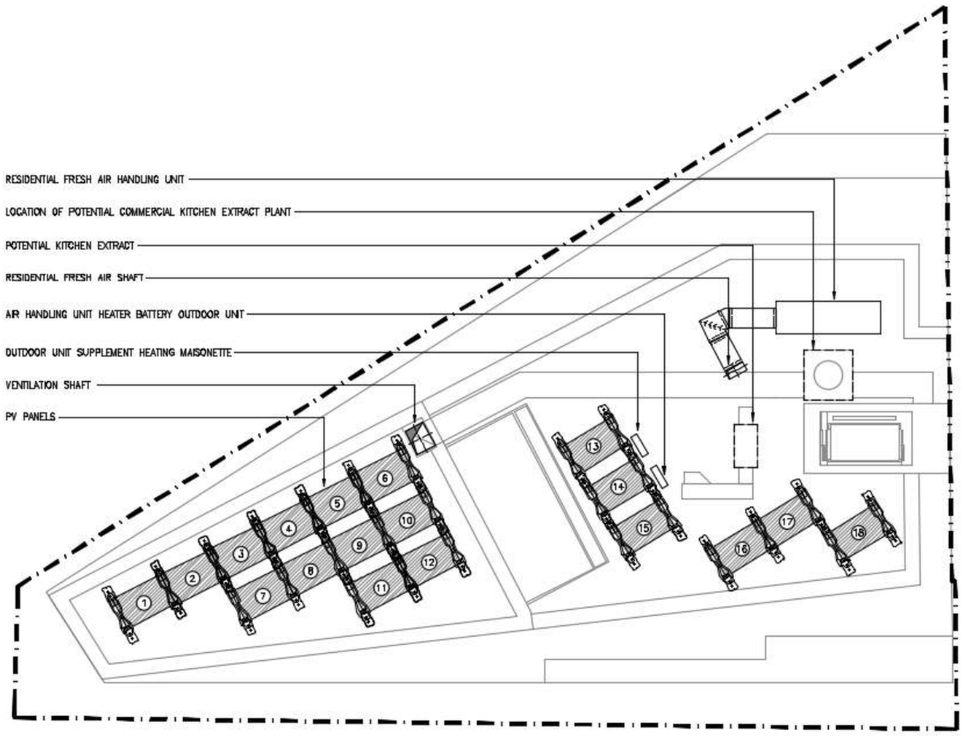


Figure 7: Proposed Plan of Roof layout showing location of PV panels

The site constraints limit adding additional weight to the structure to enable a combined solar PV and green roof installation. The planning proposal is for low ballast low level PV racking system.

Designing Green Roof with Solar PV

The inclusion of both a green roof and a photovoltaic system is challenge to the designer as to how to locate both within the roof area. Where roof space is restricted the two technologies can compete for position. There are various products that enable the PV Panels and green roofs to co-habit the same roof area. The two most commonly used option is:

1. Solar Panels above the green roof where the substrate and vegetation provide the ballast to secure the array. The layering of systems and the height at which the panels are positioned allow for vegetation to establish across the entire roof area.
2. Low level solar Panels at same height as the vegetation. Additional maintenance is required to limit plant growth to avoid creating areas of shading on the panels.

Figure 8 Low Ballast PV Rack for Use with a Membrane Flat Roof System.

Design Impacts

The installation of combine solar PV and Green roof can negatively impact of the structural design of the building to allow for ballasted PV system. On a building in an exposed location can impose loads as high as 160Kg/m² compared separating the PV installation allowing for a light weight welded system which could impose as low as 9Kg/m².

The design often requires a parapet wall to safe guard the PV from high wind loads, and Man-safe access areas for gardening maintenance. The PV racking system should avoid mechanically fixing and or ballasting direct onto or through the waterproofing membranes to maintain manufactures warranties of the roofing system. It is our view that the limited space at roof level makes the application of any regulations impractical. Accordingly, it is proposed to install a blue roof only

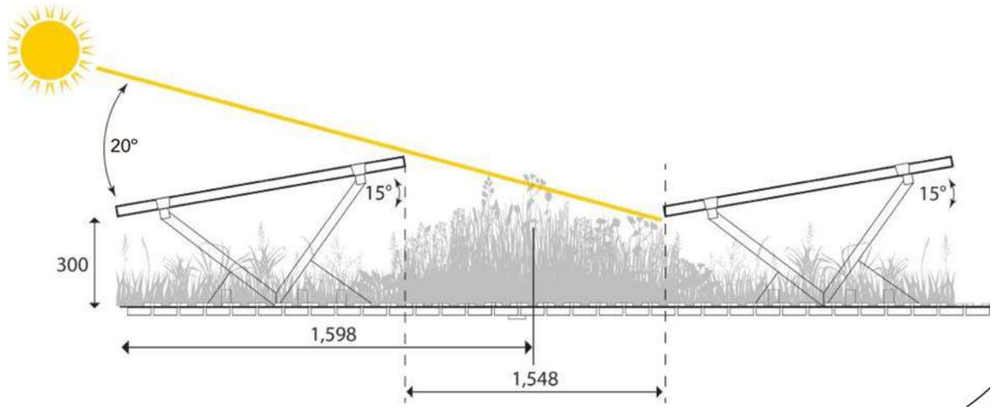


Figure 9 Bauder Bio solar Combined PV and Green Roof System

Figure 10 Solar Panel above Green Roof. (Bauder Bisolar)

There is insufficient roof space for this type of planting

Figure 11 Low Level Solar panel in Green Roof. (Naked Solar)

There is insufficient roof space for this type of planting

Power Installation

The PV array will be supplied, installed and connected to the power supplies in accordance the micro generation requires to enable into the landlord to sell on the surplus electricity. This will require the installation of special smart meter design to record the power generated, used in the building and sold onto the national grid. An example of typical domestic set up shown below.

Metering

The system design and installed in Line with Micro Generation Scheme Requirement to enable the Landlord to sell surplus electricity back to the National Grid. This requires the installation of smart two electricity meter which is capable of recode the production of the PV panels and the energy used onsite or sold back to the Grid. See Incoming Power Schematic Provide in Appendix B Drawings.

A PV generation display panel will be provided in the main entrance hall.

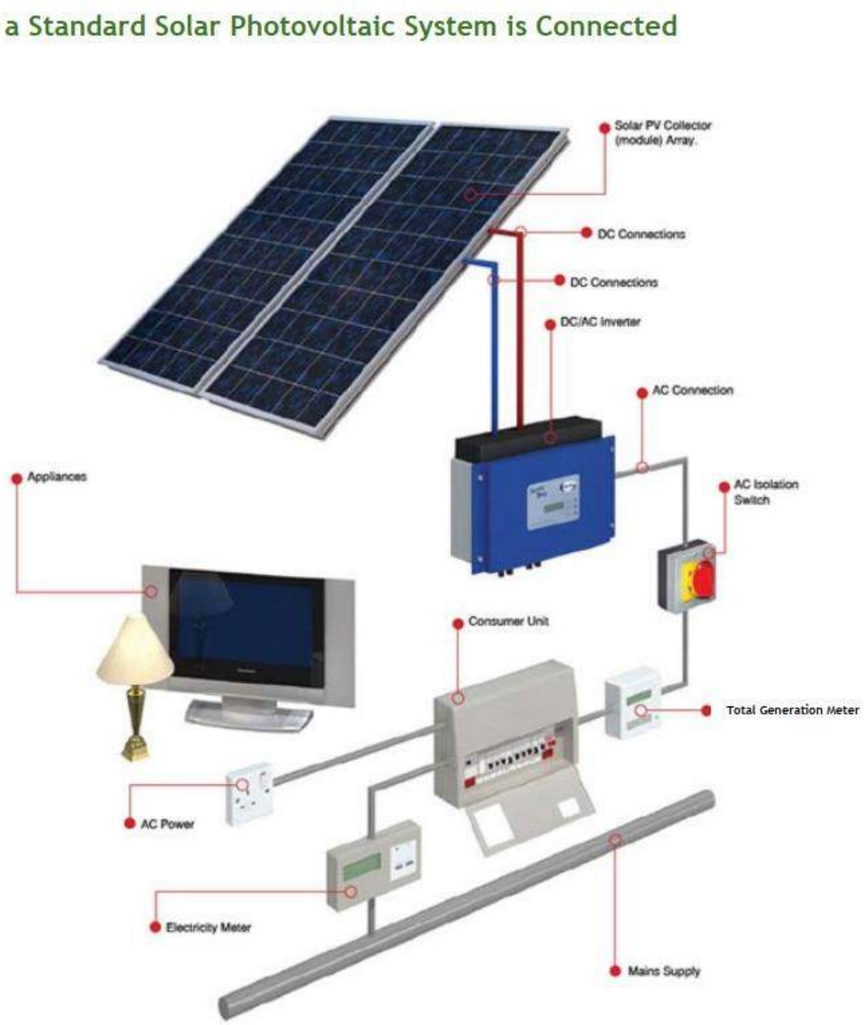


Figure 12 Typical PV Electrical installation showing meters

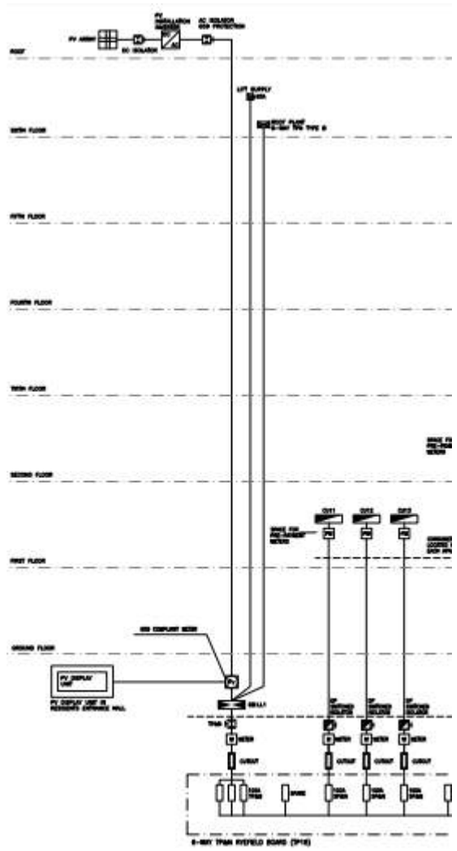


Figure 13 PV Electrical Installation Including Meters.

Maintenance

Before practical completion the Landlord will provide London Borough of Camden with a letter committing to maintain and repair the PV array for a period of twenty years (the expected Life of the typical PV Panels). This commitment will be included in the sales contract of any other future Landlord.

Roof Access

Access to fifth floor Plant Deck through access panels lift lobby area.

Access to the sixth Floor Roof is via a hooped Ladder. All the accessible flat roof areas will be providing with suitable man safe system.

5 Sustainability Plan

Section 106

Clause 4.19 On or before the Implementation Date to submit to the Council for approval the Sustainability Plan

Planning Officers Committee report 5th September 2019

29 Revised Sustainability Strategy

Prior to discharge of the S106 Sustainability Plan, a revised sustainability strategy shall be submitted to and approved in writing by the local planning authority. The revised sustainability strategy shall include the following:

i. Confirmation of sustainable construction and design principles from Policy CC2 and

CPG 'Energy Efficiency and Adaptation';

ii. Demonstrate feasibility of green roof compatible with solar PV; and
iii. Confirmation that the active cooling functions of the MVHR and ASHP systems are permanently and irreversibly removed or disabled.

Reason:

To ensure the development contributes to minimising the effects of, and can adapt to a changing climate in accordance with policy CC2 and CC3 of the London Borough of Camden Local Plan 2017.

Policy CC2 and CPG 'Energy Efficiency and Adaptation

Energy efficient design requires an integrated approach to solar gain, access to daylight, insulation, thermal materials, ventilation, heating and control systems. It is important that these aspects are considered in relation to each other when designing a scheme. These measures are likely to have higher health and wellbeing benefits over active (mechanical) measures. A building which is naturally more efficient in retaining heat in cooler months and dissipating heat in warmer months are more likely to help reduce health risks, of older and vulnerable groups, particularly those who suffer from fuel poverty.

Energy efficient (passive) design measures should be considered prior to the inclusion of any active measures to ensure that the energy demand for developments is reduced as far as possible. This helps to reduce the size of building services and energy consuming technologies needed in developments.

The Energy statement outline the building thermal fabric design values and, water efficiency, over heating risk and renewable energy options. This is as shown in Table 10 Below.

Measure	Specification	Construction stage Evidence
Draught proofing	The dwellings are design to low air permeability rate requires draught seals on all door and windows and sealed and taped wall floor ceiling junctions	Use of accredited construction details
Heating efficiency	Low temperature underfloor heating	Under Floor heating manufactures Calculations.
Windows	Solar gain reducing thermal efficient windows	Manufacture s data Sheet SAP Reports
New boiler	Energy efficient Exhaust Air heat Pumps	
LED lighting	All LED or fluorescent lighting	No other lights types are available in the domestic market
Meters, timers, sensors, and heating controls	Smart meters and intelligent internet connected thermal controls	Manufacture Data Sheets
Mechanical Ventilation with Heat	Continuous extract ventilation with air source heat pump recovering heat for use in heating and hot water	Installation commissioning inspection reports.
Insulation	All ventilation ducts and water services to be insulated	
Roof	U value 0.13W/m^2K	U Value Calculation
Walls Internal	Fully filled cavity	U Value Calculation
Walls External	U value 0.15W/m^2K	U Value Calculation
Floor	U value 0.13W/m^2K	U Value Calculation
Renewable energy technology		
Solar PV panels	Yes 4.2kWp	MCS Certificate
Solar thermal (hot water) panels	No	
Ground source heat pumps	No (not viable due to railway services)	
Double glazed windows /	Yes - U value 1.4 W/m^2K	
Combined heat and power unit	Not appropriate due to local air quality	
Green or brown roof	No	
Rainwater harvesting	No	
Other measures		
Join the Camden Climate Change	Not Proposed	
Alliance (commercial only)	Not Proposed	

Table 10 LBC - CPG energy Efficiency and Adaptation Compliance Table 3

Green Roof

Section 3 provides details of a proposed Green Roof system compatible with solar PV are available but are considered impractical.

Factors that affect PV and Green roof are the wind loads and water retention on the roof. This impacts building structure and piles, which affects buildability and project cost. Elements of the proposal may alter during the design process.

A “Blue Roof” is proposed at level 7 Biodiverse planting boxes are proposed at level 6 (extend to be agreed)

Mechanical ventilation and active cooling

Exhaust air source heat pumps are proposed as the heating back ground ventilation system. These units provide heating only for both LTHW and HWS.

The supply air is pre heated in winter to reduce the heat loss in the flats and avoid cold draughts. The pre heating of the supply fresh is a necessary element as it ensures the heat-losses remain with the unit parameters.

The exhaust air heat pump system is unable to meet the peak heat loss of the sixth-floor living area of the Duplex apartment, and additional heating is required from a standard split system air source heat pump.

The design team have researched alternative heating only heat pumps system such as the less efficient Daikin Altherma heat pumps each with a large separate outdoor condensing units and internal hydro box and hot water cylinder. None of these systems were impractical within the Duplex flat.

An additional air source heat pump is needed for the ventilation system and sixth floor Duplex will be sized to provide heating only.

Active cooling

9.18. ‘Active cooling’ should not be specified in developments where it has been demonstrated that the passive or other measures proposed have successfully addressed the risk of overheating; to avoid unnecessarily increasing a development’s energy demand and carbon emissions. In addition, it is not expected that ‘active cooling’ will proposed for any residential developments.

Figure 14 GLA Energy Assessment Guidance (9.18)

Energy Tables and System Details

The information provided is based on current design proposal and required further development which may result in changes to the specified equipment of other similar Products that are more easily integrated into the final design. follows:-

Table 11: Proposed System in LBC Sustainability Checklist and Table 11 GLA sustainable design and construction principles and climate change adaptation measures

6 Appendix

Appendix A: Calculations and Energy Consumption
Appendix B: Drawing
Appendix C: SAP reports
Appendix D: Manufacturers Technical Information

Element	Item	Comment
Energy demand reduction: Energy efficient fabric (passive measures)	Layout of uses	
	Design of windows and openings	Slightly better
	Floorplate size and depths and floor to ceiling heights	Narrow Floor Plate Standard 2.7m ceiling heights
	Reducing internal heat gains	Shading from over hanging structure and
	Reducing the need for artificial lighting	Natural Daylight in occupied rooms
	Limiting excessive solar gain	Solar reducing glass and shading
	Optimising natural ventilation	Openable windows
	Passive cooling	Not an option
	Green infrastructure	Not an option
	Best practice levels of insulation	Better than the Minimum requirements of BR
	Draught proofing and air tightness	Air Permeability of less than 4m³/m².h@50Pa
	Thermal mass	structural Load require Light weight construction
	Thermal buffers	Communal space between front doors and outside
	Consideration of renewable energy technology	Photovoltaic and Exhaust Air Heat Pumps
Energy demand reduction: Energy efficient services	Efficient ventilation	Communal clean fresh air supply from roof level. Exhaust air extract ventilation.
	Efficient cooling	No Active Cooling
Energy demand reduction:(Active Measures)	Efficient heating	Reduce heat loss from the selection of a thermal efficient building fabric
	Efficient lighting	All LED lighting
	Zoning, controls and sensors	2 thermal zone spacing heating (1. Living room, 2. Bedroom)
	Efficient appliances and equipment	Developer to supply only A rated White Goods
	Energy monitoring and building management systems	Smart energy meters
	Metering	remote display energy meter in each dwelling
Energy generation	Inclusion of low and zero carbon technologies	PV array on the roof
Water conservation	Efficient water use and Re-use of water	Specification Low water use fitting. See Energy statement for details
Adaptation to Climate Change	Sustainable urban drainage	Blue roof is proposed to limit surface water runoff to 2l/s. See Price & Myers. Lead Local Flood Authority Comments April 2019
	Impact on microclimate	No change
	Measures to reduce overheating (cooling hierarchy)	Structural shading , open windows
Materials and resource conservation	Recycling provision	Space for Recycling Bins (see Design and Access Statement)
	Reuse and recycling of materials	crushed aggregates in concrete, exist building crushed brick used as site base
	Responsible sourcing	ISO 14001registed Contractor
Nature conservation and biodiversity	Green walls, roofs and landscaping	Not applicable to this development
	Enhancement and creation of wildlife habitats	Roof top bat and bird boxes
Sustainable and active travel	Bicycle storage	yes see Design and access statement
	Low carbon vehicles	No car parking spaces
Other	Education and awareness raising	Site new letter
	On-going management and review	Developer to commit to maintaining renewable energy systems
	Future use of the building and flexibility to change	No loading bearing internal wall structures

Table 11 GLA sustainable design and construction principles and climate change adaptation measures

Appendix A Energy Tables

Stage	Heating	Saving
Be Lean	Domestic Individual Boiler	3%
Be Clean	Domestic Individual boiler	0%
Be Green	Exhaust Air Heat Pumps and PV	46%

Table 12 GLA Energy Hierarchy Modelled systems

Use	FLA	No	Space Heating (kWh p.a.)	Fuel type Space Heating	Domestic Hot Water (kWh p.a.)	Fuel type Domestic Hot Water	Lighting (kWh p.a.)	Auxiliary (kWh p.a.)	No People	Equipment	Cooking	TER Worksheet TER 2012 ($kgCO_2$ / m2)	Target Fabric Energy Efficiency (TFEE) (kWh/m²)
Unit 1 1B2P 50sqr	50.0 m²	4	1,904 kWh	Natural Gas	1,921 kWh	Natural Gas	233 kWh	75 kWh	2	2,242 kWh	49 kWh	19.72	48.3
Unit 2 2B4P	78.5 m²	4	2,319 kWh	Natural Gas	2,380 kWh	Natural Gas	340 kWh	75 kWh	3	2,513 kWh	53 kWh	15.68	38.7
Unit 3 2B4P	73.0 m²	4	2,294 kWh	Natural Gas	2,308 kWh	Natural Gas	323 kWh	75 kWh	3	2,479 kWh	53 kWh	16.44	40.7
Unit 4 2B3P	90.6 m²	1	4,825 kWh	Natural Gas	2,456 kWh	Natural Gas	385 kWh	75 kWh	3	2,567 kWh	54 kWh	19.99	63.4
Unit 5 2B5P Duplex	96.7 m²	1	5,836 kWh	Natural Gas	2,488 kWh	Natural Gas	402 kWh	75 kWh	3	2,584 kWh	55 kWh	21.15	70.5
Speculative Retails	232.0 m²	1	903 kWh		455 kWh		11,663 kWh	876 kWh	3	4,700 kWh		40.70	

Table 13 Base Line Individual gas boiler

Use	FLA	No	Space Heating (kWh p.a.)	Fuel type Space Heating	Domestic Hot Water (kWh p.a.)	Fuel type Domestic Hot Water	Lighting (kWh p.a.)	Auxiliary (kWh p.a.)
Unit 1 1B2P 50sqr	50.0 m²	4	1,368 kWh	Natural Gas	1,934 kWh	Natural Gas	236 kWh	167 kWh
Unit 2 2B4P	78.5 m²	4	2,094 kWh	Natural Gas	2,385 kWh	Natural Gas	341 kWh	219 kWh
Unit 3 2B4P	73.0 m²	4	1,567 kWh	Natural Gas	2,325 kWh	Natural Gas	328 kWh	209 kWh
Unit 4 2B3P	90.6 m²	1	4,426 kWh	Natural Gas	2,463 kWh	Natural Gas	378 kWh	241 kWh
Unit 5 2B5P Duplex	96.7 m²	1	5,388 kWh	Natural Gas	2,494 kWh	Natural Gas	395 kWh	252 kWh
Speculative Retails	232.0 m²	1	660 kWh		455 kWh		11,663 kWh	876 kWh

Table 14 Be Lean - Improved Building Thermal Envelope, Individual Gas Boilers

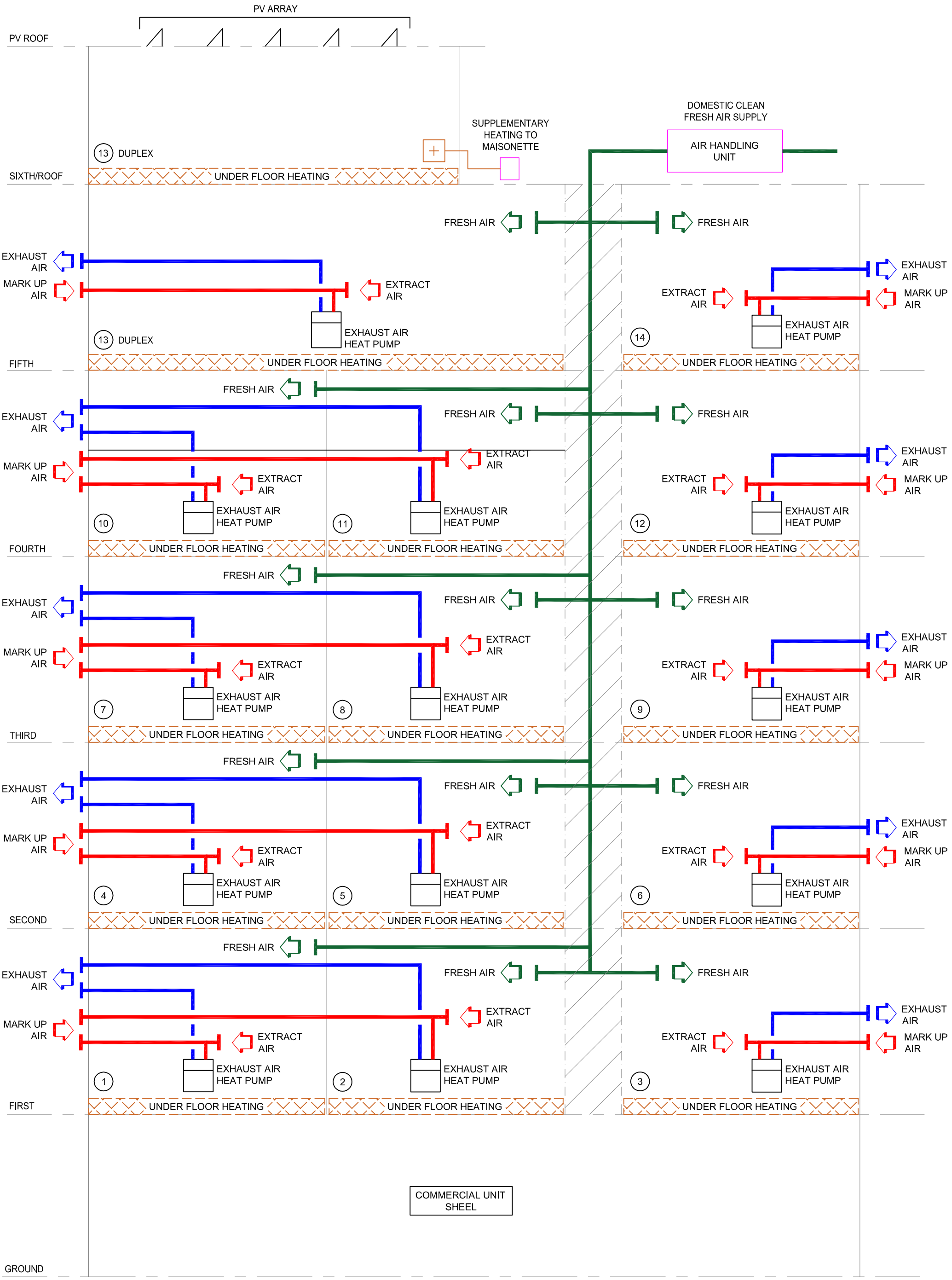
Use	FLA	No	Space Heating (kWh p.a.)	Fuel type Space Heating	Domestic Hot Water (kWh p.a.)	Fuel type Domestic Hot Water	Space and Domestic Hot Water from CHP (kWh p.a.)	Fuel type CHP	Electricity generated by CHP (kWh p.a.)	Lighting (kWh p.a.)	Auxiliary (kWh p.a.)
Unit 1 1B2P 50sqr	50.0 m²	4	1,368 kWh	Natural Gas	1,934 kWh	Natural Gas	0 kWh	Natural Gas	0	236 kWh	167 kWh
Unit 2 2B4P	78.5 m²	4	2,094 kWh	Natural Gas	2,385 kWh	Natural Gas	0 kWh	Natural Gas	0	341 kWh	219 kWh
Unit 3 2B4P	73.0 m²	4	1,567 kWh	Natural Gas	2,325 kWh	Natural Gas	0 kWh	Natural Gas	0	328 kWh	209 kWh
Unit 4 2B3P	90.6 m²	1	4,426 kWh	Natural Gas	2,463 kWh	Natural Gas	0 kWh	Natural Gas	0	378 kWh	241 kWh
Unit 5 2B5P Duplex	96.7 m²	1	5,388 kWh	Natural Gas	2,494 kWh	Natural Gas	0 kWh	Natural Gas	0	395 kWh	252 kWh
Speculative Retails	232.0 m²		660 kWh	Electric	393 kWh					5,873 kWh	986 kWh

Table 15 Be Clean - Improved Gas Boiler Efficiency and Ventilation Plant

Use	FLA	No	Space Heating (kWh p.a.)	Fuel type Space Heating	Domestic Hot Water (kWh p.a.)	Fuel type Domestic Hot Water	Space and Domestic Hot Water from CHP (kWh p.a.)	Fuel type CHP	Electricity generated by CHP (kWh p.a.)		Electricity generated by renewable (kWh p.a.) if applicable	Lighting (kWh p.a.)	Auxiliary (kWh p.a.)	Cooling (kWh p.a.)	DER Worksheet DER 2012 ($kgCO_2$ / m2)
Unit 1 1B2P 50sqr EXASHP	50.0 m²	4	679 kWh	Electric	1,170 kWh	Electric					206 kWh	236 kWh	168 kWh		21.24
Unit 2 2B4P EXASHP	78.5 m²	4	961 kWh	Electric	1,448 kWh	Electric					206 kWh	341 kWh	139 kWh		17.74
Unit 3 2B4P EXASHP	73.0 m²	4	785 kWh	Electric	1,404 kWh	Electric					206 kWh	328 kWh	156 kWh		17.54
Unit 4 2B3P EXASHP	90.6 m²	1	2,044 kWh	Electric	1,522 kWh	Electric					206 kWh	378 kWh	114 kWh		22.33
Unit 5 2B5P Duplex EXASHP	96.7 m²	1	2,393 kWh	Electric	1,550 kWh	Electric					206 kWh	395 kWh	116 kWh		23.81
Speculative Retails			660 kWh	Electric	393 kWh	Electric						5,873 kWh	986 kWh		

Table 16 Be Green – Renewable Energy, Exhaust Air Heat Pump and Photovoltaic Array.

Appendix B Drawings



–		A.H	XX.03.20
Rev	Description	Chk'd	Date

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Tel: 020 3232 0080
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Web: www.peterdeer.co.uk

Client Name:

Project Name:
369–377 KENTISH TOWN ROAD

Drawing Title:
SIMPLIFIED HEATING & HWS PLANT SCHEMATIC

Date:	Scale:	Drawn:	Checked:	Approved:
MAR 2020	NTS@A3	G.T	A.H	M.H

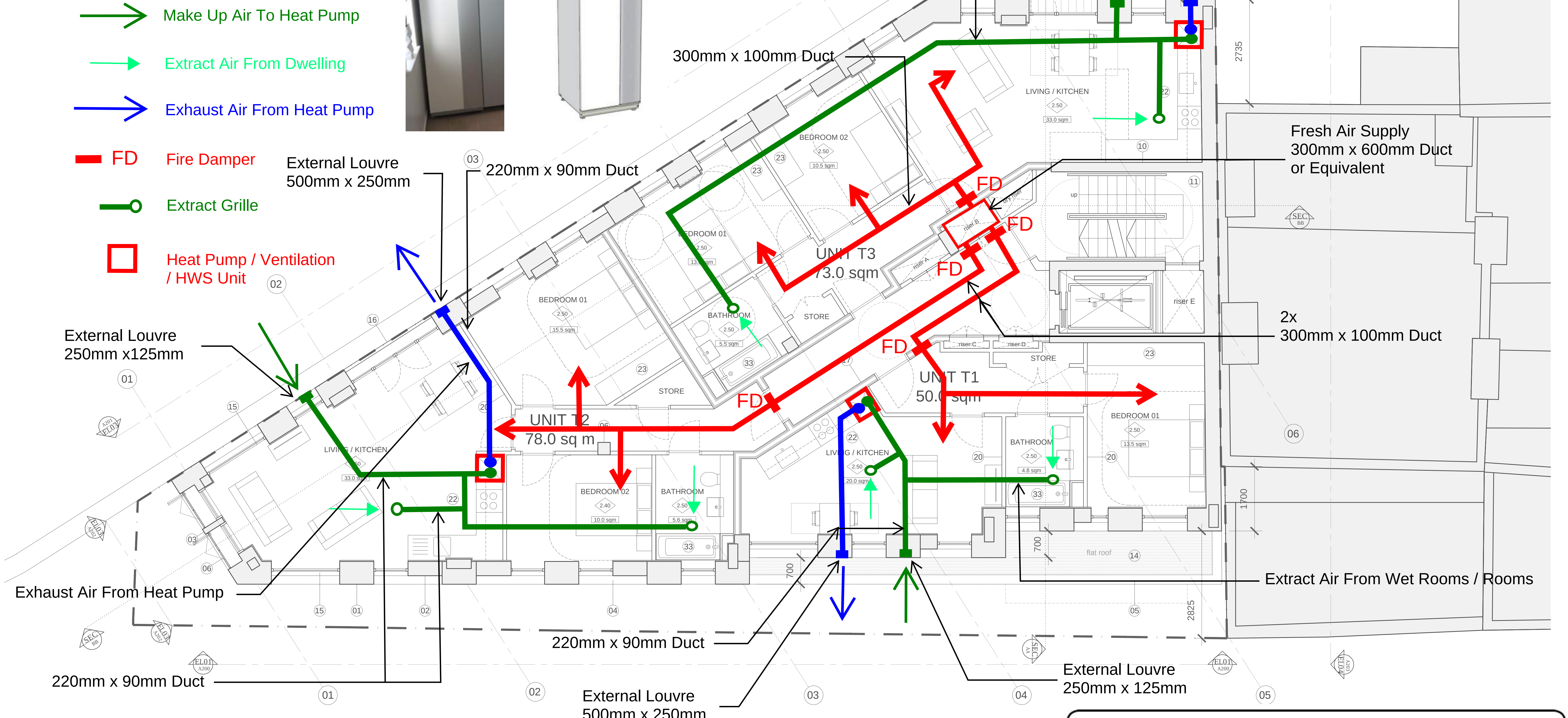
Project Number:	Drawing Number:	Revison:
4357	SK/002	SK

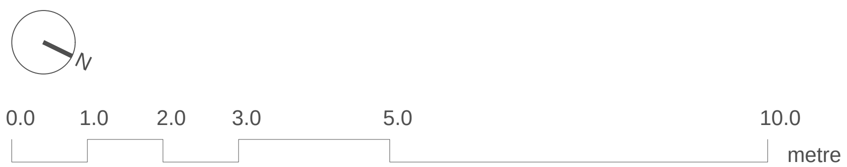
First to Fourth Floor Layout

Key

- Fresh Air To Dwelling
- Make Up Air To Heat Pump
- Extract Air From Dwelling
- Exhaust Air From Heat Pump
- FD Fire Damper
- Extract Grille
- Heat Pump / Ventilation / HWS Unit

Heat Pump with Hot Water Cylinder





4357 -sk200304 First to Fourth Floor Energy Strategy, Exhaust Air Heat Pump and Heating and Hot Water

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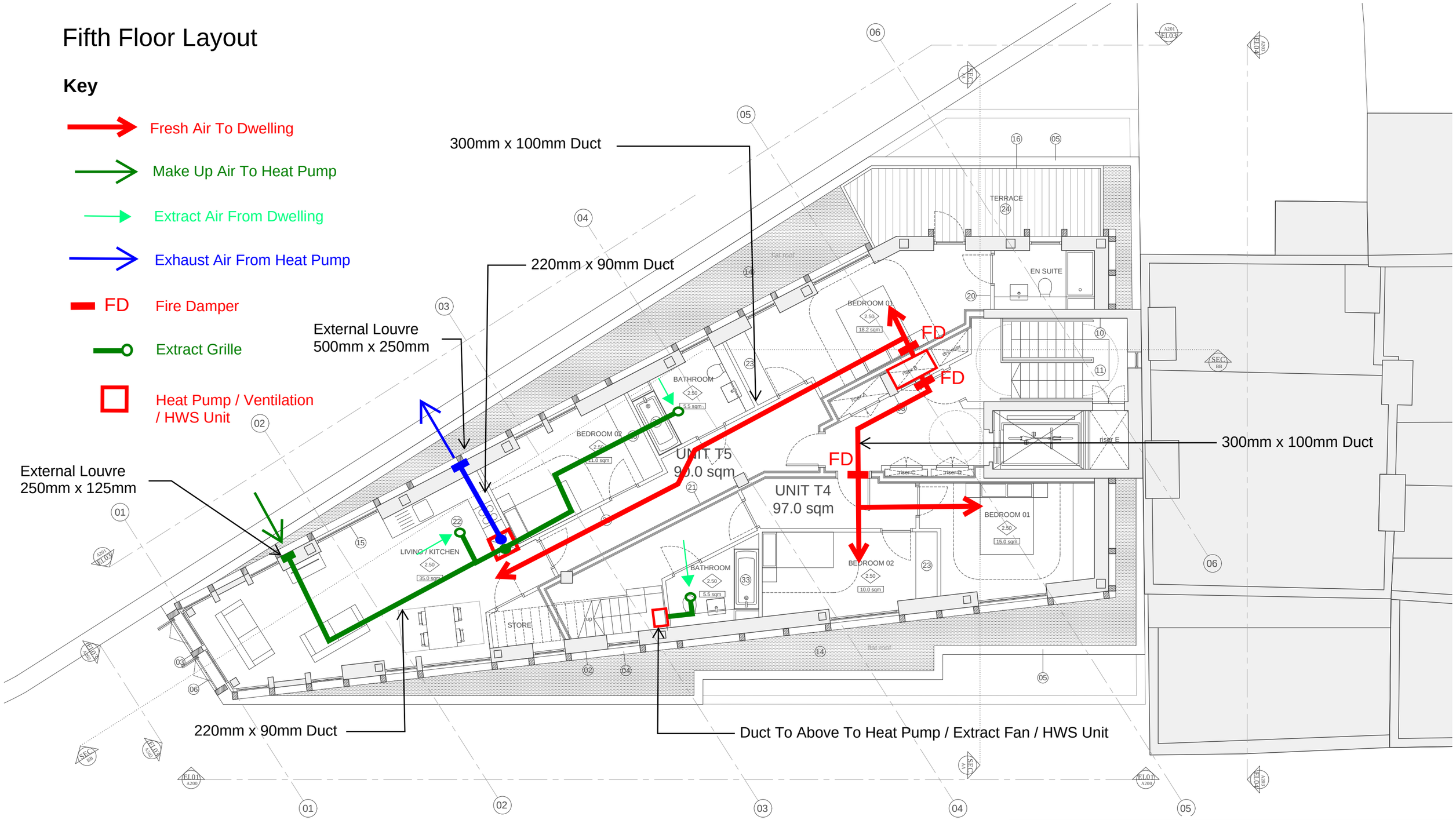
Fifth Floor Layout

Key

- Fresh Air To Dwelling
- Make Up Air To Heat Pump
- Extract Air From Dwelling
- Exhaust Air From Heat Pump
- FD — Fire Damper
- Extract Grille
- Heat Pump / Ventilation / HWS Unit



4357 -sk200304 Fifth Floor
Energy Strategy, Exhaust Air Heat Pump and Heating and Hot Water

N

0.0 1.0 2.0 3.0 5.0 10.0 metre

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Sixth Floor Layout

Key

- Fresh Air To Dwelling
- Make Up Air To Heat Pump
- Extract Air From Dwelling
- Exhaust Air From Heat Pump
- FD Fire Damper
- Extract Grille
- Heat Pump / Ventilation / HWS Unit
- Supply AHU
- Outdoor Unit

Fresh Air Vent above door

External Louvre
250mm x 125mm

External Louvre
500mm x 250mm

220mm x 90mm Duct

Duct To Below To Serve Bathroom

Roof Area Suitable for PV 38m²
(See Separate Detail)

Fifth Floor Plant Deck

LIVING / KITCHEN

TERRACE

lift OR

AOV

4357 -sk200310 Sixth Floor
Energy Strategy, Exhaust Air Heat Pump, Heating and Hot Water and PV Area

0.0 1.0 2.0 3.0 5.0 10.0 metre

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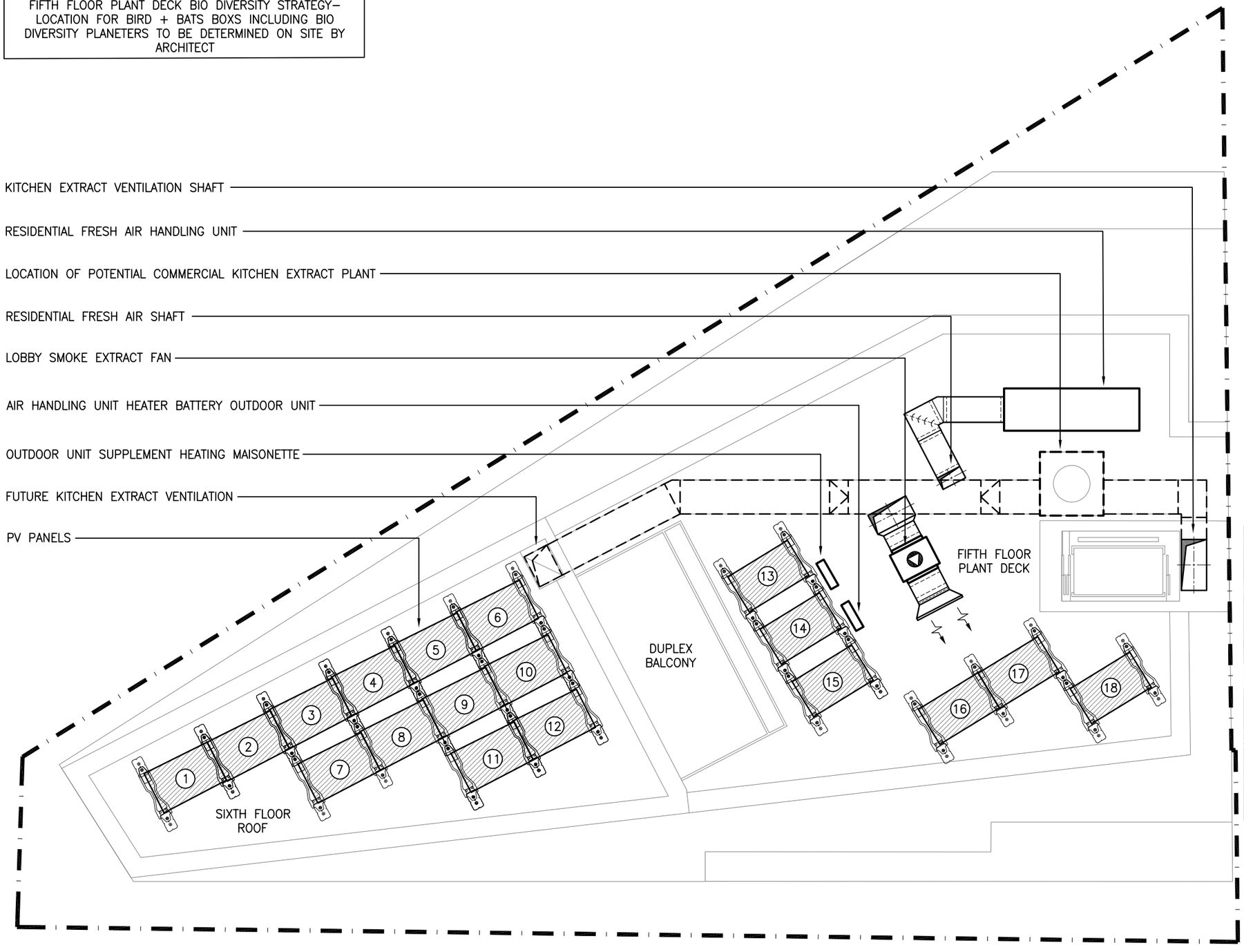
FIFTH FLOOR PLANT DECK BIO DIVERSITY STRATEGY– LOCATION FOR BIRD + BATS BOXS INCLUDING BIO DIVERSITY PLANETERS TO BE DETERMINED ON SITE BY ARCHITECT



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Scale Bar: 1:100 — 0 1 2 3 4 5 6

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2. ALL SETTING OUT ARE TO BE CONFIRMED BY THE ARCHITECT.
3. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEERS/DESIGN TEAM.
4. SMOKE EXTRACT DETAIL TO BE CONFIRMED BY FIRE CONSULTANT.

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Rev	Description	Chk'd	Date

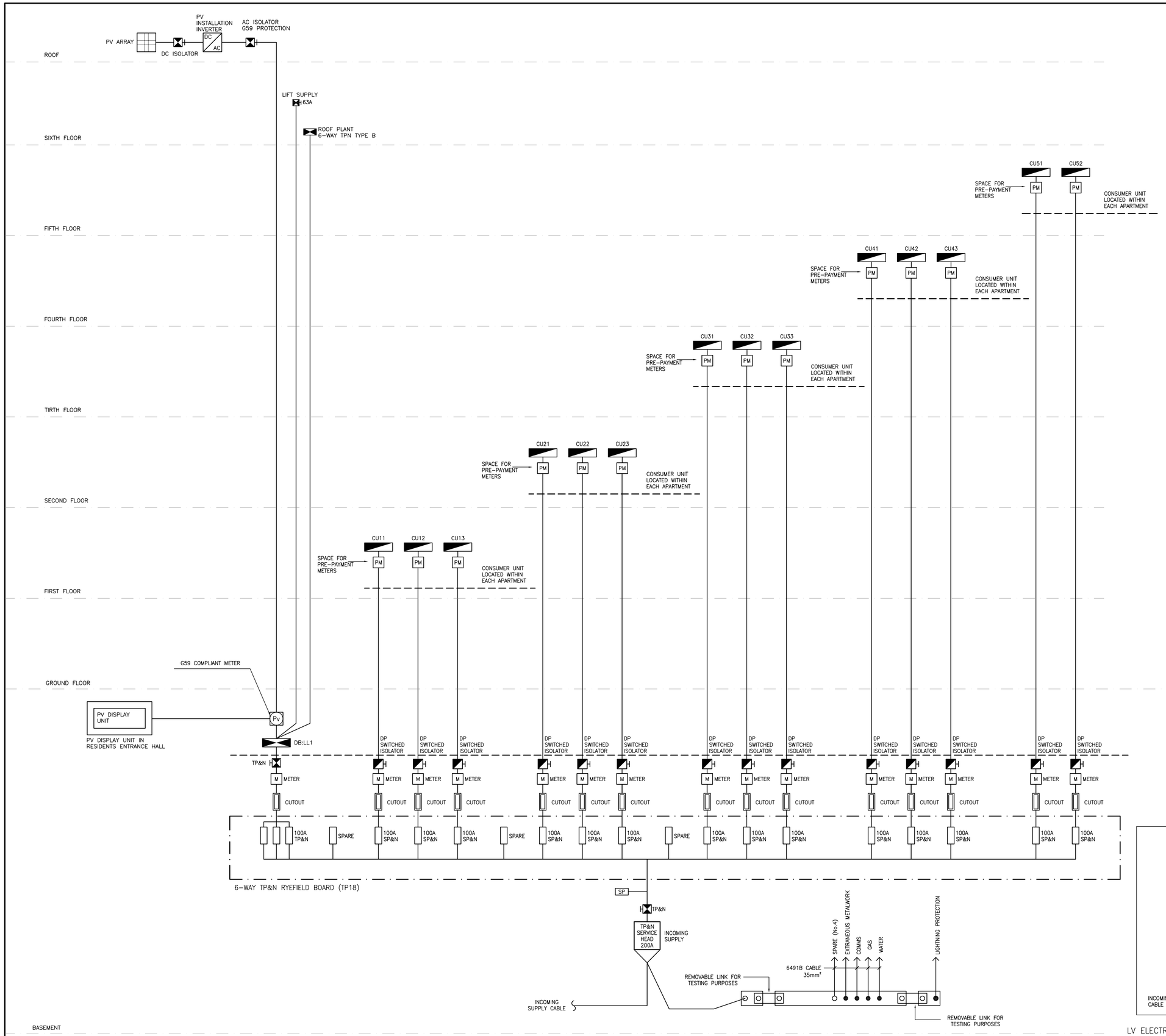
Client Name:

Project Name: 369–377 KENTISH TOWN ROAD

Drawing Title: ROOF LAYOUT – PV ARRAY

Date:	Scale:	Drawn:	Checked:	Approved:
MAR 2020	1:100@A3	G.T	A.H	M.H

Project Number:	Drawing Number:	Revison:
4357	SK/103	SK



NOTES:

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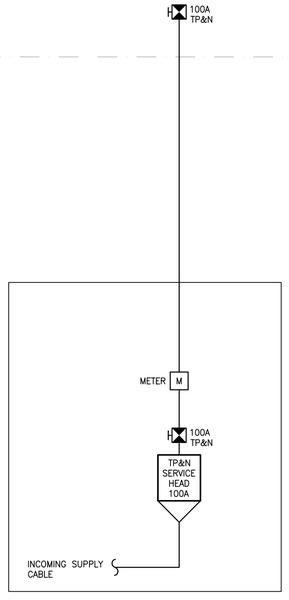
2. THIS IS AN INDICATIVE SCHEMATIC, CONTRACTOR WILL BE RESPONSIBLE FOR THE FINAL DESIGN.
3. ALL SETTING OUT ARE TO BE CONFIRMED BY THE ARCHITECT.
4. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEERS/DESIGN TEAM.
5. LANDLORD 3 PHASE SUPPLY FOR PV ARRAY.
6. PROVIDE SURGE PROTECTION IN ACCORDANCE WITH BS 7671.

LEGEND:

- TP&N DISTRIBUTION BOARD
- SP&N DISTRIBUTION BOARD
- TP&N ISOLATOR
- SP&N ISOLATOR
- PV GENERATION METER
- UTILITY METER
- SPACE FOR PRE-PAYMENT METER
- SURGE PROTECTION DEVICE



LV ELECTRICAL SCHEMATIC FOR COMMERCIAL UNIT

Rev	Description	Chk'd	Date
P	PRELIMINARY ISSUE	Y.C	10.03.20

Status:

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Client Name:

Project Name:
369-377 KENTISH TOWN ROAD

Drawing Title:
LV ELECTRICAL SCHEMATIC

Date:	Scale:	Drawn:	Checked:	Approved:
MARCH 20	NTS@A1	Y.C	Y.C	M.R

Project Number:	Drawing Number:	Revision:
4357	E/100	P

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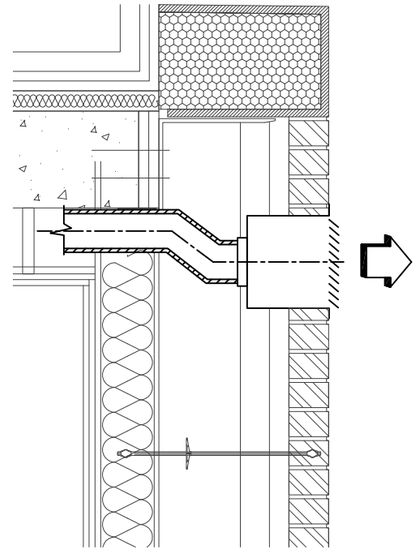
3. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEERS/DESIGN TEAM.

LEGEND:

- – MAKEUP AIR INLET (250x125mm)
- – EXHAUST AIR OUTLET (500x250mm)



TYPICAL GRILLE DETAIL FOR A&B
(SCALE N.T.S)

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Rev	Description	Chk'd	Date

Client Name:

Project Name: 369-377 KENTISH TOWN ROAD

Drawing Title: KENTISH TOWN ROAD ELEVATION GRILLE LOCATIONS

Date:	Scale:	Drawn:	Checked:	Approved:
MAR 2020	1:100@A3	G.T	A.H	M.H

Project Number:	Drawing Number:	Revison:
4357	SK/004	SK

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Scale Bar: 1:100 — 0 1 2 3 4 5 6

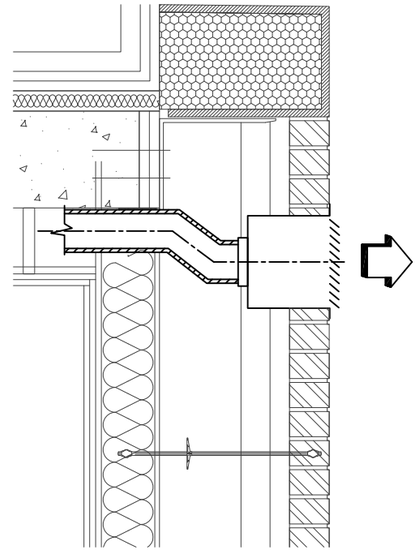
Status: SKETCH

NOTES:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE MECHANICAL SPECIFICATION.
2. ALL SETTING OUT ARE TO BE CONFIRMED BY THE ARCHITECT.
3. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEERS/DESIGN TEAM.

LEGEND:

- MAKEUP AIR INLET (250x125mm)
- EXHAUST AIR OUTLET (500x250mm)



TYPICAL GRILLE DETAIL FOR A&B
(SCALE N.T.S)

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Southgate, London, N14 6HA.

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Rev	Description	Chk'd	Date

Client Name:

Project Name: 369-377 KENTISH TOWN ROAD

Drawing Title: RAILWAY ELEVATION GRILLE LOCATIONS

Date:	Scale:	Drawn:	Checked:	Approved:
MAR 2020	1:100@A3	G.T	A.H	M.H

Project Number:	Drawing Number:	Revison:
4357	SK/005	SK

Appendix C SAP Report (Be Green – Exhaust Air Heat Pump).

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.25
Printed on 08 March 2020 at 14:39:08

Project Information:

Assessed By: ()
Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE
Total Floor Area: 50m²
Site Reference : 4357 Kentish Town Road EXASHP
Plot Reference: Unit 1 1B2P 50sqr EXASHP
Address : Unit 1 , 369-377 Kentish Town Road , Kentish Town, London, NW5 2TJ

Client Details:

Name:
Address :

This report covers items included within the SAP calculations.
It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Electricity
Fuel factor: 1.55 (electricity)

Target Carbon Dioxide Emission Rate (TER)	28.7 kg/m²	
Dwelling Carbon Dioxide Emission Rate (DER)	21.24 kg/m²	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	48.3 kWh/m²	
Dwelling Fabric Energy Efficiency (DFEE)	41.8 kWh/m²	
		OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.15 (max. 0.30)	0.16 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	(no floor)		
Roof	(no roof)		
Openings	1.41 (max. 2.00)	2.00 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	4.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main Heating system:
Heat pumps with warm air distribution - electric
NIBE F370

Secondary heating system: None

5 Cylinder insulation

Hot water Storage: No Separate Cylinder

N/A

Regulations Compliance Report

6 Controls

Space heating controls	Programmer and at least two room thermostats	OK
Hot water controls:	No cylinder thermostat No cylinder	

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100.0%	
Minimum	75.0%	OK

8 Mechanical ventilation

Continuous extract system		
Specific fan power:	0.7	
Maximum	0.7	OK

9 Summertime temperature

Overheating risk (Thames valley):	Medium	OK

Based on:

Overshading:	Average or unknown
Windows facing: East	3.24m²
Windows facing: East	4.34m²
Windows facing: East	2.87m²
Ventilation rate:	4.00
Blinds/curtains:	Net curtain (covering whole window) Closed 100% of daylight hours

10 Key features

Party Walls U-value	0 W/m²K
Photovoltaic array	

Thermal Bridge Report

Property Details: Unit 1 1B2P 50sqr EXASHP

Address: Unit 1 , 369-377 Kentish Town Road , Kentish Town, London, NW5 2TJ
Located in: England
Region: Thames valley

Thermal bridges:

Thermal bridges: User-defined = UD
Default = D
Approved = A
User-defined (individual PSI-values) Y-Value = 0.0473

External Junctions Details:

Junction Type	PSI-Value	Length	Reference	Type
Other lintels (including other steel lintels)	0.3	5.34	E2	[A]
Sill	0.04	4.34	E3	[A]
Jamb	0.05	32.92	E4	[A]
Party floor between dwellings (in blocks of flats)	0.07	4.33	E7	[A]
Corner (normal)	0.09	6.15	E16	[A]
Corner (inverted internal area greater than external area)	-0.09	3.08	E17	[A]
Party wall between dwellings	0.06	3.08	E18	[A]

Party Junctions Details:

Intermediate floor between dwellings (in blocks of flats)	0	25.9	P3	[D]

SAP Input

Property Details: Unit 1 1B2P 50sqr EXASHP

Address: Unit 1 , 369-377 Kentish Town Road , Kentish Town, London, NW5 2TJ
Located in: England
Region: Thames valley
UPRN:
Date of assessment: 02 January 2019
Date of certificate: 08 March 2020
Assessment type: New dwelling design stage
Transaction type: Non marketed sale
Tenure type: Unknown
Related party disclosure: No related party
Thermal Mass Parameter: Indicative Value Low
Water use <= 125 litres/person/day: True
PCDF Version: 456

Property description:

Dwelling type: Flat
Detachment:
Year Completed: 2019

Floor Location:	Floor area:	Storey height:
Floor 0	50 m²	2.41 m

Living area: 28.4 m² (fraction 0.568)
Front of dwelling faces: South West

Opening types:

Name:	Source:	Type:	Glazing:	Argon:	Frame:
door	Manufacturer	Solid			Wood
Type A	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood
Type B	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood
Type E	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood

Name:	Gap:	Frame Factor:	g-value:	U-value:	Area:	No. of Openings:
door	mm	0.7	0	2	2	1
Type A	16mm or more	0.7	0.57	1.3	1.08	3
Type B	16mm or more	0.7	0.57	1.3	2.17	2
Type E	16mm or more	0.7	0.57	1.3	2.87	1

Name:	Type-Name:	Location:	Orient:	Width:	Height:
door		Wall to corridor	South	1	2
Type A		External Wall	East	0.45	2.41
Type B		External Wall	East	0.9	2.41
Type E		External Wall	East	1.19	2.41

Overshading: Average or unknown

Opaque Elements:

Type:	Gross area:	Openings:	Net area:	U-value:	Ru value:	Curtain wall:	Kappa:
External Elements							
External Wall	39.82	10.45	29.37	0.15	0	False	N/A
Wall to corridor	22.82	2	20.82	0.17	0.43	False	N/A
Wall to lift shaft	12.55	0	12.55	0.17	0.43	False	N/A
Extranl wall with nieghbou	13.31	0	13.31	0.15	0	False	N/A
Internal Elements							
Party Elements							
Part Wall	11.25						N/A

Party Ceiling	50	N/A
Party Floor	50	N/A

Thermal bridges:

Thermal bridges: User-defined (individual PSI-values) Y-Value = 0.0473

	Length	Psi-value		
[Approved]	5.34	0.3	E2	Other lintels (including other steel lintels)
[Approved]	4.34	0.04	E3	Sill
[Approved]	32.92	0.05	E4	Jamb
[Approved]	4.33	0.07	E7	Party floor between dwellings (in blocks of flats)
[Approved]	6.15	0.09	E16	Corner (normal)
[Approved]	3.08	-0.09	E17	Corner (inverted internal area greater than external area)
[Approved]	3.08	0.06	E18	Party wall between dwellings
	25.9	0	P3	Intermediate floor between dwellings (in blocks of flats)

Ventilation:

Pressure test: Yes (As designed)
Ventilation: Centralised whole house extract
Number of wet rooms: Kitchen + 1
Ductwork: , rigid
Approved Installation Scheme: False
Number of chimneys: 0
Number of open flues: 0
Number of fans: 0
Number of passive stacks: 0
Number of sides sheltered: 2
Pressure test: 4

Main heating system:

Main heating system: Heat pumps with warm air distribution
Electric heat pumps
Fuel: Electricity
Info Source: Boiler Database
Database: (rev 456, product index 100271, SEDBUK 311%):
Brand name: NIBE
Model: F370
Model qualifier: Radiators
(provides DHW all year)
Fan coil units
Central heating pump : 2013 or later
Design flow temperature: Design flow temperature<=45°C
Boiler interlock: Yes

Main heating Control:

Main heating Control: Programmer and at least two room thermostats
Control code: 2505

Secondary heating system:

Secondary heating system: None

Water heating:

Water heating: 999 From DHW-only community scheme
Heat source: No hot water system present - electric immersion assumed
Electricity, heat fraction 0, efficiency 0

No hot water cylinder
Solar panel: False

Others:

Electricity tariff: Standard Tariff
In Smoke Control Area: Unknown

SAP Input

Conservatory: No conservatory
Low energy lights: 100%
Terrain type: Dense urban
EPC language: English
Wind turbine: No
Photovoltaics: Photovoltaic 1
Installed Peak power: 0.25
Tilt of collector: 30°
Overshading: None or very little
Collector Orientation: South East
Assess Zero Carbon Home: No

Predicted Energy Assessment

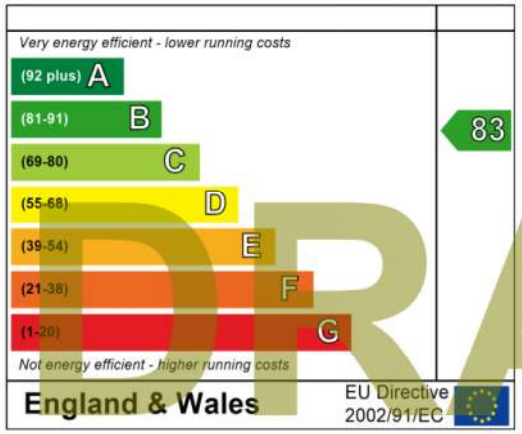
Unit 1
369-377 Kentish Town Road
Kentish Town
London
NW5 2TJ

Dwelling type: Mid floor Flat
Date of assessment: 02 January 2019
Produced by: Stroma Certification
Total floor area: 50 m²

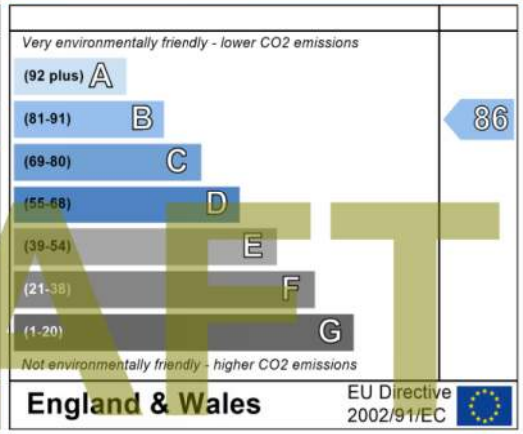
This is a Predicted Energy Assessment for a property which is not yet complete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, an Energy Performance Certificate is required providing information about the energy performance of the completed property.

Energy performance has been assessed using the SAP 2012 methodology and is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



Environmental Impact (CO_2) Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO2) emissions. The higher the rating the less impact it has on the environment.

SAP 2012 Overheating Assessment

Calculated by Stroma FSAP 2012 program, produced and printed on 08 March 2020

Property Details: Unit 1 1B2P 50sqr EXASHP

Dwelling type:	Flat
Located in:	England
Region:	Thames valley
Cross ventilation possible:	No
Number of storeys:	1
Front of dwelling faces:	South West
Overshading:	Average or unknown
Overhangs:	None
Thermal mass parameter:	Indicative Value Low
Night ventilation:	False
Blinds, curtains, shutters:	Net curtain (covering whole window)
Ventilation rate during hot weather (ach):	4 (Windows fully open)

Overheating Details:

Summer ventilation heat loss coefficient:	159.06	**(P1)**
Transmission heat loss coefficient:	32.8	
Summer heat loss coefficient:	191.85	**(P2)**

Overhangs:

Orientation:	**Ratio:**	**Z_overhangs:**
East (Type A)	0	1
East (Type B)	0	1
East (Type E)	0	1

Solar shading:

Orientation:	**Z blinds:**	**Solar access:**	**Overhangs:**	**Z summer:**	
East (Type A)	0.8	0.9	1	0.72	**(P8)**
East (Type B)	0.8	0.9	1	0.72	**(P8)**
East (Type E)	0.8	0.9	1	0.72	**(P8)**

Solar gains:

Orientation		**Area**	**Flux**	**g_**	**FF**	**Shading**	**Gains**	
East (Type A)	0.9 x	3.24	117.51	0.57	0.7	0.72	98.44	
East (Type B)	0.9 x	4.34	117.51	0.57	0.7	0.72	131.86	
East (Type E)	0.9 x	2.87	117.51	0.57	0.7	0.72	87.2	
						Total	317.49	**(P3/P4)**

Internal gains:

	June	**July**	**August**	
Internal gains	302.75	290.22	296.5	
Total summer gains	639.77	607.71	575.82	**(P5)**
Summer gain/loss ratio	3.33	3.17	3	**(P6)**
Mean summer external temperature (Thames valley)	16	17.9	17.8	
Thermal mass temperature increment	1.3	1.3	1.3	
Threshold temperature	20.63	22.37	22.1	**(P7)**
Likelihood of high internal temperature	**Slight**	**Medium**	**Medium**	

Assessment of likelihood of high internal temperature: Medium

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.25
Printed on 08 March 2020 at 14:39:03

Project Information:

Assessed By: () **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 78.5m²
Site Reference : 4357 Kentish Town Road EXASHP **Plot Reference:** Unit 2 2B4P EXASHP
Address : Unit 2, 369-377 Kentish Town Road , Kentish Town, London, NW5 2TJ

Client Details:

Name:
Address :

This report covers items included within the SAP calculations.
It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Electricity
Fuel factor: 1.55 (electricity)

Target Carbon Dioxide Emission Rate (TER)	22.28 kg/m²	
Dwelling Carbon Dioxide Emission Rate (DER)	17.74 kg/m²	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	38.7 kWh/m²	
Dwelling Fabric Energy Efficiency (DFEE)	42.4 kWh/m²	
		Fail

Excess energy = 3.71 kg/m² (09.6 %)

2 Fabric U-values

Element	Average	Highest	
External wall	0.15 (max. 0.30)	0.15 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	(no floor)		
Roof	(no roof)		
Openings	1.34 (max. 2.00)	2.00 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	4.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main Heating system:
Heat pumps with warm air distribution - electric
NIBE F370

Secondary heating system: None

5 Cylinder insulation

Hot water Storage: No Separate Cylinder

N/A

Regulations Compliance Report

6 Controls

Space heating controls	Programmer and at least two room thermostats	OK
Hot water controls:	No cylinder thermostat No cylinder	

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100.0%	
Minimum	75.0%	OK

8 Mechanical ventilation

Continuous extract system		
Specific fan power:	0.7	
Maximum	0.7	OK

9 Summertime temperature

Overheating risk (Thames valley):	Medium	OK

Based on:

Overshading:	Average or unknown
Windows facing: East	2.16m²
Windows facing: East	4.34m²
Windows facing: East	4.34m²
Windows facing: South West	6.51m²
Windows facing: South West	4.34m²
Windows facing: South West	6.51m²
Windows facing: South	4.99m²
Ventilation rate:	6.00
Blinds/curtains:	Net curtain (covering whole window) Closed 100% of daylight hours

10 Key features

Party Walls U-value	0 W/m²K
Photovoltaic array	

Thermal Bridge Report

Property Details: Unit 2 2B4P EXASHP

Address: Unit 2, 369-377 Kentish Town Road , Kentish Town, London, NW5 2TJ
Located in: England
Region: Thames valley

Thermal bridges:

Thermal bridges: User-defined = UD
Default = D
Approved = A
User-defined (individual PSI-values) Y-Value = 0.1316

External Junctions Details:

Junction Type	PSI-Value	Length	Reference	Type
Other lintels (including other steel lintels)	0.3	14.77	E2	[A]
Sill	0.04	13.77	E3	[A]
Jamb	0.05	57.02	E4	[A]
Corner (normal)	0.09	6.15	E16	[A]
Party wall between dwellings	0.12	27.77	E18	[D]

Party Junctions Details:

Intermediate floor between dwellings (in blocks of flats)	0	10.39	P3	[D]

SAP Input

Property Details: Unit 2 2B4P EXASHP

Address: Unit 2, 369-377 Kentish Town Road , Kentish Town, London, NW5 2TJ
Located in: England
Region: Thames valley
UPRN:
Date of assessment: 02 January 2019
Date of certificate: 08 March 2020
Assessment type: New dwelling design stage
Transaction type: Non marketed sale
Tenure type: Unknown
Related party disclosure: No related party
Thermal Mass Parameter: Indicative Value Low
Water use <= 125 litres/person/day: True
PCDF Version: 456

Property description:

Dwelling type: Flat
Detachment:
Year Completed: 2019

Floor Location:	Floor area:	Storey height:
Floor 0	78.5 m²	2.4 m

Living area: 28.4 m² (fraction 0.362)
Front of dwelling faces: South West

Opening types:

Name:	Source:	Type:	Glazing:	Argon:	Frame:
door	Manufacturer	Solid			Wood
Type A	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood
Type B	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood
Type C	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood
Type B SW	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood
Type C SW	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood
Type D SW	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood
Type F S	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood

Name:	Gap:	Frame Factor:	g-value:	U-value:	Area:	No. of Openings:
door	mm	0.7	0	2	2	1
Type A	16mm or more	0.7	0.57	1.3	1.08	2
Type B	16mm or more	0.7	0.57	1.3	2.17	2
Type C	16mm or more	0.7	0.57	1.3	4.34	1
Type B SW	16mm or more	0.7	0.57	1.3	2.17	3
Type C SW	16mm or more	0.7	0.57	1.3	4.34	1
Type D SW	16mm or more	0.7	0.57	1.3	6.51	1
Type F S	16mm or more	0.7	0.57	1.3	4.99	1

Name:	Type-Name:	Location:	Orient:	Width:	Height:
door		Wall to corridor	North	1	2
Type A		External Wall	East	0.45	2.41
Type B		External Wall	East	0.9	2.41
Type C		External Wall	East	1.8	2.41
Type B SW		External Wall	South West	0.9	2.41
Type C SW		External Wall	South West	1.8	2.41
Type D SW		External Wall	South West	2.7	2.41
Type F S		External Wall	South	2.07	2.41

SAP Input

Overshading: Average or unknown

Opaque Elements:

Type:	Gross area:	Openings:	Net area:	U-value:	Ru value:	Curtain wall:	Kappa:
External Elements							
External Wall	85.39	33.19	52.2	0.15	0	False	N/A
Wall to corridor	3.65	2	1.65	0.15	0.43	False	N/A
Internal Elements							
Party Elements							
Part Wall	31.94						N/A
Party FLoorqs	78.5						N/A
Party Floor	78.5						N/A

Thermal bridges:

Thermal bridges: User-defined (individual PSI-values) Y-Value = 0.1316

	Length	Psi-value		
[Approved]	14.77	0.3	E2	Other lintels (including other steel lintels)
[Approved]	13.77	0.04	E3	Sill
[Approved]	57.02	0.05	E4	Jamb
[Approved]	6.15	0.09	E16	Corner (normal)
	27.77	0.12	E18	Party wall between dwellings
	10.39	0	P3	Intermediate floor between dwellings (in blocks of flats)

Ventilation:

Pressure test: Yes (As designed)
Ventilation: Centralised whole house extract
Number of wet rooms: Kitchen + 1
Ductwork: , rigid
Approved Installation Scheme: False
Number of chimneys: 0
Number of open flues: 0
Number of fans: 0
Number of passive stacks: 0
Number of sides sheltered: 2
Pressure test: 4

Main heating system:

Main heating system: Heat pumps with warm air distribution
Electric heat pumps
Fuel: Electricity
Info Source: Boiler Database
Database: (rev 456, product index 100271, SEDBUK 331%):
Brand name: NIBE
Model: F370
Model qualifier: Radiators
(provides DHW all year)
Fan coil units
Central heating pump : 2013 or later
Design flow temperature: Design flow temperature<=45°C
Boiler interlock: Yes

Main heating Control:

Main heating Control: Programmer and at least two room thermostats
Control code: 2505

Secondary heating system:

Secondary heating system: None

Water heating:

Water heating: 999 From DHW-only community scheme

SAP Input

Heat source: No hot water system present - electric immersion assumed
Electricity, heat fraction 0, efficiency 0

No hot water cylinder
Solar panel: False

Others:

Electricity tariff: Standard Tariff
In Smoke Control Area: Unknown
Conservatory: No conservatory
Low energy lights: 100%
Terrain type: Dense urban
EPC language: English
Wind turbine: No
Photovoltaics: Photovoltaic 1
Installed Peak power: 0.25
Tilt of collector: 30°
Overshading: None or very little
Collector Orientation: South East
Assess Zero Carbon Home: No

Predicted Energy Assessment

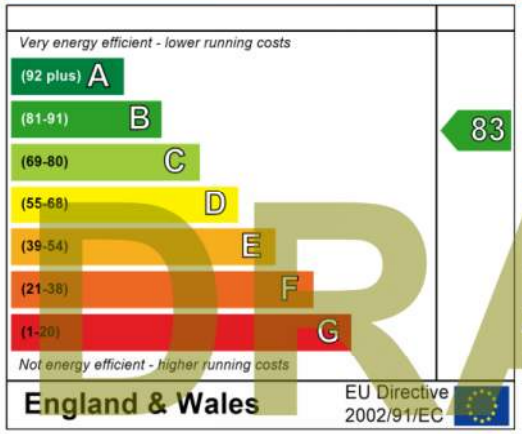
Unit 2
369-377 Kentish Town Road
Kentish Town
London
NW5 2TJ

Dwelling type: Mid floor Flat
Date of assessment: 02 January 2019
Produced by: Stroma Certification
Total floor area: 78.5 m²

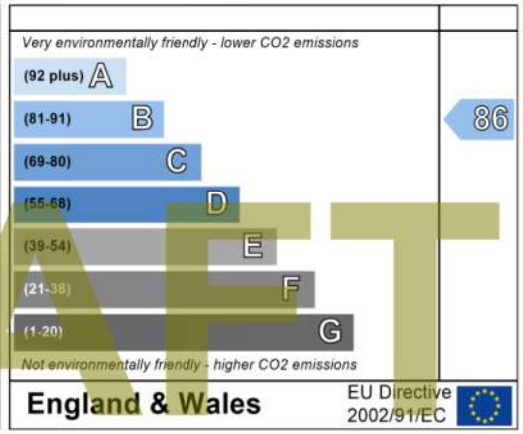
This is a Predicted Energy Assessment for a property which is not yet complete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, an Energy Performance Certificate is required providing information about the energy performance of the completed property.

Energy performance has been assessed using the SAP 2012 methodology and is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



Environmental Impact (CO_2) Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO2) emissions. The higher the rating the less impact it has on the environment.

SAP 2012 Overheating Assessment

Calculated by Stroma FSAP 2012 program, produced and printed on 08 March 2020

Property Details: Unit 2 2B4P EXASHP

Dwelling type:	Flat
Located in:	England
Region:	Thames valley
Cross ventilation possible:	Yes
Number of storeys:	1
Front of dwelling faces:	South West
Overshading:	Average or unknown
Overhangs:	None
Thermal mass parameter:	Indicative Value Low
Night ventilation:	False
Blinds, curtains, shutters:	Net curtain (covering whole window)
Ventilation rate during hot weather (ach):	6 (Windows fully open)

Overheating Details:

Summer ventilation heat loss coefficient:	373.03	**(P1)**
Transmission heat loss coefficient:	64.8	
Summer heat loss coefficient:	437.83	**(P2)**

Overhangs:

Orientation:	Ratio:	Z_overhangs:
East (Type A)	0	1
East (Type B)	0	1
East (Type C)	0	1
South West (Type B SW)	0	1
South West (Type C SW)	0	1
South West (Type D SW)	0	1
South (Type F S)	0	1

Solar shading:

Orientation:	Z blinds:	Solar access:	Overhangs:	Z summer:	
East (Type A)	0.8	0.9	1	0.72	**(P8)**
East (Type B)	0.8	0.9	1	0.72	**(P8)**
East (Type C)	0.8	0.9	1	0.72	**(P8)**
South West (Type B SW)	0.8	0.9	1	0.72	**(P8)**
South West (Type C SW)	0.8	0.9	1	0.72	**(P8)**
South West (Type D SW)	0.8	0.9	1	0.72	**(P8)**
South (Type F S)	0.8	0.9	1	0.72	**(P8)**

Solar gains:

Orientation		Area	Flux	g_	FF	Shading	Gains	
East (Type A)	0.9 x	2.16	117.51	0.57	0.7	0.72	65.62	
East (Type B)	0.9 x	4.34	117.51	0.57	0.7	0.72	131.86	
East (Type C)	0.9 x	4.34	117.51	0.57	0.7	0.72	131.86	
South West (Type B SW)	0.9 x	6.51	119.92	0.57	0.7	0.72	201.85	
South West (Type C SW)	0.9 x	4.34	119.92	0.57	0.7	0.72	134.57	
South West (Type D SW)	0.9 x	6.51	119.92	0.57	0.7	0.72	201.85	
South (Type F S)	0.9 x	4.99	112.21	0.57	0.7	0.72	144.77	
						Total	1012.37	**(P3/P4)**

Internal gains:

	June	July	August	
Internal gains	418.24	400.67	408.69	
Total summer gains	1482.95	1413.04	1343.39	**(P5)**

SAP 2012 Overheating Assessment

Summer gain/loss ratio	3.39	3.23	3.07	**(P6)**
Mean summer external temperature (Thames valley)	16	17.9	17.8	
Thermal mass temperature increment	1.3	1.3	1.3	
Threshold temperature	20.69	22.43	22.17	**(P7)**
Likelihood of high internal temperature	**Slight**	**Medium**	**Medium**	

Assessment of likelihood of high internal temperature: Medium

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.25
Printed on 08 March 2020 at 14:38:58

Project Information:

Assessed By: () **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 73m²
Site Reference : 4357 Kentish Town Road EXASHP **Plot Reference:** Unit 3 2B4P EXASHP
Address : Unit 3, 369-377 Kentish Town Road , Kentish Town, London, NW5 2TJ

Client Details:

Name:
Address :

This report covers items included within the SAP calculations.
It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Electricity
Fuel factor: 1.55 (electricity)

Target Carbon Dioxide Emission Rate (TER)	23.44 kg/m²	
Dwelling Carbon Dioxide Emission Rate (DER)	17.54 kg/m²	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	40.7 kWh/m²	
Dwelling Fabric Energy Efficiency (DFEE)	35.0 kWh/m²	
		OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.15 (max. 0.30)	0.16 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	(no floor)		
Roof	(no roof)		
Openings	1.38 (max. 2.00)	2.00 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	4.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main Heating system: Heat pumps with warm air distribution - electric
NIBE F370

Secondary heating system: None

5 Cylinder insulation

Hot water Storage: No Separate Cylinder

N/A

Regulations Compliance Report

6 Controls

Space heating controls	Programmer and at least two room thermostats	OK
Hot water controls:	No cylinder thermostat No cylinder	

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100.0%	
Minimum	75.0%	OK

8 Mechanical ventilation

Continuous extract system		
Specific fan power:	0.7	
Maximum	0.7	OK

9 Summertime temperature

Overheating risk (Thames valley):	Medium	OK

Based on:

Overshading:	Average or unknown
Windows facing: South West	2.16m²
Windows facing: South West	4.34m²
Windows facing: West	4.34m²
Windows facing: West	4.34m²
Ventilation rate:	4.00
Blinds/curtains:	Net curtain (covering whole window) Closed 100% of daylight hours

10 Key features

Party Walls U-value	0 W/m²K
Photovoltaic array	

Thermal Bridge Report

Property Details: Unit 3 2B4P EXASHP

Address: Unit 3, 369-377 Kentish Town Road , Kentish Town, London, NW5 2TJ
Located in: England
Region: Thames valley

Thermal bridges:

Thermal bridges: User-defined = UD
Default = D
Approved = A
User-defined (individual PSI-values) Y-Value = 0.047

External Junctions Details:

Junction Type	PSI-Value	Length	Reference	Type
Other lintels (including other steel lintels)	0.3	7.3	E2	[A]
Sill	0.04	6.3	E3	[A]
Jamb	0.05	37.74	E4	[A]
Corner (normal)	0.09	3.08	E16	[A]
Party wall between dwellings	0.06	3.08	E18	[A]

DRAFT

SAP Input

Property Details: Unit 3 2B4P EXASHP

Address:	Unit 3, 369-377 Kentish Town Road , Kentish Town, London, NW5 2TJ
Located in:	England
Region:	Thames valley
UPRN:	
Date of assessment:	02 January 2019
Date of certificate:	08 March 2020
Assessment type:	New dwelling design stage
Transaction type:	Non marketed sale
Tenure type:	Unknown
Related party disclosure:	No related party
Thermal Mass Parameter:	Indicative Value Low
Water use <= 125 litres/person/day:	True
PCDF Version:	456

Property description:

Dwelling type:	Flat
Detachment:	
Year Completed:	2019

Floor Location:	**Floor area:**	**Storey height:**
Floor 0	73 m²	2.4 m

Living area:	28.4 m² (fraction 0.568)
Front of dwelling faces:	South West

Opening types:

Name:	Source:	Type:	Glazing:	Argon:	Frame:
door	Manufacturer	Solid			Wood
Type A sw	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood
Type B sw	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood
Type C W	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood
Type B W	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood

Name:	Gap:	Frame Factor:	g-value:	U-value:	Area:	No. of Openings:
door	mm	0.7	0	2	2	1
Type A sw	16mm or more	0.7	0.57	1.3	1.08	2
Type B sw	16mm or more	0.7	0.57	1.3	2.17	2
Type C W	16mm or more	0.7	0.57	1.3	4.34	1
Type B W	16mm or more	0.7	0.57	1.3	2.17	2

Name:	Type-Name:	Location:	Orient:	Width:	Height:
door		Wall to corridor	North	1	2
Type A sw		External Wall	South West	0.45	2.41
Type B sw		External Wall	South West	0.9	2.41
Type C W		External Wall	West	1.8	2.41
Type B W		External Wall	West	0.9	2.41

Overshading: Average or unknown

Opaque Elements:

Type:	Gross area:	Openings:	Net area:	U-value:	Ru value:	Curtain wall:	Kappa:
External Elements							
External Wall	60.52	15.18	45.34	0.15	0	False	N/A
Wall to corridor	30.14	2	28.14	0.17	0.43	False	N/A
External wall with nieghbour	11.35	0	11.35	0.15	0	False	N/A
Internal Elements							

SAP Input

Party Elements

Part Wall	11.04	N/A
Party Ceiling	73	N/A
Party Floor	73	N/A

Thermal bridges:

Thermal bridges: User-defined (individual PSI-values) Y-Value = 0.047

	Length	Psi-value		
[Approved]	7.3	0.3	E2	Other lintels (including other steel lintels)
[Approved]	6.3	0.04	E3	Sill
[Approved]	37.74	0.05	E4	Jamb
[Approved]	3.08	0.09	E16	Corner (normal)
[Approved]	3.08	0.06	E18	Party wall between dwellings

Ventilation:

Pressure test:	Yes (As designed)
Ventilation:	Centralised whole house extract Number of wet rooms: Kitchen + 1 Ductwork: , rigid Approved Installation Scheme: False
Number of chimneys:	0
Number of open flues:	0
Number of fans:	0
Number of passive stacks:	0
Number of sides sheltered:	2
Pressure test:	4

Main heating system:

Main heating system:	Heat pumps with warm air distribution Electric heat pumps Fuel: Electricity Info Source: Boiler Database Database: (rev 456, product index 100271, SEDBUK 321%): Brand name: NIBE Model: F370 Model qualifier: Radiators (provides DHW all year) Fan coil units Central heating pump : 2013 or later Design flow temperature: Design flow temperature<=45°C Boiler interlock: Yes

Main heating Control:

Main heating Control:	Programmer and at least two room thermostats Control code: 2505

Secondary heating system:

Secondary heating system:	None

Water heating:

Water heating:	999 From DHW-only community scheme Heat source: No hot water system present - electric immersion assumed Electricity, heat fraction 0, efficiency 0 No hot water cylinder Solar panel: False

Others:

Electricity tariff:	Standard Tariff
In Smoke Control Area:	Unknown

DRAFT

SAP Input

Conservatory:	No conservatory
Low energy lights:	100%
Terrain type:	Dense urban
EPC language:	English
Wind turbine:	No
Photovoltaics:	Photovoltaic 1 Installed Peak power: 0.25 Tilt of collector: 30° Overshading: None or very little Collector Orientation: South East
Assess Zero Carbon Home:	No

Predicted Energy Assessment

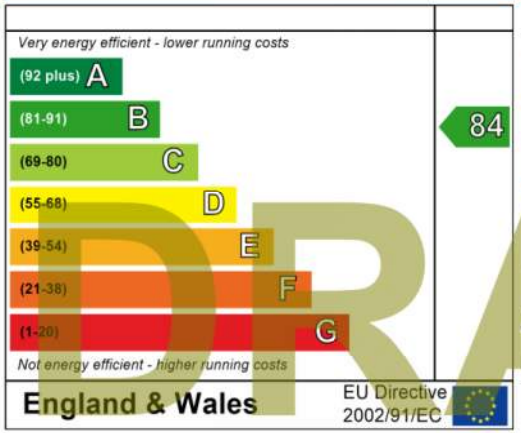
Unit 3
369-377 Kentish Town Road
Kentish Town
London
NW5 2TJ

Dwelling type: Mid floor Flat
Date of assessment: 02 January 2019
Produced by: Stroma Certification
Total floor area: 73 m²

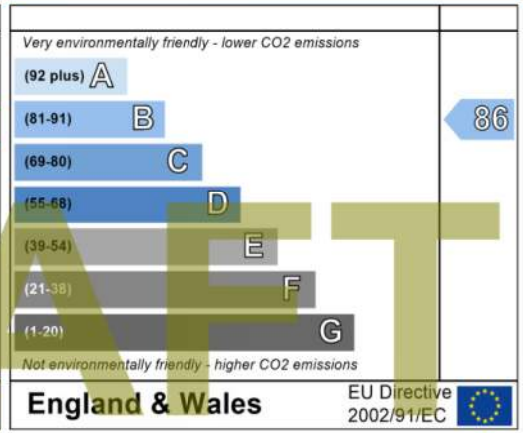
This is a Predicted Energy Assessment for a property which is not yet complete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, an Energy Performance Certificate is required providing information about the energy performance of the completed property.

Energy performance has been assessed using the SAP 2012 methodology and is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



Environmental Impact (CO_2) Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO2) emissions. The higher the rating the less impact it has on the environment.

SAP 2012 Overheating Assessment

Calculated by Stroma FSAP 2012 program, produced and printed on 08 March 2020

Property Details: Unit 3 2B4P EXASHP

Dwelling type:	Flat
Located in:	England
Region:	Thames valley
Cross ventilation possible:	No
Number of storeys:	1
Front of dwelling faces:	South West
Overshading:	Average or unknown
Overhangs:	None
Thermal mass parameter:	Indicative Value Low
Night ventilation:	False
Blinds, curtains, shutters:	Net curtain (covering whole window)
Ventilation rate during hot weather (ach):	4 (Windows fully open)

Overheating Details:

Summer ventilation heat loss coefficient:	231.26	**(P1)**
Transmission heat loss coefficient:	40.5	
Summer heat loss coefficient:	271.77	**(P2)**

Overhangs:

Orientation:	**Ratio:**	**Z_overhangs:**
South West (Type A sw)	0	1
South West (Type B sw)	0	1
West (Type C W)	0	1
West (Type B W)	0	1

Solar shading:

Orientation:	**Z blinds:**	**Solar access:**	**Overhangs:**	**Z summer:**	
South West (Type A sw)	0.8	0.9	1	0.72	**(P8)**
South West (Type B sw)	0.8	0.9	1	0.72	**(P8)**
West (Type C W)	0.8	0.9	1	0.72	**(P8)**
West (Type B W)	0.8	0.9	1	0.72	**(P8)**

Solar gains:

Orientation		**Area**	**Flux**	**g_**	**FF**	**Shading**	**Gains**	
South West (Type A sw)	0.9 x	2.16	119.92	0.57	0.7	0.72	66.97	
South West (Type B sw)	0.9 x	4.34	119.92	0.57	0.7	0.72	134.57	
West (Type C W)	0.9 x	4.34	117.51	0.57	0.7	0.72	131.86	
West (Type B W)	0.9 x	4.34	117.51	0.57	0.7	0.72	131.86	
						Total	465.25	**(P3/P4)**

Internal gains:

	June	**July**	**August**	
Internal gains	398.8	382.13	389.94	
Total summer gains	890.31	847.38	809.96	**(P5)**
Summer gain/loss ratio	3.28	3.12	2.98	**(P6)**
Mean summer external temperature (Thames valley)	16	17.9	17.8	
Thermal mass temperature increment	1.3	1.3	1.3	
Threshold temperature	20.58	22.32	22.08	**(P7)**
Likelihood of high internal temperature	**Slight**	**Medium**	**Medium**	

SAP 2012 Overheating Assessment

Assessment of likelihood of high internal temperature: Medium

DRAFT

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.25
Printed on 08 March 2020 at 14:38:53

Project Information:

Assessed By: () **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 90.6m²
Site Reference : 4357 Kentish Town Road EXASHP **Plot Reference:** Unit 4 2B3P EXASHP
Address : Unit 4, 369-377 Kentish Town Road , Kentish Town, London, NW5 2TJ

Client Details:

Name:
Address :

This report covers items included within the SAP calculations.
It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Electricity
Fuel factor: 1.55 (electricity)

Target Carbon Dioxide Emission Rate (TER)	28.9 kg/m²	
Dwelling Carbon Dioxide Emission Rate (DER)	22.33 kg/m²	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	63.4 kWh/m²	
Dwelling Fabric Energy Efficiency (DFEE)	63.8 kWh/m²	Fail

Excess energy = 0.36 kg/m² (00.6 %)

2 Fabric U-values

Element	Average	Highest	
External wall	0.15 (max. 0.30)	0.15 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	(no floor)		
Roof	0.15 (max. 0.20)	0.15 (max. 0.35)	OK
Openings	1.33 (max. 2.00)	2.00 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	4.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main Heating system:
Heat pumps with warm air distribution - electric
NIBE F370

Secondary heating system: None

5 Cylinder insulation

Hot water Storage: No Separate Cylinder

N/A

Regulations Compliance Report

6 Controls

Space heating controls	Programmer and at least two room thermostats	OK
Hot water controls:	No cylinder thermostat No cylinder	

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100.0%	
Minimum	75.0%	OK

8 Mechanical ventilation

Continuous extract system		
Specific fan power:	0.7	
Maximum	0.7	OK

9 Summertime temperature

Overheating risk (Thames valley):	Slight	OK

Based on:

Overshading:	Average or unknown
Windows facing: East	4.34m²
Windows facing: East	4.7m²
Windows facing: East	7.29m²
Windows facing: South	6.26m²
Windows facing: South West	7.29m²
Windows facing: South West	4.7m²
Windows facing: South West	8.68m²
Windows facing: South West	4.34m²
Windows facing: West	4.34m²
Ventilation rate:	6.00
Blinds/curtains:	Net curtain (covering whole window) Closed 100% of daylight hours

10 Key features

Party Walls U-value	0 W/m²K
Photovoltaic array	

Thermal Bridge Report

Property Details: Unit 4 2B3P EXASHP

Address: Unit 4, 369-377 Kentish Town Road , Kentish Town, London, NW5 2TJ
Located in: England
Region: Thames valley

Thermal bridges:

Thermal bridges:

User-defined = UD
Default = D
Approved = A
User-defined (individual PSI-values) Y-Value = 0.1098

External Junctions Details:

Junction Type	PSI-Value	Length	Reference	Type
Other lintels (including other steel lintels)	0.3	27.349	E2	[A]
Sill	0.04	26.349	E3	[A]
Jamb	0.05	85.94	E4	[A]
Corner (normal)	0.09	6.15	E16	[A]
Party wall between dwellings	0.06	1.6	E18	[A]
Party floor between dwellings (in blocks of flats)	0.07	83.04	E7	[A]
Flat roof	0.08	41.52	E14	[D]

Party Junctions Details:

Intermediate floor between dwellings (in blocks of flats)	0	1.6	P3	[D]

SAP Input

Property Details: Unit 4 2B3P EXASHP

Address: Unit 4, 369-377 Kentish Town Road , Kentish Town, London, NW5 2TJ
Located in: England
Region: Thames valley
UPRN:
Date of assessment: 02 January 2019
Date of certificate: 08 March 2020
Assessment type: New dwelling design stage
Transaction type: Non marketed sale
Tenure type: Unknown
Related party disclosure: No related party
Thermal Mass Parameter: Indicative Value Low
Water use <= 125 litres/person/day: True
PCDF Version: 456

Property description:

Dwelling type: Flat
Detachment:
Year Completed: 2019

Floor Location:	Floor area:	Storey height:
Floor 0	90.6 m²	2.4 m

Living area: 35 m² (fraction 0.386)
Front of dwelling faces: South West

Opening types:

Name:	Source:	Type:	Glazing:	Argon:	Frame:
door	Manufacturer	Solid			Wood
Type B East	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood
Type G East	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood
Type I East	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood
Type H South	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood
Type I SW	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood
Type G SW	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood
Type B SW	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood
Type C SW	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood
Type B West	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood

Name:	Gap:	Frame Factor:	g-value:	U-value:	Area:	No. of Openings:
door	mm	0.7	0	2	2	1
Type B East	16mm or more	0.7	0.57	1.3	2.17	2
Type G East	16mm or more	0.7	0.57	1.3	4.7	1
Type I East	16mm or more	0.7	0.57	1.3	7.29	1
Type H South	16mm or more	0.7	0.57	1.3	6.26	1
Type I SW	16mm or more	0.7	0.57	1.3	7.29	1
Type G SW	16mm or more	0.7	0.57	1.3	4.7	1
Type B SW	16mm or more	0.7	0.57	1.3	2.17	4
Type C SW	16mm or more	0.7	0.57	1.3	4.34	1
Type B West	16mm or more	0.7	0.57	1.3	2.17	2

Name:	Type-Name:	Location:	Orient:	Width:	Height:
door		Wall to Corridor	North	1	2
Type B East		External Wall	East	0.9	2.41
Type G East		External Wall	East	1.95	2.41
Type I East		External Wall	East	3.025	2.41
Type H South		External Wall	South	2.599	2.41
Type I SW		External Wall	South West	3.025	2.41

Type G SW	External Wall	South West	1.95	2.41
Type B SW	External Wall	South West	0.9	2.41
Type C SW	External Wall	South West	1.8	2.41
Type B West	External Wall	West	0.9	2.41

Overshading: Average or unknown

Opaque Elements:

Type:	Gross area:	Openings:	Net area:	U-value:	Ru value:	Curtain wall:	Kappa:
External Elements							
External Wall	127.67	51.94	75.73	0.15	0	False	N/A
Wall to Corridor	22.46	2	20.46	0.15	0.43	False	N/A
Wall to Lift Shaft	14.05	0	14.05	0.15	0	False	N/A
Wall to Nieghbour	5.1	0	5.1	0.15	0	False	N/A
Roof	43.34	0	43.34	0.15	0		N/A
Internal Elements							
Party Elements							
Part Wall	30.81						N/A
ceiling	47.26						N/A
Party Floor	90.6						N/A

Thermal bridges:

Thermal bridges: User-defined (individual PSI-values) Y-Value = 0.1098

	Length	Psi-value		
[Approved]	27.349	0.3	E2	Other lintels (including other steel lintels)
[Approved]	26.349	0.04	E3	Sill
[Approved]	85.94	0.05	E4	Jamb
[Approved]	6.15	0.09	E16	Corner (normal)
[Approved]	1.6	0.06	E18	Party wall between dwellings
[Approved]	83.04	0.07	E7	Party floor between dwellings (in blocks of flats)
	41.52	0.08	E14	Flat roof
	1.6	0	P3	Intermediate floor between dwellings (in blocks of flats)

Ventilation:

Pressure test: Yes (As designed)
Ventilation: Centralised whole house extract
Number of wet rooms: Kitchen + 1
Ductwork: , rigid
Approved Installation Scheme: False
Number of chimneys: 0
Number of open flues: 0
Number of fans: 0
Number of passive stacks: 0
Number of sides sheltered: 2
Pressure test: 4

Main heating system:

Main heating system: Heat pumps with warm air distribution
Electric heat pumps
Fuel: Electricity
Info Source: Boiler Database
Database: (rev 456, product index 100271, SEDBUK 318%):
Brand name: NIBE
Model: F370
Model qualifier: Radiators
(provides DHW all year)
Fan coil units

Central heating pump : 2013 or later
Design flow temperature: Design flow temperature<=45°C
Boiler interlock: Yes

Main heating Control:

Main heating Control: Programmer and at least two room thermostats
Control code: 2505

Secondary heating system:

Secondary heating system: None

Water heating:

Water heating: 999 From DHW-only community scheme
Heat source: No hot water system present - electric immersion assumed
Electricity, heat fraction 0, efficiency 0

No hot water cylinder
Solar panel: False

Others:

Electricity tariff: Standard Tariff
In Smoke Control Area: Unknown
Conservatory: No conservatory
Low energy lights: 100%
Terrain type: Dense urban
EPC language: English
Wind turbine: No
Photovoltaics: Photovoltaic 1
Installed Peak power: 0.25
Tilt of collector: 30°
Overshading: None or very little
Collector Orientation: South East
Assess Zero Carbon Home: No

Predicted Energy Assessment

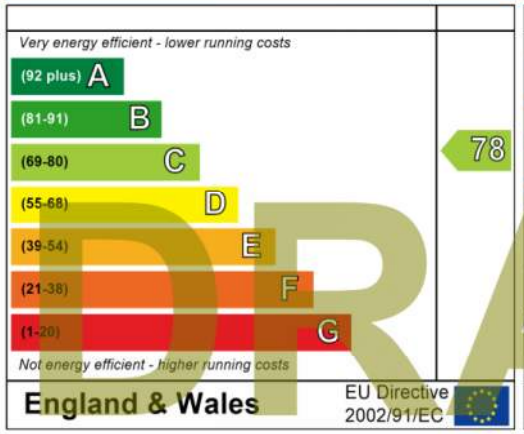
Unit 4
369-377 Kentish Town Road
Kentish Town
London
NW5 2TJ

Dwelling type: Mid floor Flat
Date of assessment: 02 January 2019
Produced by: Stroma Certification
Total floor area: 90.6 m²

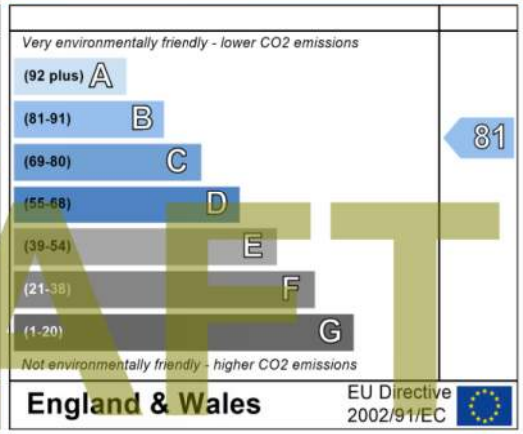
This is a Predicted Energy Assessment for a property which is not yet complete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, an Energy Performance Certificate is required providing information about the energy performance of the completed property.

Energy performance has been assessed using the SAP 2012 methodology and is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



Environmental Impact (CO_2) Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO2) emissions. The higher the rating the less impact it has on the environment.

SAP 2012 Overheating Assessment

Calculated by Stroma FSAP 2012 program, produced and printed on 08 March 2020

Property Details: Unit 4 2B3P EXASHP

Dwelling type:	Flat
Located in:	England
Region:	Thames valley
Cross ventilation possible:	Yes
Number of storeys:	1
Front of dwelling faces:	South West
Overshading:	Average or unknown
Overhangs:	as detailed below
Thermal mass parameter:	Indicative Value Low
Night ventilation:	False
Blinds, curtains, shutters:	Net curtain (covering whole window)
Ventilation rate during hot weather (ach):	6 (Windows fully open)

Overheating Details:

Summer ventilation heat loss coefficient:	430.53	**(P1)**
Transmission heat loss coefficient:	115.1	
Summer heat loss coefficient:	545.67	**(P2)**

Overhangs:

Orientation:	Ratio:	Z_overhangs:
East (Type B East)	0.12	0.93
East (Type G East)	0.12	0.93
East (Type I East)	0.12	0.93
South (Type H South)	0.12	0.87
South West (Type I SW)	0.12	0.9
South West (Type G SW)	0.12	0.9
South West (Type B SW)	0.12	0.9
South West (Type C SW)	0.12	0.9
West (Type B West)	0.12	0.93

Solar shading:

Orientation:	Z blinds:	Solar access:	Overhangs:	Z summer:	
East (Type B East)	0.8	0.7	0.93	0.51	**(P8)**
East (Type G East)	0.8	0.7	0.93	0.51	**(P8)**
East (Type I East)	0.8	0.7	0.93	0.51	**(P8)**
South (Type H South)	0.8	0.7	0.87	0.46	**(P8)**
South West (Type I SW)	0.8	0.7	0.9	0.48	**(P8)**
South West (Type G SW)	0.8	0.7	0.9	0.48	**(P8)**
South West (Type B SW)	0.8	0.7	0.9	0.48	**(P8)**
South West (Type C SW)	0.8	0.7	0.9	0.48	**(P8)**
West (Type B West)	0.8	0.7	0.93	0.51	**(P8)**

Solar gains:

Orientation		Area	Flux	g_	FF	Shading	Gains
East (Type B East)	0.7 x	4.34	117.51	0.57	0.7	0.51	92.52
East (Type G East)	0.7 x	4.7	117.51	0.57	0.7	0.51	100.2
East (Type I East)	0.7 x	7.29	117.51	0.57	0.7	0.51	155.42
South (Type H South)	0.7 x	6.26	112.21	0.57	0.7	0.46	114.88
South West (Type I SW)	0.7 x	7.29	119.92	0.57	0.7	0.48	150.79
South West (Type G SW)	0.7 x	4.7	119.92	0.57	0.7	0.48	97.22

SAP 2012 Overheating Assessment

South West (Type B SW)	0.7 x	8.68	119.92	0.57	0.7	0.48	179.55
South West (Type C SW)	0.7 x	4.34	119.92	0.57	0.7	0.48	89.77
West (Type B West)	0.7 x	4.34	117.51	0.57	0.7	0.51	92.52
						Total	1072.87 **(P3/P4)**

Internal gains:

	June	July	August	
Internal gains	456.07	436.84	445.39	
Total summer gains	1586	1509.71	1429.01	**(P5)**
Summer gain/loss ratio	2.91	2.77	2.62	**(P6)**
Mean summer external temperature (Thames valley)	16	17.9	17.8	
Thermal mass temperature increment	1.3	1.3	1.3	
Threshold temperature	20.21	21.97	21.72	**(P7)**
Likelihood of high internal temperature	**Not significant**	**Slight**	**Slight**	

Assessment of likelihood of high internal temperature: Slight

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.25
Printed on 08 March 2020 at 14:38:49

Project Information:

Assessed By: () **Building Type:** Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE Total Floor Area: 96.7m²
Site Reference : 4357 Kentish Town Road EXASHP **Plot Reference:** Unit 5 2B5P Masonette EXASHP
Address : Unit 5 2B5P Mason, 369-377 Kentish Town Road , Kentish Town, London, NW5 2TJ

Client Details:

Name:
Address :

This report covers items included within the SAP calculations.
It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Electricity
Fuel factor: 1.55 (electricity)

Target Carbon Dioxide Emission Rate (TER)	30.72 kg/m²	
Dwelling Carbon Dioxide Emission Rate (DER)	23.81 kg/m²	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	70.5 kWh/m²	
Dwelling Fabric Energy Efficiency (DFEE)	69.5 kWh/m²	
		OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.15 (max. 0.30)	0.15 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	(no floor)		
Roof	0.15 (max. 0.20)	0.15 (max. 0.35)	OK
Openings	1.32 (max. 2.00)	2.00 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	4.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main Heating system: Heat pumps with warm air distribution - electric
NIBE F370

Secondary heating system: None

5 Cylinder insulation

Hot water Storage: No Separate Cylinder

N/A

Regulations Compliance Report

6 Controls

Space heating controls	Programmer and at least two room thermostats	OK
Hot water controls:	No cylinder thermostat No cylinder	

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100.0%	
Minimum	75.0%	OK

8 Mechanical ventilation

Continuous extract system		
Specific fan power:	0.7	
Maximum	0.7	OK

9 Summertime temperature

Overheating risk (Thames valley):	Slight	OK

Based on:

Overshading:	Average or unknown
Windows facing: East	2.17m²
Windows facing: East	9.4m²
Windows facing: East	4.34m²
Windows facing: East	7.51m²
Windows facing: South	6.26m²
Windows facing: South West	7.4m²
Windows facing: South West	6.51m²
Windows facing: North	12.53m²
Ventilation rate:	6.00
Blinds/curtains:	Net curtain (covering whole window) Closed 100% of daylight hours

10 Key features

Party Walls U-value	0 W/m²K
Photovoltaic array	

Thermal Bridge Report

Property Details: Unit 5 2B5P Masonette EXASHP

Address: Unit 5 2B5P Mason, 369-377 Kentish Town Road , Kentish Town, London, NW5 2TJ
Located in: England
Region: Thames valley

Thermal bridges:

Thermal bridges: User-defined = UD
Default = D
Approved = A
User-defined (individual PSI-values) Y-Value = 0.0822

External Junctions Details:

Junction Type	PSI-Value	Length	Reference	Type
Other lintels (including other steel lintels)	0.3	24.284	E2	[A]
Sill	0.04	23.284	E3	[A]
Jamb	0.05	61.84	E4	[A]
Corner (normal)	0.09	18.45	E16	[A]
Party floor between dwellings (in blocks of flats)	0.07	83.04	E7	[A]
Flat roof	0.08	48.34	E14	[D]

Party Junctions Details:

Intermediate floor between dwellings (in blocks of flats)	0	15.17	P3	[D]

SAP Input

Property Details: Unit 5 2B5P Masonette EXASHP

Address:	Unit 5 2B5P Mason, 369-377 Kentish Town Road , Kentish Town, London, NW5 2TJ
Located in:	England
Region:	Thames valley
UPRN:	
Date of assessment:	02 January 2019
Date of certificate:	08 March 2020
Assessment type:	New dwelling design stage
Transaction type:	Non marketed sale
Tenure type:	Unknown
Related party disclosure:	No related party
Thermal Mass Parameter:	Indicative Value Low
Water use <= 125 litres/person/day:	True
PCDF Version:	456

Property description:

Dwelling type:	Flat
Detachment:	
Year Completed:	2019

Floor Location:	**Floor area:**	**Storey height:**
Floor 0	48.7 m²	2.4 m
Floor 1	48 m²	2.4 m

Living area:	48 m² (fraction 0.496)
Front of dwelling faces:	South West

Opening types:

Name:	**Source:**	**Type:**	**Glazing:**	**Argon:**	**Frame:**
door	Manufacturer	Solid			Wood
Type B East	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood
Type G East	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood
Type B 6 East	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood
Type J L6 East	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood
Type K L6 South	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood
Type L L6 SW	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood
Type B L6 SW	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood
Type M L6 North	SAP 2012	Windows	low-E, En = 0.05, soft coat	Yes	Wood

Name:	**Gap:**	**Frame Factor:**	**g-value:**	**U-value:**	**Area:**	**No. of Openings:**
door	mm	0.7	0	2	2	1
Type B East	16mm or more	0.7	0.57	1.3	2.17	1
Type G East	16mm or more	0.7	0.57	1.3	4.7	2
Type B 6 East	16mm or more	0.7	0.57	1.3	2.17	2
Type J L6 East	16mm or more	0.7	0.57	1.3	7.51	1
Type K L6 South	16mm or more	0.7	0.57	1.3	6.26	1
Type L L6 SW	16mm or more	0.7	0.57	1.3	7.4	1
Type B L6 SW	16mm or more	0.7	0.57	1.3	2.17	3
Type M L6 North	16mm or more	0.7	0.57	1.3	12.53	1

Name:	**Type-Name:**	**Location:**	**Orient:**	**Width:**	**Height:**
door		Wall to Corridor	North	1	2
Type B East		External Wall	East	0.9	2.41
Type G East		External Wall	East	1.95	2.41
Type B 6 East		Wall Level 6	East	0.9	2.41
Type J L6 East		Wall Level 6	East	3.115	2.41
Type K L6 South		Wall Level 6	South	2.599	2.41
Type L L6 SW		Wall Level 6	South West	3.07	2.41
Type B L6 SW		Wall Level 6	South West	0.9	2.41
Type M L6 North		Wall Level 6	North	5.2	2.41

SAP Input

Overshading:	Average or unknown

Opaque Elements:

Type:	**Gross area:**	**Openings:**	**Net area:**	**U-value:**	**Ru value:**	**Curtain wall:**	**Kappa:**
External Elements							
External Wall	46.65	11.57	35.08	0.15	0	False	N/A
Wall to Corridor	14.18	2	12.18	0.15	0.43	False	N/A
Wall to Lift Shaft	12.54	0	12.54	0.15	0	False	N/A
Wall to Nieghbour	8.3	0	8.3	0.15	0	False	N/A
Wall Level 6	102.15	44.55	57.6	0.15	0	False	N/A
Roof level 5	43.76	0	43.76	0.15	0		N/A
Roof Level 6	48	0	48	0.15	0		N/A
Internal Elements							
Party Elements							
Part Wall	30.81						N/A
Living room	48						N/A
Bedroom	48						N/A

Thermal bridges:

Thermal bridges:	User-defined (individual PSI-values) Y-Value = 0.0822			
	Length	**Psi-value**		
[Approved]	24.284	0.3	E2	Other lintels (including other steel lintels)
[Approved]	23.284	0.04	E3	Sill
[Approved]	61.84	0.05	E4	Jamb
[Approved]	18.45	0.09	E16	Corner (normal)
[Approved]	83.04	0.07	E7	Party floor between dwellings (in blocks of flats)
	48.34	0.08	E14	Flat roof
	15.17	0	P3	Intermediate floor between dwellings (in blocks of flats)

Ventilation:

Pressure test:	Yes (As designed)
Ventilation:	Centralised whole house extract Number of wet rooms: Kitchen + 1 Ductwork: , rigid Approved Installation Scheme: False
Number of chimneys:	0
Number of open flues:	0
Number of fans:	0
Number of passive stacks:	0
Number of sides sheltered:	2
Pressure test:	4

Main heating system:

Main heating system:	Heat pumps with warm air distribution Electric heat pumps Fuel: Electricity Info Source: Boiler Database Database: (rev 456, product index 100271, SEDBUK 321%): Brand name: NIBE Model: F370 Model qualifier: Radiators (provides DHW all year) Fan coil units

SAP Input

	Central heating pump : 2013 or later
	Design flow temperature: Design flow temperature<=45°C
	Boiler interlock: Yes
Main heating Control:	
Main heating Control:	Programmer and at least two room thermostats
	Control code: 2505
Secondary heating system:	
Secondary heating system:	None
Water heating:	
Water heating:	999 From DHW-only community scheme
	Heat source: No hot water system present - electric immersion assumed
	Electricity, heat fraction 0, efficiency 0
	No hot water cylinder
	Solar panel: False
Others:	
Electricity tariff:	Standard Tariff
In Smoke Control Area:	Unknown
Conservatory:	No conservatory
Low energy lights:	100%
Terrain type:	Dense urban
EPC language:	English
Wind turbine:	No
Photovoltaics:	Photovoltaic 1
	Installed Peak power: 0.25
	Tilt of collector: 30°
	Overshading: None or very little
	Collector Orientation: South East
Assess Zero Carbon Home:	No

Predicted Energy Assessment

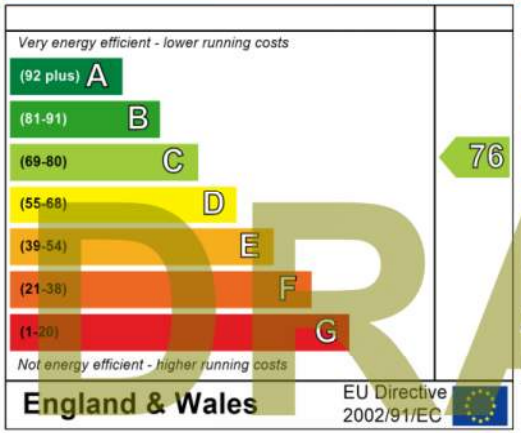
Unit 5 2B5P Mason
369-377 Kentish Town Road
Kentish Town
London
NW5 2TJ

Dwelling type: Mid floor Flat
Date of assessment: 02 January 2019
Produced by: Stroma Certification
Total floor area: 96.7 m²

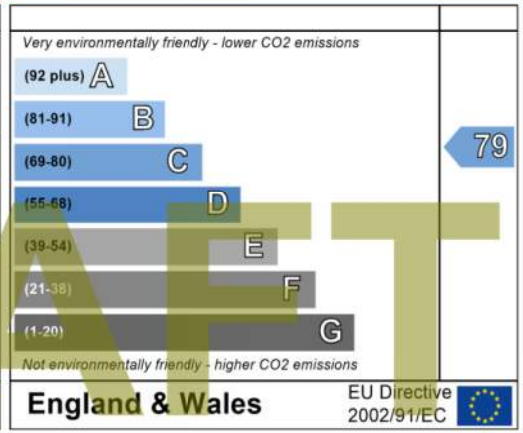
This is a Predicted Energy Assessment for a property which is not yet complete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, an Energy Performance Certificate is required providing information about the energy performance of the completed property.

Energy performance has been assessed using the SAP 2012 methodology and is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



Environmental Impact (CO_2) Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO2) emissions. The higher the rating the less impact it has on the environment.

SAP 2012 Overheating Assessment

Calculated by Stroma FSAP 2012 program, produced and printed on 08 March 2020

Property Details: Unit 5 2B5P Masonette EXASHP

Dwelling type:	Flat
Located in:	England
Region:	Thames valley
Cross ventilation possible:	Yes
Number of storeys:	2
Front of dwelling faces:	South West
Overshading:	Average or unknown
Overhangs:	as detailed below
Thermal mass parameter:	Indicative Value Low
Night ventilation:	False
Blinds, curtains, shutters:	Net curtain (covering whole window)
Ventilation rate during hot weather (ach):	6 (Windows fully open)

Overheating Details:

Summer ventilation heat loss coefficient:	459.52	**(P1)**
Transmission heat loss coefficient:	128.5	
Summer heat loss coefficient:	588.03	**(P2)**

Overhangs:

Orientation:	**Ratio:**	**Z_overhangs:**
East (Type B East)	0.12	0.93
East (Type G East)	0.12	0.93
East (Type B 6 East)	0.12	0.93
East (Type J L6 East)	0.12	0.93
South (Type K L6 South)	0.12	0.87
South West (Type L L6 SW)	0.12	0.9
South West (Type B L6 SW)	0.12	0.9
North (Type M L6 North)	0.12	0.96

Solar shading:

Orientation:	**Z blinds:**	**Solar access:**	**Overhangs:**	**Z summer:**	
East (Type B East)	0.8	0.7	0.93	0.51	**(P8)**
East (Type G East)	0.8	0.7	0.93	0.51	**(P8)**
East (Type B 6 East)	0.8	0.7	0.93	0.51	**(P8)**
East (Type J L6 East)	0.8	0.7	0.93	0.51	**(P8)**
South (Type K L6 South)	0.8	0.7	0.87	0.46	**(P8)**
South West (Type L L6 SW)	0.8	0.7	0.9	0.48	**(P8)**
South West (Type B L6 SW)	0.8	0.7	0.9	0.48	**(P8)**
North (Type M L6 North)	0.8	0.7	0.96	0.53	**(P8)**

Solar gains:

Orientation		**Area**	**Flux**	**g_**	**FF**	**Shading**	**Gains**
East (Type B East)	0.7 x	2.17	117.51	0.57	0.7	0.51	46.26
East (Type G East)	0.7 x	9.4	117.51	0.57	0.7	0.51	200.4
East (Type B 6 East)	0.7 x	4.34	117.51	0.57	0.7	0.51	92.52
East (Type J L6 East)	0.7 x	7.51	117.51	0.57	0.7	0.51	160.11
South (Type K L6 South)	0.7 x	6.26	112.21	0.57	0.7	0.46	114.88
South West (Type L L6 SW)	0.7 x	7.4	119.92	0.57	0.7	0.48	153.07
South West (Type B L6 SW)	0.7 x	6.51	119.92	0.57	0.7	0.48	134.66
North (Type M L6 North)	0.7 x	12.53	81.19	0.57	0.7	0.53	193.65

SAP 2012 Overheating Assessment

		Total	1095.55	**(P3/P4)**

Internal gains:

	June	**July**	**August**	
Internal gains	472.37	452.41	461.17	
Total summer gains	1633.01	1547.96	1439.64	**(P5)**
Summer gain/loss ratio	2.78	2.63	2.45	**(P6)**
Mean summer external temperature (Thames valley)	16	17.9	17.8	
Thermal mass temperature increment	1.3	1.3	1.3	
Threshold temperature	20.08	21.83	21.55	**(P7)**
Likelihood of high internal temperature	**Not significant**	**Slight**	**Slight**	

Assessment of likelihood of high internal temperature: Slight

DRAFT

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

369-377 Kentish Town Road

As designed

Date: Sun Mar 08 14:14:05 2020

Administrative information

Building Details

Address: 369-377 Kentish Town Road, London, NW1

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.6.a.2

Interface to calculation engine: Design Database

Interface to calculation engine version: v26.06.00.12

BRUKL compliance check version: v5.6.a.1

Owner Details

Name: Information not provided by the user

Telephone number: Information not provided by the user

Address: Information not provided by the user, Information not provided by the user, Information not provided by the user

Certifier details

Name: Information not provided by the user

Telephone number: 020 8232 0080

Address: 282 Chase Road,, London, N14 6HA

Criterion 1: The calculated CO_2 emission rate for the building must not exceed the target

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	40.7
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	40.7
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	36.2
Are emissions from the building less than or equal to the target?	BER =< TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	Surface where the maximum value occurs*
Wall**	0.35	0.2	0.2	0-FLOOR Wall 1
Floor	0.25	-	-	"No heat loss floors"
Roof	0.25	-	-	"No heat loss roofs"
Windows***, roof windows, and rooflights	2.2	1.5	1.5	0-FLOOR Window 1
Personnel doors	2.2	-	-	"No external personnel doors"
Vehicle access & similar large doors	1.5	-	-	"No external vehicle access doors"
High usage entrance doors	3.5	-	-	"No external high usage entrance doors"

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$]
$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]
$U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

* There might be more than one surface where the maximum U-value occurs.
** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.
*** Display windows and similar glazing are excluded from the U-value check.
N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air Permeability	Worst acceptable standard	This building
$m^3/(h.m^2)$ at 50 Pa	10	4

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- Split of multi split

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.8	4.2	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.

1- Default DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	-
Standard value	1	N/A

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
A	Local supply or extract ventilation units serving a single area
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal supply and extract ventilation units serving a single room or zone with heating and heat recovery
E	Local supply and extract ventilation system serving a single area with heating and heat recovery
F	Other local ventilation units
G	Fan-assisted terminal VAV unit
H	Fan coil units
I	Zonal extract system where the fan is remote from the zone with grease filter

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
0-FLOOR	-	-	-	1	-	-	-	-	-	0.75	0.5

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
0-FLOOR	-	110	70	1941

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
0-FLOOR	YES (+23.8%)	YES

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m²]	232	232
External area [m²]	301	301
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	4	5
Average conductance [W/K]	193.32	215.78
Average U-value [W/m²K]	0.64	0.72
Alpha value* [%]	26.07	18.28

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
100	**A1/A2 Retail/Financial and Professional services**
	A3/A4/A5 Restaurants and Cafes/Drinking Est /Takeaways
	B1 Offices and Workshop businesses
	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	C2 Residential Institutions: Hospitals and Care Homes
	C2 Residential Institutions: Residential schools
	C2 Residential Institutions: Universities and colleges
	C2A Secure Residential Institutions
	Residential spaces
	D1 Non-residential Institutions: Community/Day Centre
	D1 Non-residential Institutions: Libraries, Museums, and Galleries
	D1 Non-residential Institutions: Education
	D1 Non-residential Institutions: Primary Health Care Building
	D1 Non-residential Institutions: Crown and County Courts
	D2 General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger terminals
	Others: Emergency services
	Others: Miscellaneous 24hr activities
	Others: Car Parks 24 hrs
	Others: Stand alone utility block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	2.84	3.89
Cooling	35.65	21.26
Auxiliary	4.25	3.78
Lighting	25.31	50.27
Hot water	1.7	1.96
Equipment*	20.26	20.26
TOTAL**	**69.75**	**81.15**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	0	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	418.96	309.52
Primary energy* [kWh/m²]	214.14	239.2
Total emissions [kg/m²]	38.2	40.7

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	36.2	382.7	2.8	35.7	4.2	3.54	2.98	3.8	4.2
	Notional	34	275.5	3.9	21.3	3.8	2.43	3.6	----	----

Key to terms

Heat dem [MJ/m2] = Heating energy demand
Cool dem [MJ/m2] = Cooling energy demand
Heat con [kWh/m2] = Heating energy consumption
Cool con [kWh/m2] = Cooling energy consumption
Aux con [kWh/m2] = Auxiliary energy consumption
Heat SSEFF = Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER = Cooling system seasonal energy efficiency ratio
Heat gen SSEFF = Heating generator seasonal efficiency
Cool gen SSEER = Cooling generator seasonal energy efficiency ratio
ST = System type
HS = Heat source
HFT = Heating fuel type
CFT = Cooling fuel type

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	$U_{i\text{-}Typ}$	$U_{i\text{-}Min}$	Surface where the minimum value occurs*
Wall	0.23	0.2	0-FLOOR Wall 1
Floor	0.2	-	"No heat loss floors"
Roof	0.15	-	"No heat loss roofs"
Windows, roof windows, and rooflights	1.5	1.5	0-FLOOR Window 1
Personnel doors	1.5	-	"No external personnel doors"
Vehicle access & similar large doors	1.5	-	"No external vehicle access doors"
High usage entrance doors	1.5	-	"No external high usage entrance doors"

$U_{i\text{-}Typ}$ = Typical individual element U-values [W/(m²K)] $U_{i\text{-}Min}$ = Minimum individual element U-values [W/(m²K)]

* There might be more than one surface where the minimum U-value occurs.

Air Permeability	Typical value	This building
$m^3/(h.m^2)$ at 50 Pa	5	4

Appendix D Exhaust Air Heat Pump , Manufacturer's Literature

Exhaust Air Heat Pump NIBE™ F730
A new generation of heat pumps

COMING SOON

NIBE Uplink™

A+++

Energy efficiency class package label for NIBE F730

Features of NIBE™ F730

Inverter controlled compressor
Compressor output 1.1-6.0kW
Integrated Corrosion resistant hot water cylinder with environmentally friendly insulation for minimal heat loss
Delivered in two parts for easy transportation
Low energy fan
Low energy circulation pump
Scheduling (indoor comfort, hot water, ventilation and holiday mode)
Multicolour TFT display with user instructions
MCS approved
SAP Q rated
UK Building and Water Regulations Approved

NIBE F730

F730 is part of a new generation of heat pumps, which have been introduced to supply your home with inexpensive and environmentally friendly heating. Heat production is safe and economical with integrated hot water heater, immersion heater, circulation pump and control system.

The heat pump can be connected to an optional low temperature heat distribution system. e.g. radiators, convectors or underfloor heating. It is also prepared for connection to several different accessories, for example climate systems with different temperatures.

F730 is equipped with a control computer for good comfort, good economy and safe operation. Clear information about status, operation time and all temperatures in the heat pump are shown on the large and easy to read display. This means, for example, that external unit thermometers are not necessary.

Technical specifications
NIBE™ F730

Heating capacity (PH)*	(kW)	1.15/2.47
COP*		3.18/2.60
Heating capacity (PH)**	(kW)	1.46/4.06
COP**		4.72/2.93
P_{design} 55 °C	(kW)	5
Efficiency class package label 55 °C		A++
Efficiency class hot water / Load profile		A/L
Output immersion heater	(kW)	3
Volume, hot water cylinder	(litre)	180
Corrosion protection		Stainless
Height excl inverter box, incl feet	(mm)	2000-2025
Width	(mm)	600
Depth	(mm)	610
Weight	(kg)	185

* According to EN14511, A20(12)W45 at 108m3/hr ventilation and minimum/maximum compressor speed.
** According to EN 14511, A20(12)W35 at 216m3/hr ventilation and minimum/maximum compressor speed.

Heat pump function

NIBE F730 is a complete exhaust air heat pump for both new installations and replacement in houses or similar.

It has an integrated DC fan and hot water cylinder that has stainless steel corrosion protection. There is an integrated immersion heater.

Energy is recovered from the ventilation air and, if desired, extracted from outdoor air. The energy is then supplied to the heat pump, which reduces energy costs considerably. The device ventilates the house, supplies heat and produces domestic hot water.

NIBE F730 is intended for low temperature radiator circuits and/or under floor heating.

Docking options

NIBE F730 can be connected in several different ways, e.g. to solar panels, two or more heating systems or to an extra electric hot water heater.

M11785 NBD UK F730 1510-1X

NIBE Energy Systems Limited - Tel: 0845 095 1200 - Fax: 0845 095 1201 - www.nibe.co.uk

Technical specifications

CE IP 21

1x230 V		*Stainless*
Output data according to EN 14 511		
Heating capacity (P_H)/COP[1]	kW/-	1.27 / 3.41
Heating capacity (P_H)/COP[2]	kW/-	3.41 / 2.42
Output data according to EN 14 825		
Rated heating output ($P_{designh}$)	kW	5
SCOP cold climate, 35°C / 55 °C	kW	4.65 / 3.57
SCOP average climate, 35 °C / 55 °C	kW	4.35 / 3.38
SCOP warm climate, 35°C / 55°C	kW	4.44 / 3.40
Additional power		
Max power, immersion heater (factory setting)	kW	3.5 (3.5)
Energy rating, average climate		
The product's efficiency class room heating, average climate 35 / 55 °C[3]		A++ / A++
The system's efficiency class room heating, average climate 35 / 55 °C[4]		A+++ / A++
Declared tap profile/efficiency class hot water heating[5]		L / A
Electrical data		
Rated voltage	V	230 V ~ 50 Hz
Max operating current	A	28.3
Min. fuse rating	A	16
Drive output heating medium pump	W	10-75
Driving power exhaust air fan	W	25-170
Enclosure class		IP 21
Refrigerant circuit		
Type of refrigerant		R407C
GWP refrigerant		1774
Volume	kg	0.74
CO_2 equivalent	ton	1.312
Cut-out value pressostat HP	MPa/bar	2.9 / 29.0
Cut-out value pressostat LP	MPa/bar	0.05 / 0.5
Heating medium circuit		
Opening pressure, safety valve	MPa/bar	0.25 / 2.5
Operating pressure (supply line)	MPa/bar	0.2 / 2.0
Max temperature, supply line (factory setting)	°C	70 (60)
Ventilation		
Min. airflow	l/s	21
Sound effect level according to EN 12 102		
Sound power level (L_{WA})[6]	dB(A)	40-55
Sound pressure levels		
Sound pressure level in the installation room (L_{PA})[7]	dB(A)	36-51
Pipe connections		
Heating medium ext Ø	mm	22
Hot water ext Ø	mm	22
Cold water ext Ø	mm	22
Ventilation Ø	mm	125

1 A20(12)W45, exhaust air flow 42 l/s (150 m³/h) min. compressor frequency

2 A20(12)W45, exhaust air flow 42 l/s (150 m³/h) max. compressor frequency

3 Scale for the product's efficiency class room heating: A++ to G.

4 Scale for the system's efficiency class room heating: A+++ to G. Reported efficiency for the system takes the product's temperature regulator into account.

5 Scale for efficiency class hot water: A to G.

6 The value varies with the selected fan curve. For more detailed sound data, including sound to channels, visit nibe.eu.

7 The value can vary with the room's damping capacity. These values apply at a damping of 4 dB.

Other 1x230 V		*Stainless*
Water heater and heating section		
Volume heating section	litre	10
Volume, hot water heater	litre	180
Max pressure in hot water heater	MPa/bar	0.65 / 6.5
Capacity hot water heating according to EN 12 897		
Maximum water supply pressure	MPa/bar	1.6 / 16
Operating pressure, tap water	MPa/bar	0.6 / 6.0
Expansion vessel, tap water, precharge pressure	MPa/bar	0.35 / 3.5
Volume expansion vessel (external)	litre	18
Pressure reduction valve, setting	MPa/bar	0.3 / 3.0
Max operating pressure of T&P-valve	MPa/bar	0.7 / 7.0
Max operating temperature T&P-valve	°C	95
Discharge capacity of T&P-valve	kW	25
Set opening pressure expansion valve tap water	MPa/bar	0.6 / 6.0
Cut out, temperature limiter	°C	80
Heating time 15 °C to 60 °C	h min	2 h 55 min
Capacity charge coil, 15 °C to 60 °C, primary flow 900 l/h	kW	2.9
Pressure drop at 900 l/h	kPa	15
Tap volume 40 °C[1]	litre	168.2
Idle loss	kWh/24 h	2.02
Dimensions and weight		
Width	mm	600
Depth	mm	610
Height excl. inverter box, incl. feet	mm	2000 - 2030
Required ceiling height	mm	2,170
Net weight	kg	185
Mass unit, filled with water	kg	375
Part No.		066 156

1 Comfort mode, normal

NIBE Exhaust Air Heat Pump (EAHP)

Domus Ventilation Ducting Specification

Issue 1

1. Introduction

1.1 When ventilation based on opening windows, simple extract fans, passive systems or central extract is used, the energy from the inside air is wasted. In contrast to this, controlled domestic ventilation with heat recovery reuses the energy from the exhausted air; not only that, the additional heat generated internally from lighting, occupants and domestic appliances can be utilised through heat recovery.

1.2 **NIBE** exhaust air heat pumps facilitate heat recovery and supply the energy recovered from the exhaust air for domestic hot water and heating.

1.3 Not only does energy recovery ensure a healthy and comfortable form of heating, it also produces considerable savings in terms of heat energy and associated carbon dioxide emissions.

1.4 All new domestic ventilation systems must be designed and installed in accordance with Building Regulations, England and Wales Approved Document F or Scotland Technical Standard Section 3.14 Ventilation; **NIBE** EAHP systems are no exception being classified as Type 3 or Mechanical Extract Ventilation (MEV) systems; this will help achieve excellent indoor air quality and prevent damp problems to the building fabric or structure.

1.5 To be able to ensure a high level of efficiency and a comfortable living environment, we recommend that the installation of the ventilation system should be carefully planned, and this plan must be strictly adhered to by the ventilation installer.

1.6 In operation, waste air is extracted via sealed plastic ducting from the bathrooms, toilets, kitchen and utility room ("wet rooms"); at the same time, the equivalent volume of fresh air should enter the building via bespoke wall vents into the living rooms and bedrooms or in the case of the **NIBE 470**, through air supply ducting as this unit is classified as Type 4 or Mechanical Ventilation with Heat Recovery (MVHR). An additional, ducted, outdoor air supply is required for the **NIBE F730.** This allows outdoor air to mix into the exhaust air via the supplied air damper.

1.7 Using heat pump technology the waste air is converted into a usable heat source sufficient to heat water for both the heating system and domestic hot water.

2. Planning

2.1 **Domus Ventilation** offer a free design and scheduling service that is based on the following statements:

3. Replacement Air

3.1 For the provision of replacement air, a **Fresh TL98F** fresh air supply kit must be installed in every habitable room other than "wet" rooms within in the property.

3.2 The kits must be installed as per manufacturer's instructions and should be positioned to provide maximum air circulation throughout the property.

3.3 A minimum of four kits must be installed to support a **NIBE F370** and a minimum of 3 kits to support a **NIBE 730** (the **NIBE F470** has its own ducted fresh air supply) in order for the heat pump to work correctly and efficiently. Therefore, some combined use living areas may require two inlets.

3.4 The internal grilles must be positioned so that they are unlikely to be covered by curtains or blinds. Also, due consideration should be given to access to the internal grilles by the occupier for future cleaning of the integral filter.

4. Ducting

4.1 The duct size used is determined by the diameter of the duct connections fitted to the heat pump housing. The **NIBE F370**, **F470** and **F730** units all have 125mm duct connections, therefore either **Domus Ventilation EasiPipe 125** or its rectangular equivalent, **Domus Ventilation System 125 (204x60mm)** or a mixture of the two should be employed throughout the whole design.

4.2 The outdoor air supply for the **NIBE F730** requires 125mm diameter ducting for connection to the supplied air damper.

4.3 All duct runs should be as short and as straight as possible and 45 degree bends should be fitted in preference to 90 degree bends to reduce the duct system resistance and hence improve overall airflow performance.

4.4 The use of flexible hose should be avoided, however if it is necessary to make a small offset in the ducting, the **Domus Ventilation Universal Duct Ref. 5B303** should be used either singly or in multiples; furthermore, both of the heat pump duct runs should have a **Domus Ventilation Universal Duct Ref. 5B303** fitted near to the heat pump to both isolate any fan noise being transmitted through the ducts and to assist with the alignment of the duct runs to the heat pump housing duct connections.

5. Joint Sealing

5.1 To ensure optimum performance is achieved by the heat pump and to avoid damage from condensate leakage, all duct joints must be **100%** sealed with **Domus Ventilation Ref. DDSEAL** acrylic intumescent duct sealant and tape.

5.2 For heat pump systems, duct sealing tape or solvent weld should only be used in conjunction with non-hardening sealant. The use of mechanical fixings is unnecessary and should be avoided as these will create air leaks and may corrode in a moist air stream.

6. Mounting

6.1 The ducting should be supported using **Domus Ventilation Ref. 522** surface mounting clips for **Domus System 125** or **Domus Ref. 596** surface mounting clips for **Domus EasiPipe 125**. The use of alternative good quality proprietary duct support systems or products such as galvanised steel strapping is an acceptable alternative, however care must be taken to ensure that the ducting or insulation is not damaged or pierced.

6.2 It is recommended that the ducting is supported every 0.5m and either side of a joint to provide extra mechanical strength.

7. Insulation

7.1 To avoid condensation forming inside the extract duct from the wet rooms, the duct should be insulated if it passes through an area likely to be colder than the temperature of the extract air e.g. when passing through a cold loft space. In these instances, **Domus Thermal** insulation should be used in conjunction with **Domus Ventilation** rigid duct systems. For **Domus EasiPipe 125** parts include **TS1100-5, TS590, TS591** and **TS592** and for **Domus System 125** parts include **TS510, TS550, TS555, TS582, TS575** and **TS540**. Alternatively **Domus EasiPipe 125** and **Domus System 125** should be wrapped with **Domus Ref. 10TP12** insulation sheet. In each case, the vapour barrier should be made airtight using **Domus Ventilation Ref. 50TP45** or **50TP100** aluminium duct sealing tape.

7.2 Insulation is required for the entire length of the **NIBE F730** outdoor air duct

7.3 If it is more practical to use a flexible hose in this situation, **Domus Ventilation Ref. 5210** insulated flexible hose should be employed, again making good the vapour barrier with **Domus Ventilation Ref. 50TP45** tape

7.4 Due to the excellent efficiencies achieved by the heat pumps, the exhaust air will have reduced in temperature by such an extent that condensation will form on the outside of the exhaust duct leading to potential moisture damage to adjacent surfaces such as plasterboard ceilings. To counter this, the exhaust duct must be insulated in the same way as previously described.

7.5 An acceptable alternative in both cases is the use of proprietary insulation having a thermal insulation value equal to or lower than 0.04W/m.K.

8 Air Valves

8.1 **Domus Ventilation Ref. 136-25** ceiling mounted adjustable air valves should be fitted for the provision of extraction in all wet rooms. A choice of Domus Ventilation Architectural grilles and flow control plenums are also available

8.2 Air valves should be positioned to provide maximum air circulation through rooms i.e. the optimum fitting position is at high (ceiling) level diagonally opposite the door into the room.

8.3 By rotating the central cone, infinitely variable air flow rates can be achieved in order to provide the prescribed amount for any particular room; for example, 8 l/s extract rate from a bathroom or 13 l/s from a kitchen. This rotation would occur at the plenum when using the architectural grilles

8.4 When commissioning is complete the valve adjustment should be fixed using the lock-nut provided.

9. Fire-Stopping

9.1 Building Regulations, England and Wales Approved Document B states that, if a fire-separating element is to be effective, then every opening to allow services to pass through the element should be adequately protected by sealing or fire-stopping so that the fire resistance of the element is not impaired.

Taken from Approved Document B

9.13 Every wall separating semi-detached houses, or houses in terraces should be constructed as a compartment wall and the houses should be considered as separate buildings.
9.14 If a domestic garage is attached to (or forms an integral part of) a house, the garage should be separated from rest of the house by compartment walls and ceiling.
9.15 In buildings containing flats or maisonettes the following should be constructed as compartment walls or compartment floors:
- *a. Every floor (unless it is within a maisonette, i.e. between one storey and another within a dwelling); and*
- *b. Every wall separating a flat or maisonette from any other part of the building; and*
- *c. Every wall enclosing a refuse storage chamber*

9.2 **Domus EasiPipe 125** or **Domus System 125** penetrations should be fire-stopped when required. For **Domus EasiPipe 125** use **Domus Ventilation Fire Sleeve Ref. DFS125,** or **Fire Collar DFSV125** or **Firebrake+ FBS125H** depending on fire strategy. For **Domus System 125** use **Domus Ventilation Fire Sleeve DFS204** or **Firebrake+ FBS20460H** depending on fire strategy. Make good using **Domus Ventilation Ref. DDSEAL** acrylic intumescent sealant.

9.3 **IMPORTANT - IF IN DOUBT - SEEK ADVICE.**

10. Noise

10.1 To reduce fan noise and/or noise from rooms connected by common duct systems (cross-talk), duct silencers should be fitted near to each room inlet valve.

10.2 **Domus Ventilation** silencers are available in two sizes, both measuring 0.5m in length. **Domus Ventilation Ref. 5SL-500** is 204x60mm size and **Domus Ventilation Ref**. 9SL-500 is 220x90mm size.

10.3.1 **Domus Ventilation** silencers can be supported using four **Domus Ventilation Ref. 922** support clips or by following the guidance provided in section 6 and should be sealed into the duct run using **Domus Ventilation Ref. DDSEAL** acrylic intumescent sealant and tape.

11. Further Assistance

11.1 Technical assistance and literature is available by e-mailing vent.projects@domusventilation.co.uk or calling the number shown below.

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