NRG CONSULTING

Vacant site adjacent No. 1
Narcissus Road, and to the rear
of 132/134 Mill Lane,
London,
NW6 1NE

Energy and Sustainability Statement

June 2023

CONTENTS

DOCUMENT CONTROL SHEET	
Report Reference	PP2079/NR/ES/202306-EC
Issue Purpose	Updated Following Planning Comments
Revision	D
Client	Rare Origins Ltd
Author	Edward Coate
Approved By	Ryan Thrower
Date of Issue	20th June 2023

DISCLAIMER

1. EXECUTIVE SUMMARY

1.1 NRG Consulting have been appointed to undertake an Energy and Sustainability Statement (otherwise referred to as an Energy Statement) on a proposed development at **the Vacant Land at No1 Narcissus Road, NW6 1NE**, situated within the **London Borough of Camden.**

The proposed development is described as : *"Erection of four-storey building for use as 7 residential flats, including outdoor amenity space, refuse, recycling and cycle storage"*

1.2 SAP calculations have been undertaken and this document illustrates a reduction in CO_2 emissions over the baseline of Part L 2021 via:

Energy Efficient Measures (*Be Lean*)

- High levels of thermal insulation to achieve U-Values lower than the Part L 2021 notional building specification.
- LED Lighting with high luminous efficacy (85lm/W)
- Decentralised Mechanical Extract Ventilation (0.2 SFP)
- Air Permeability target of 4 m3/(hm2) @50Pa
- Time and Temperature Zone Controls

Decentralised Energy (*Be Clean*)

Due to the small size and heat demand of the scheme and the distance from the scheme to any proposed district heating networks, no connection too nor provision for a future connection has been allowed for.

Renewable Technologies (*Be Green*)

The apartments will be served by individual ASHPs. This has been currently modelled using a Vaillant Arotherm.

1.3 A carbon emissions table is shown below illustrating the savings at each stage of the energy hierarchy.

1.4 This report illustrates how the design of the proposed development has been developed to incorporate energy efficient features and renewable energy to achieve a **73.40% reduction.**

	CO_2 Emissions (Tonnes per Annum)	
	Regulated	
Baseline: Part L 2021 of the Building Regulations (TER)	**6.4**	**Regulated CO_2 Savings at *'Be Lean'* over Part L 2021** **4.04 %**
Be Lean: Energy Demand Reduction	**6.1**	
Be Clean: Supply Energy Efficiently	**6.1**	
Be Green: Renewable Energy (DER)	**1.7**	
Regulated CO_2 Savings at 'Be Green' over Part L 2021	**73.40%**	
Savings via Renewable Energy	**72.28%**	

Table: Carbon Emissions Table

2. POLICY FRAMEWORK

2.1 The proposed development falls within the Government's **"minor"** category of planning applications. **The site also falls within the "medium" designated under Camden Planning Guidance**[1]

NATIONAL POLICY – NPPF (2021)

The delivery of sustainable development is at the foundation of the NPPF, which defines it as "meeting the needs of the present without compromising the ability of future generations to meet their own needs.

REGIONAL POLICY

The London Plan - March 2021	
The London Plan sets out high-end goals for the whole of London based on the Energy Hierarchy. It also states that its overarching goal is for London to become a zero-carbon city. This will require reduction of all greenhouse gases, of which carbon dioxide is the most prominent. Local Boroughs should ensure that all developments maximise opportunities for on-site electricity and heat production and reduce carbon emissions in-line with the stages of the Energy Hierarchy. In-line with the Zero Carbon Policy, all CO_2 emissions should be offset via a mixture of on-site and off-site measures.	
Policy SI2	Minimising greenhouse gas emissions
Policy SI3	Energy Infrastructure
Policy SI 4	Managing heat risk
Energy Assessment Guidance: Greater London Authority Guidance on preparing energy assessments as part of planning applications (June 2022)	

1 https://www.camden.gov.uk/documents/20142/4823269/Energy+efficiency+CPG+Jan+2021.pdf/96c4fe9d-d3a4-4067-1030-29689a859887?t=1611732902542

GLA – Energy Assessment Guidance (June 2022);

On 15th June 2022, with the implementation of Part L of the Building Regulations (2021) and SAP 10.2 a new GLA guidance note was released to supersede the April 2020 guidance.

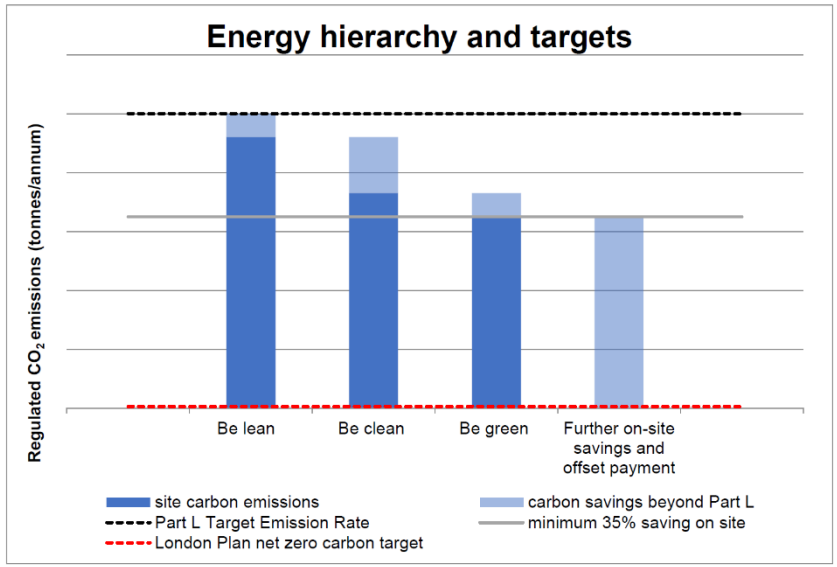
The main clarification of the June 2022 guidance was to confirm that the minimum expected carbon reduction on-site was to remain at 35% better than Part L 2021; the same target as the previous Building Regulation version. A new benchmark target of 50% better than Part L 2021 has been introduced for residential developments also. The cover note for the new version states:

Background

On 15 June 2022, national building regulations were updated to enhance energy performance standards for new buildings through Part L 2021. A new Part O 2021 was also introduced, updating requirements to tackle overheating.

The Mayor's Energy Assessment Guidance has been updated to explain how London Plan policy should be applied now that these regulations have taken effect. This note summarises the key updates.

Part L 2021 is a stepping-stone towards the Future Homes Standard and Future Buildings Standard which the Government is expected to consult on in 2023 and introduce in 2025.



LOCAL POLICIES

2.2 The following Planning Policies from the local authority are relevant to this report:

London Borough of Camden Local Plan (2017)

Policy CC1 Climate change mitigation

The Council will require all development to minimise the effects of climate change and encourage all developments to meet the highest feasible environmental standards that are financially viable during construction and occupation.

We will:

a. promote zero carbon development and require all development to reduce carbon dioxide emissions through following the steps in the energy hierarchy;
b. require all major development to demonstrate how London Plan targets for carbon dioxide emissions have been met;
c. ensure that the location of development and mix of land uses minimise the need to travel by car and help to support decentralised energy networks;
d. support and encourage sensitive energy efficiency improvements to existing buildings;
e. require all proposals that involve substantial demolition to demonstrate that it is not possible to retain and improve the existing building; and
f. expect all developments to optimise resource efficiency.

For decentralised energy networks, we will promote decentralised energy by:

g. working with local organisations and developers to implement decentralised energy networks in the parts of Camden most likely to support them;
h. protecting existing decentralised energy networks (e.g. at Gower Street, Bloomsbury, King's Cross, Gospel Oak and Somers Town) and safeguarding potential network routes; and
i. requiring all major developments to assess the feasibility of connecting to an existing decentralised energy network, or where this is not possible establishing a new network.

To ensure that the Council can monitor the effectiveness of renewable and low carbon technologies, major developments will be required to install appropriate monitoring equipment.

Policy CC2 Adapting to climate change

The Council will require development to be resilient to climate change.

All development should adopt appropriate climate change adaptation measures such as:

a. the protection of existing green spaces and promoting new appropriate green infrastructure;
b. not increasing, and wherever possible reducing, surface water run-off through increasing permeable surfaces and use of Sustainable Drainage Systems;
c. incorporating bio-diverse roofs, combination green and blue roofs and green walls where appropriate; and
d. measures to reduce the impact of urban and dwelling overheating, including application of the cooling hierarchy.

Any development involving 5 or more residential units or 500 sqm or more of any additional floorspace is required to demonstrate the above in a Sustainability Statement.

Sustainable design and construction measures

The Council will promote and measure sustainable design and construction by:

e. ensuring development schemes demonstrate how adaptation measures and sustainable development principles have been incorporated into the design and proposed implementation;
f. encourage new build residential development to use the Home Quality Mark and Passivhaus design standards;
g. encouraging conversions and extensions of 500 sqm of residential floorspace or above or five or more dwellings to achieve "excellent" in BREEAM domestic refurbishment; and
h. expecting non-domestic developments of 500 sqm of floorspace or above to achieve "excellent" in BREEAM assessments and encouraging zero carbon in new development from 2019.

The Energy Hierarchy

The Council's Sustainability Plan 'Green Action for Change' commits the Council to seek low and where possible zero carbon buildings. New developments in Camden will be expected to be designed to minimise energy use and CO2 emissions in operation through the application of the energy hierarchy. It is understood that some sustainable design measures may be challenging for listed buildings and some conservation areas and we would advise developers to engage early with the Council to develop innovative solutions.

The energy hierarchy is a sequence of steps that minimise the energy consumption of a building. Buildings designed in line with the energy hierarchy prioritise lower cost passive design measures, such as improved fabric performance over higher cost active systems such as renewable energy technologies. The hierarchy comprises of the *Be Lean, Be Clean, Be Green and Be Seen* stages (the latter stage for minor developments and outside of the scope of this report).

All developments involving five or more dwellings and/or more than 500 sqm of (gross internal) any floorspace will be required to submit an energy statement demonstrating how the energy hierarchy has been applied to make the fullest contribution to CO2 reduction. All new residential development will also be required to demonstrate a 19% CO2 reduction below Part L 2013 Building Regulations (in addition to any requirements for renewable energy). This can be demonstrated through an energy statement or sustainability statement.

The Council will expect developments of five or more dwellings and/or more than 500 sqm of any gross internal floorspace to achieve a 20% reduction in carbon dioxide emissions from on-site renewable energy generation, unless it can be demonstrated that such provision is not feasible. This is in line with stage three of the energy hierarchy 'Be green'. The 20% reduction should be calculated from the regulated CO2 emissions of the development after all proposed energy efficiency measures and any CO2 reduction from non-renewable decentralised energy (e.g. CHP) have been incorporated.- Source - Camden Energy efficiency and adaptation CPG (Jan 2021)

The above can be seen within the first table of Section 1 and is a renewable contribution of 72.28%.

The on-site reduction target both for CO2 reduction and from renewable contribution has been met and therefore no CO2 offset is required.

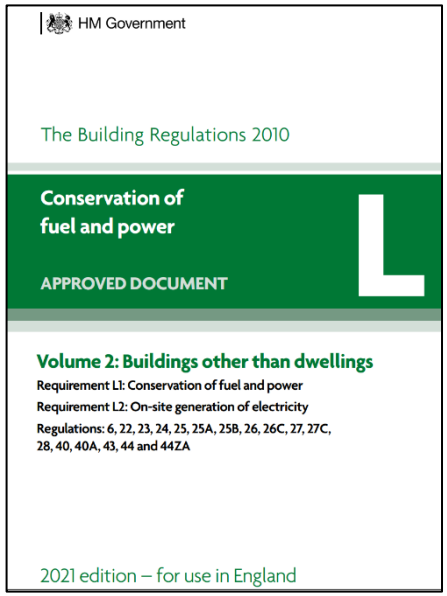
BUILDING REGULATIONS (PART L 2021 & FUTURE HOMES STANDARD)

2.3 On 24th July 2018 the Department for Business Energy & Industrial Strategy (BEIS) published their update to SAP 9.92 (Part L 2013), called SAP 10.

In October 2019, the Ministry of Housing, Communities and Local Government (MHCLG) then issued consultation on changes to Part L of the Building Regulations. Dubbed *The Future Homes Standard*, it is an aspiration to ensure all new homes will have low carbon heating and "world-leading levels of energy efficiency" by 2025 and is intended to be the primary driver in achieving the Governments desire to reduce carbon emissions in the creation of new-build housing stock.

On the June 15th, 2022, Part L 2021 of the Building Regulations came into force. As per the requirements, all new homes must produce 31% less CO_2 emissions than that of Part L 2013 in-order to achieve Building Regulation compliance.

2.4 The major change in the regulations is the change in carbon factor of electricity to represent the decarbonisation of the National Grid and the push towards net-zero carbon developments.



3. ENERGY CALCULATIONS - *"Be Lean"*

3.1 In order to estimate the CO_2 emissions for the site, a SAP Calculation has been carried out by a licensed and accredited OCDEA Domestic Energy Assessor using Design SAP 10's online platform.

3.2 The baseline CO_2 emissions covered by Part L 2021 of the Building Regulations will be expressed as the Target Emissions Rate (TER). This covers regulated carbon emissions from:

- Heating
- Cooling
- Hot Water
- Lighting
- Auxiliary (Pumps and Fans)

3.3 Passive Design Measures

Passive design measures utilised by the architect in the concept and development of the schemes design include:

- High levels of insulation have been proposed in excess of the Part L 2021 notional values.
- Through good design and careful construction, air infiltration will be minimised and thus a low Air Permeability target has been sort.
- Optimising orientation and site layout to reduce energy demand.
- Provision of cross-ventilation.
- High performance glazing system and façade design to reduce heat demand and increase solar gains.
- Thermal Bridging has been reviewed and appropriate industry schemes have been proposed.

3.4 For the Be Lean scenario, an 89.5% Gas Combi Boiler has been modelled for the heating as per the GLA Guidance on Energy Statements (June 2022). The purpose of modelling a Gas Boiler is to create a theoretical scenario where the carbon reduction by non-renewable energy measures can be quantified.

ELEMENT	PART L1a LIMITING FABRIC PARAMETERS	PROPOSED U-VALUES (W/m^2K)
Walls		
External Walls	*0.26 W/m^2K*	**0.17 W/m^2K**
Sheltered Walls	*0.26 W/m^2K*	**0.17 W/m^2K**
Party Walls	*0.0 W/m^2K*	**0.0 W/m^2K**
Floors		
Ground Floor	*0.18 W/m^2K*	**0.12 W/m^2K**
Roof		
Main Roof	*0.16 W/m^2K*	**0.12 W/m^2K**
Openings		
Windows	*1.6 W/m^2K*	**1.3 W/m^2K**
Air Permeability		
4 $m^3/(hm^2)$ @50Pa		
Thermal Bridging		
CBA Full Fill details		

***Table**: Proposed Fabric Specification*

3.5 Active Design

The development will incorporate efficient building services to limit carbon emissions, including:

- A zero-NOx heating system
- LED Lighting
- Time and Temperature Zone Control
- dMEV

ELEMENT	PROPOSED DETAILS
Ventilation	**Decentralized Mechanical Extract Ventilation (0.2 SFP)**
Heating – Be Green	**Vaillant Arotherm (3.5 kW)**
Heating Controls	**Time and Temperature Zone Controls**
Heat Emitters	**Radiators**
Hot Water	**From ASHP**
Lighting	**LED (85 lm/W)**

***Table**: Proposed Mechanical and Electrical Specification*

3.6 Overheating Hierarchy

This development will be Part O compliant and has been designed to avoid Overheating with the early stages of the cooling hierarchy prioritised and with the lack of communal heat distribution and the provision of openable windows (with blinds) being major factors in mitigating any potential risks.

A full assessment for Part O of the Building Regulations will be undertaken prior to commencement on-site but on the next page the GLA Hierarchy is examined.

Cooling Hierarchy	Measures Undertaken
Reduce the amount of heat entering the building through orientation, shading, high albedo materials, fenestration, insulation and the provision of green infrastructure.	High albedo materials will be prioritised where possible. Insulation levels in-line with Part L 2021 notional U-Values have been proposed. Shading will be provided via the Window reveals.
Minimise internal heat generation through energy efficient design:	As the dwellings will be heated by Individual Air Source Heat Pumps, there will be no communal heat infrastructure in the building requiring mitigation.
Manage the heat within the building through exposed internal thermal mass and high ceilings:	Level of exposed thermal mass has been maximised where possible, but it is likely that studwork will be used for internal partitions. The Floor to Ceiling Height exceeds with the requirements of the London Plan (2021)
Provide Passive Ventilation	Openable Windows and MEV is proposed which will allow for night time purge ventilation if required.
Provide Mechanical Ventilation	Mechanical Ventilation with Heat Recovery is not proposed.

	CO_2 Emissions (Tonnes per Annum)	
	Regulated	
Baseline: Part L 2021 of the Building Regulations (TER)	**6.4**	**Regulated CO_2 Savings at *'Be Lean'* over Part L 2021** **4.04 %**
Be Lean: Energy Demand Reduction	**6.1**	

Table: Carbon Emissions Table – *Be Lean*

4. DECENTRALISED ENERGY – *Be Clean*

4.1 In the context of the London Plan, decentralised energy refers to low- and zero-carbon power and/or heat generated and delivered within London. This includes microgeneration, on-site energy networks, through to large-scale heat networks. **The site is not located in a Decentralised Energy Priority Area within Camden as per their guidance map**

4.2 The London Heat Map displays nearby connections to Heat Networks within London including both proposed and future connections as well as displaying areas of heat network opportunities.

Feature	Description/Unit
Nearest Existing District Heat Network	Church Street
Distance from Scheme	3100m
Table: Existing Heat Network Details	

Connection to Existing Heating Networks (and Future Networks)

Feature	Description/Unit
Nearest Proposed District Heat Network	South Kilburn
Distance from Scheme	1800m
Proposed Year of Operation	In construction
Table: Proposed Heat Network Details	

4.3 Based on the type, location, and size of scheme, as well as the high on-site carbon reduction, no connection to an existing or future district heat network is proposed.

London Heat Map

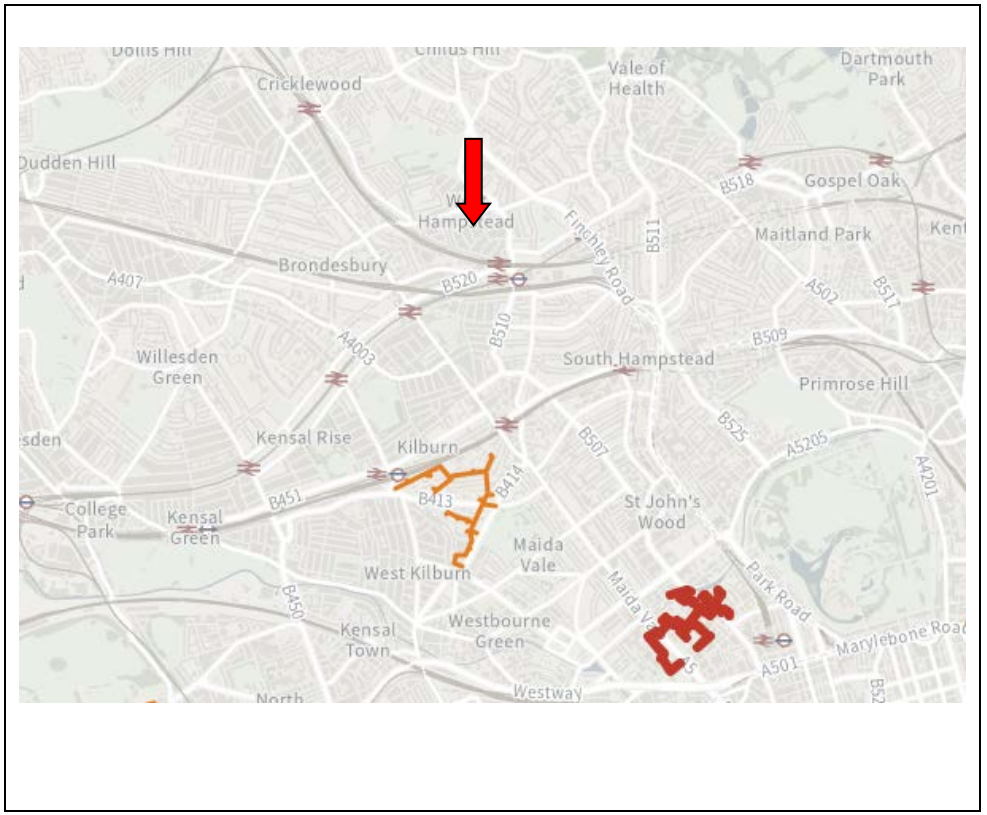


Figure : *London Heat Map*

5. RENEWABLE ENERGY - *"Be Green"*

5.1 The London Plan (2021) defines renewable energy sources as:

"Energy derived from a source that is continually replenished, such as wind, wave, solar, hydroelectric and energy from plant material, but not fossil fuels or nuclear energy. Although not strictly renewable, geothermal energy is generally included."

The London Plan (2021) sets out high-target goals of maximising all possible avenues for renewable energy on site.

5.2 Based on recent legislation such as the Clean Air Act as well as the location of the proposed development, the following technologies have been discounted:

- Wind Turbines
- Biomass
- Hydropower / Wave Technology
- Biogas / Biofuel

5.3 The feasibility of remaining renewable and low carbon technologies is highlighted in the table opposite.

5.4 Following a review of the available technologies, the following have been chosen to be integrated into the scheme:

- Individual Air Source Heat Pumps

FEASIBILITY

Technology	Considerations					Overall Feasibility
	Cost	Noise	Land Use	Tariffs	CO_2 Offset	
Photovoltaic Panels (PV)	There is currently an increased cost of PV installation due to supply-chain issues and shipping costs. This is partially offsetting the decreased payback time that the rise in electricity costs per kWh has created. The CO_2 offset of PV in Part L 2021 is 73.8% less than Part L 2013 therefore carbon savings for the technology are greatly diminished. The main issue with PV to apartments is the fact that it is not practical to directly invert small amounts to each individual apartment for payback and logistic reasons. Therefore, a Landlord Supply connection is the only feasible provision and this brings no financial or on-site benefits to the residents due to the very low communal electricity demand.					**No**
Air Source Heat Pumps (ASHP)	ASHPs provide a low-temperature heating system at high efficiency. ASHPs also work to reduce energy bills onto the end-user over that of standard electric heating. While ASHPs do require an external unit, there is space on this scheme to install them and the current models operate at much quieter levels than historic issues as well as being more aesthetic.					**Yes**
Ground Source Heat Pumps (GSHP)	GSHPs are like ASHPs but operate at slightly higher efficiencies due to drawing heat from the ground, a source that is warmer than the outside air, especially in Winter. However, the technology is more expensive than Air Source and requires either significant horizontal space for a *slinky* style system or deep boreholes as part of a vertical system. As this is not proposed here, ASHPs are more suited to the scheme.					**No**
Solar Thermal	Solar Thermal technologies would only assist with the Hot Water demand for the properties, which Is very limited due to the size of the dwellings. The water cylinder for a solar thermal system would also be much larger and require more cupboard space. This would therefore reduce usable floor area.					**No**

Table: Renewable Energy Feasibility

ASHP Provision & Details

5.6 An Air Source Heat Pump has been proposed to provide the heating and hot water for the scheme. The technology has been chosen because:

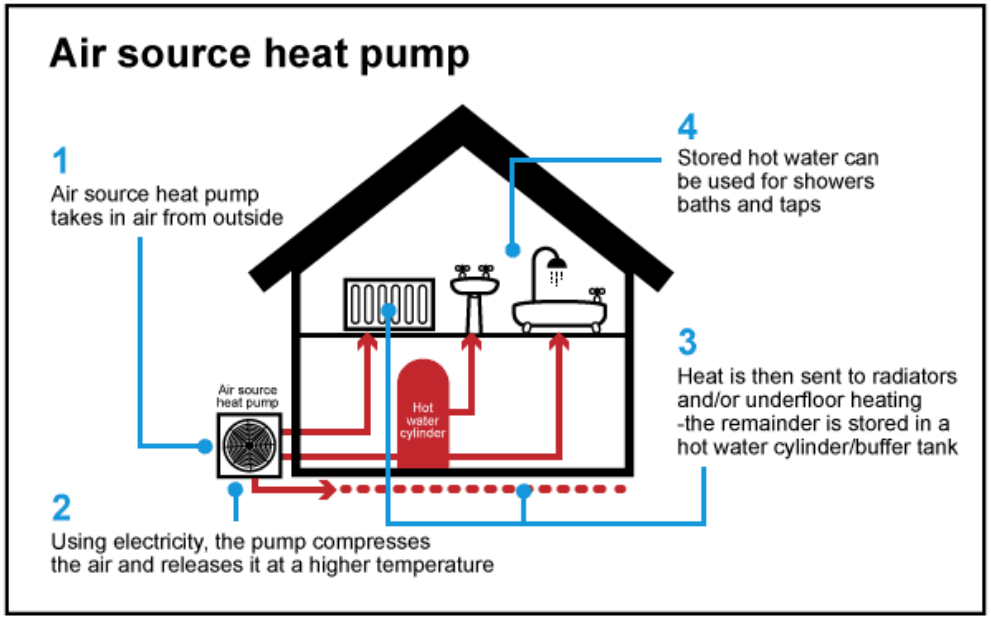
- It is a highly efficient system (400%+) and will provide both the space heating and hot water of the proposed dwelling.
- Requires less capital cost and is simpler to install than Ground Source Heat Pumps
- It is simple to install when compared to other renewable technologies.

5.7 At this early stage, a specific Air Source Heat Pump make, and type (Vaillant Arotherm 3.5 KW) has been modelled to demonstrate compliance.

A final make & model will be supplied during M&E design at RIBA Stage 3 / 4.

ASHP System Details	
Area Used	All
Number of Heat Pumps	7
Size of Heat Pumps	1100 * 765 * 450mm (width * height * depth)
Thermal Store	No
Make and Model	Vaillant Arotherm 3.5 kW
SCOP	4.41
Fraction of Heat	100%

***Table**: Proposed ASHP Specification*



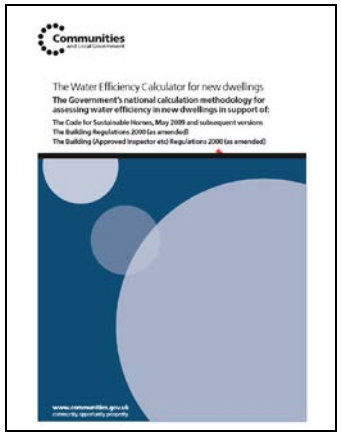
6. WATER EFFICIENCY

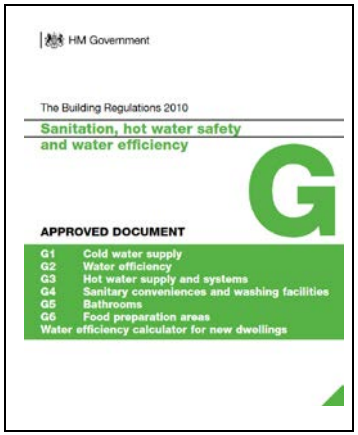
6.1 The Local Plan requires that all developments must incorporate water conservation measures to limit the consumption to 110 litres per person per day.

6.2 This target is the same as the optional target included within Part G of the Building Regulations which encourages the efficient use of potable water. The specification proposed has been produced using the calculation methodology used to assess compliance against the water performance targets in Building Regulations 17.K and is based on the Government's *"The Water Efficiency Calculator for new dwellings – September 2009"* (withdrawn in June 2016).

6.3 The current guidance and calculation methodology can now be found within *Approved Document G - Sanitation, hot water safety and water efficiency* (2015 edition with 2016 amendments): https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/504207/BR_PDF_AD_G_2015_with_2016_amendments.pdf

6.4 The proposed specification for the scheme can be found on the right-hand side of the page showing compliance. For the Dishwashers and Washing Machines, default consumption figures have been used.





PROPOSED SANITARYWARE SPECIFICATION

ELEMENT	SPECIFICATION	UNIT OF MEASUREMENT
WC	***6/3 dual flush***	*Litres per Flush*
Basin Taps	***5***	*Litres per Minute*
Kitchen Sink Taps	***9***	*Litres per Minute*
Shower	***8***	*Litres per Minute*
Bath	***155***	*Capacity to Overflow*
Washing Machine	***8.17***	*Litres per Kilo (Dry)*
Dishwasher	***1.25***	*Litres per Place Setting*
Allowance for External Use	5	*(Litres / Person / Day)*
Total Consumption (Litres / Person / Day)		**109.7**

Table *: Proposed Water Consumption (litres/person/day – Bath and Shower Dwellings*

ELEMENT	SPECIFICATION	UNIT OF MEASUREMENT
WC	***6/3 dual flush***	*Litres per Flush*
Basin Taps	***7***	*Litres per Minute*
Kitchen Sink Taps	***9***	*Litres per Minute*
Shower	***11***	*Litres per Minute*
Washing Machine	***8.17***	*Litres per Kilo (Dry)*
Dishwasher	***1.25***	*Litres per Place Setting*
Allowance for External Use	5	*(Litres / Person / Day)*
Total Consumption (Litres / Person / Day)		**109**

Table : *Proposed Water Consumption (litres/person/day – Shower Only Dwellings*

7. SUSTAINABILITY MEASURES

7.1 The proposed development has incorporated sustainable measures wherever possible through the design and proposals. Some of these are:

Materials

7.2 When considering minimising the environmental impact of materials this requires the specification of materials with a low environmental impact across their lifetime. The BRE's Green Guide rating system focuses on the major building element build ups of the roof, external walls, internal walls, upper and ground floor and windows and rates each element from A+ to E across a range of environmental factors.

7.3 All timber products used on the project, including site as well as construction timber, will be legally harvested and traded timber. No products used in the development should be included on the CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) list.

Additionally, all timber and timber-based products should be procured from suppliers and manufacturers who can provide full Chain of Custody certification for their corresponding products. Certifications that demonstrate full Chain of Custody certification include Forest Stewardship Council (FSC) or Programme for Endorsement of Forest Certification (PEFC).

Insulation

7.4 The insulation for the scheme has been generally specified as Mineral Wool or such based variants.

- ✓ Offers ever decreasing Thermal Conductivity.
- ✓ Achieves an A+ rating when compared to the BRE Green Guide.
- ✓ Has zero ozone depletion potential (zero ODP) and zero global warming potential (GWP).
- ✓ Having BBA certification and Part B compliance.

Transport

7.5 The proposed development is car-free.

7.6 Dedicated and secure cycle storage will be provided in-line with The London Plan and London Borough of Camden requirements. This storage will be in compliance with London Cycling Design Standards (2014).

Construction Waste

7.7 A Site Waste Management Plan (SWMP) will be developed and implemented which will aim to reduce waste generation and target a diversion rate from landfill of up to 95% for non-hazardous construction and demolition waste. The SWMP will be developed to meet the requirements of the local authority.

Opportunities will be investigated to minimise and reduce waste generation in line with the Waste and Resources Action Programme (WRAP) "Halving Waste to Landfill" initiative by:

- Agreeing with material suppliers to reduce the amount of packaging or to participate in a packaging take-back scheme;
- Implementing a 'just in time' material delivery system to avoid materials being stockpiled, which increases the risk of their damage and disposal as waste;
- Prioritising preassembled and prefabricated construction materials, wherever practicable, to minimise onsite generation of waste and packaging and reduce the number of delivery and collection vehicles to and from the Site;
- Paying attention to material quantity requirements to avoid over ordering and generation of waste materials;
- Segregating waste at source where practical;
- Colour coding and signposting skips to reduce risk of cross contamination. Skips will also be covered to prevent dust and debris blowing around the Site, these will be cleared on a regular basis; and
- Not burning wastes or unwanted materials on-site.

Ecology and Biodiversity

7.8 The landscape proposals for the project have been developed with the objectives - among others - to increase biodiversity on site and to provide areas of urban habitat.

7.9 Generally planting that is varied, responsive to the seasons and beneficial to wildlife has been proposed; robustness and ease of maintenance have also been key considerations in selecting planting species.

Planting will be complemented with physical structures such as bird boxes, bat boxes and bee boxes to encourage biodiversity and to provide safe habitat to urban wildlife.

Health and Wellbeing

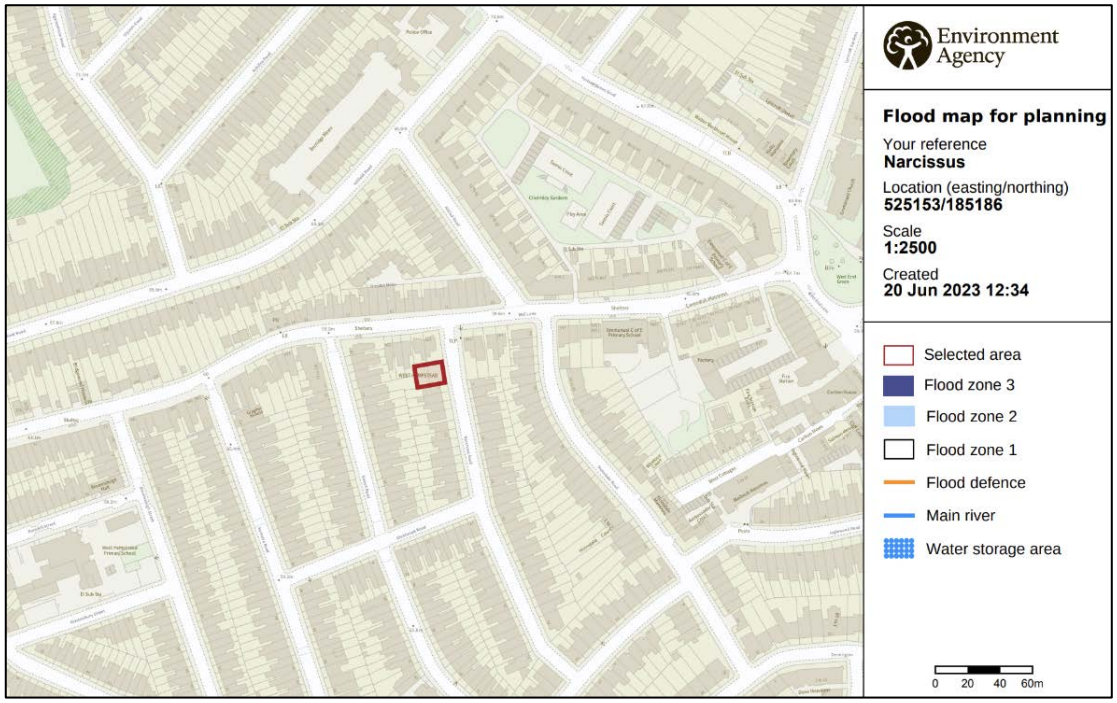
7.10 The development at Narcissus Road is aiming to create a high quality built environment that supports the health, social and cultural well-being of its residents. Below are detailed some of the design principles that contribute to that aim;-

- Good levels of daylight and fresh air ventilation to apartments;
- Where possible, apartments designed as dual aspect to maximise the views of the outside and increase natural light;
- Control of summer overheating to ensure comfortable temperatures in the apartments in-line with new Part O of the Building Regulations;
- Good levels of sound insulation within the apartments;
- Dedicated bicycle store at ground floor;
- Landscaped external amenity space;
- Private cycle storage, no car parking, good pedestrian routes and excellent access to public transport to promote healthy and sustainable transport;
- Excellent accessibility to apartments and facilities to ensure the development is suitable for those with physical impairments;
- Access to recreational amenity within the surrounding area; and
- Selection of schools within the local area

Flood Risk

7.11 Due to the provision of increased soft landscaping, the impermeable area draining to the watercourse will decrease post development, therefore a reduction in peak and volume rate of run-off will occur through the proposed design.

7.12 The Government Flood Risk maps confirms that the site is located in an area with low probability of tidal and fluvial flooding assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%). The Flood Risk Map indicates the site to be at very low risk of surface water flooding with a chance of flooding of greater than 1 in 30 (3.3%),



8. CONCLUSION

8.1 A full energy strategy in-line with the energy hierarchy has been undertaken and this document illustrates a reduction in CO_2 emissions over the baseline of Part L 2021 via:

Energy Efficient Measures (*Be Lean*)

- High levels of thermal insulation to achieve U-Values lower than the Part L 2021 notional building specification.
- LED Lighting with high luminous efficacy (85lm/W)
- Decentralised Mechanical Extract Ventilation (0.2 SFP)
- Air Permeability target of 4 m3/(hm2) @50Pa
- Time and Temperature Zone Controls

Renewable Technologies *(Be Green)*

Individual Air Source Heat Pumps will be provided alongside Underfloor Heating for maximum efficiency and carbon savings.

When the above is considered, the scheme will achieve a **73.40%** reduction at Be Green over that of the Part L 2021 baseline.

This report also demonstrates renewable energy savings of **72.28%**.

8.2 A final carbon emission reduction table is shown on the opposite side of the page illustrating the savings at each stage of the energy hierarchy.

	CO_2 Emissions (Tonnes per Annum)	
	Regulated	
Baseline: Part L 2021 of the Building Regulations (TER)	6.4	Regulated CO_2 Savings at *'Be Lean'* over Part L 2021 4.04 %
Be Lean: Energy Demand Reduction	6.1	
Be Clean: Supply Energy Efficiently	6.1	
Be Green: Renewable Energy (DER)	1.7	
Regulated CO_2 Savings at 'Be Green' over Part L 2021	73.40%	
Savings via Renewable Energy	72.28%	

Table: Carbon Emissions Table

Appendix 1

Narcissus Road

Residential Units - Part L 2021

All Plots	AREA	TER *Part L 2021 Baseline*	Total TER	DER 'Be Lean'	Total BER *'Be Lean'*	DER 'Be Green'	Total DER *'Be Green'*
	m^2	kg CO2/m^2/yr	kg CO2/yr	kg CO2/m^2/yr	kg CO2/yr	kg CO2/m^2/yr	kg CO2/yr
Unit GF E	47	18.37	863	17.35	815	4.72	222
Unit GF W	71	14.35	1,019	14.18	1,007	3.98	283
Unit FF E	47	16.30	766	15.20	714	4.10	193
Unit FF W	71	12.55	891	12.18	865	3.44	244
Unit SF E	47	16.81	790	15.96	750	4.26	200
Unit SF W	71	12.78	907	12.52	889	3.54	251
Unit TF	67	16.94	1,135	16.03	1,074	4.51	302
Total Site Area (m^2):	421	TOTAL TER CO2:	6,372	TOTAL DER CO2:	6,114	TOTAL DER CO2:	1,695

Total Site TER	6,372	kg CO2/yr
Total Site DER	1,695	kg CO2/yr

CO2 Savings at 'Be Green'	73.40%	
CO2 Savings at 'Be Lean'	4.04%	
Renewable Energy Savings	72.28%	

Final CO2 Emissions at 'Be Lean'	6,114	kg CO2/yr
Final CO2 Emissions at 'Be Green'	1695	kg CO2/yr

Appendix 2

Summary for Input Data

elmhurst energy

Property Reference	Unit GF East	**Issued on Date**	16/03/2023
Assessment Reference	Unit GF East BL	**Prop Type Ref**	Unit GF East
Property			

SAP Rating	77 C	**DER**	18.63	**TER**	19.85
Environmental	88 B	**% DER < TER**			6.15
CO_2 Emissions (t/year)	0.7	**DFEE**	45.66	**TFEE**	50.20
Compliance Check	See BREL	**% DFEE < TFEE**			9.05
% DPER < TPER	-9.00	**DPER**	115.86	**TPER**	106.29

Assessor Details	Mr. Edward Coate	**Assessor ID**	Z417-0001
Client	NRG, TBC		

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	South
Property Tenture	1
Transaction Type	6
Terrain Type	Urban
1.0 Property Type	Flat, End-Terrace
Position of Flat	Ground-floor flat
Which Floor	0
2.0 Number of Storeys	1
3.0 Date Built	2023
4.0 Sheltered Sides	1
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Precise calculation
7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	Yes

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	23.50 m	41.16 m²	2.80 m

8.0 Living Area 22.84 m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.17	70.00	53.76	46.58	0.00	None	7.18	Calculate Wall Area
External Wall 2	Timber Frame	Timber framed wall (two layers of plasterboard)	0.17	18.00	12.04	9.94	0.00	None	2.10	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall 1	Filled Cavity with Edge Sealing	Double plasterboard on both sides, twin timber f rame with/without sheathing board	0.00	20.00	20.16		None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall 1	Plasterboard on timber frame	9.00	44.80

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Timber I-joists, carpeted	20.00	41.16

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Ground Floor - Timber	Lowest occupied	Suspended timber, insulation between joists	0.12	None	0.00	20.00	41.16

12.0 Opening Types

Summary for Input Data

elmhurst energy

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Opening Type 1	SAP table	Door to Corridor							1.40
Opening Type 2	Manufacturer	Window	Double Low-E Hard 0.2			0.72		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Opening	Opening Type 2	External Wall 1	East	4.77	
Opening	Opening Type 2	External Wall 1	West	2.42	
Opening	Opening Type 1	External Wall 2	South	2.10	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Calculate Bridges	

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E2 Other lintels (including other steel lintels)	Independently assessed	4.80	0.02	0.02	Yes
E3 Sill	Independently assessed	3.80	0.02	0.02	Yes
E4 Jamb	Independently assessed	19.20	0.02	0.02	No
E5 Ground floor (normal)	Independently assessed	19.20	0.09	0.09	No
E16 Corner (normal)	Independently assessed	14.00	0.05	0.05	No
E18 Party wall between dwellings	Independently assessed	5.60	0.06	0.06	Yes
E5 Ground floor (normal)	Independently assessed	4.30	0.16	0.16	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	19.20	0.03	0.03	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	4.30	0.10	0.10	No
E17 Corner (inverted – internal area greater than external area)	Independently assessed	5.60	-0.09	-0.09	No
P1 Party wall - Ground floor	Independently assessed	7.00	0.16	0.16	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Independently assessed	7.00	0.00	0.00	No

Y-value	0.05	W/m²K
18.0 Pressure Testing	Yes	
Designed AP_{50}	4.00	m³/(h.m²) @ 50 Pa
Test Method	Blower Door	

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Mechanical Ventilation data Type	Data Sheet
Type	Mechanical extract ventilation - decentralised
Duct Type	Rigid
Wet Rooms	1
Brand, Model	DEF

19.1 Mechanical extract ventilation - Decentralised

SFP	Fan/Room Type	Count
0.20	Through Wall Fan Kitchen	1
0.20	Through Wall Fan Other Wet Room	1

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System	No	

22.0 Lighting

No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	85.00	5	425	7

24.0 Main Heating 1	Manufacturer	
Percentage of Heat	100.00	%
Fuel Type	Mains gas	
SAP Code	103	
In Winter	89.50	
In Summer	89.50	

Summary for Input Data

elmhurst energy

Model Name	DEF
Manufacturer	DEF
Controls SAP Code	2110
Delayed Start Stat	Yes
Burner Control	On/Off
Flue Type	Balanced
Fan Assisted Flue	Yes
Is MHS Pumped	Pump in heated space
Heating Pump Age	2013 or later
Heat Emitter	Radiators and Underfloor
Underfloor Heating	Yes - Pipes in thin screed
Boiler Interlock	Yes
Combi boiler type	Standard Combi
Combi keep hot type	Electric, time clock

25.0 Main Heating 2 — None

26.0 Heat Networks — None

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1										
Heat source 2										
Heat source 3										
Heat source 4										
Heat source 5										

28.0 Water Heating

Water Heating	Main Heating 1
SAP Code	901
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
Cold Water Source	From mains
Bath Count	1

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder — None

In Airing Cupboard	No

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
			0	0
			0	0
			0	0

Appendix 3

Summary for Input Data

elmhurst energy

Property Reference	Unit GF East	**Issued on Date**	16/03/2023
Assessment Reference	Unit GF East	**Prop Type Ref**	Unit GF East
Property			

SAP Rating	85 B	**DER**	4.99	**TER**	19.83
Environmental	97 A	**% DER < TER**			74.84
CO_2 Emissions (t/year)	0.19	**DFEE**	45.66	**TFEE**	50.20
Compliance Check	See BREL	**% DFEE < TFEE**			9.05
% DPER < TPER	50.68	**DPER**	52.37	**TPER**	106.19

Assessor Details	Mr. Edward Coate	**Assessor ID**	Z417-0001
Client	NRG, TBC		

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	South
Property Tenture	1
Transaction Type	6
Terrain Type	Urban
1.0 Property Type	Flat, End-Terrace
Position of Flat	Ground-floor flat
Which Floor	0
2.0 Number of Storeys	1
3.0 Date Built	2023
4.0 Sheltered Sides	1
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Precise calculation
7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	Yes

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	23.50 m	41.16 m²	2.80 m

8.0 Living Area 22.84 m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.17	70.00	53.76	46.58	0.00	None	7.18	Calculate Wall Area
External Wall 2	Timber Frame	Timber framed wall (two layers of plasterboard)	0.17	18.00	12.04	9.94	0.00	None	2.10	Enter Gross Area

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)	Shelter Res	Shelter
Party Wall 1	Filled Cavity with Edge Sealing	Double plasterboard on both sides, twin timber f rame with/without sheathing board	0.00	20.00	20.16		None

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Internal Wall 1	Plasterboard on timber frame	9.00	44.80

10.1 Party Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
Party Ceiling 1	Timber I-joists, carpeted	20.00	41.16

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Ground Floor - Timber	Lowest occupied	Suspended timber, insulation between joists	0.12	None	0.00	20.00	41.16

12.0 Opening Types

Summary for Input Data

elmhurst energy

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Opening Type 1	SAP table	Door to Corridor							1.40
Opening Type 2	Manufacturer	Window	Double Low-E Hard 0.2			0.72		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Opening	Opening Type 2	External Wall 1	East	4.77	
Opening	Opening Type 2	External Wall 1	West	2.42	
Opening	Opening Type 1	External Wall 2	South	2.10	

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Calculate Bridges	

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E2 Other lintels (including other steel lintels)	Independently assessed	4.80	0.02	0.02	Yes
E3 Sill	Independently assessed	3.80	0.02	0.02	Yes
E4 Jamb	Independently assessed	19.20	0.02	0.02	No
E5 Ground floor (normal)	Independently assessed	19.20	0.09	0.09	No
E16 Corner (normal)	Independently assessed	14.00	0.05	0.05	No
E18 Party wall between dwellings	Independently assessed	5.60	0.06	0.06	Yes
E5 Ground floor (normal)	Independently assessed	4.30	0.16	0.16	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	19.20	0.03	0.03	No
E7 Party floor between dwellings (in blocks of flats)	Independently assessed	4.30	0.10	0.10	No
E17 Corner (inverted – internal area greater than external area)	Independently assessed	5.60	-0.09	-0.09	No
P1 Party wall - Ground floor	Independently assessed	7.00	0.16	0.16	No
P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	Independently assessed	7.00	0.00	0.00	No

Y-value	0.05	W/m²K
18.0 Pressure Testing	Yes	
Designed AP_{50}	4.00	m³/(h.m²) @ 50 Pa
Test Method	Blower Door	

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Mechanical Ventilation data Type	Data Sheet
Type	Mechanical extract ventilation - decentralised
Duct Type	Rigid
Wet Rooms	1
Brand, Model	DEF

19.1 Mechanical extract ventilation - Decentralised

SFP	Fan/Room Type	Count
0.20	Through Wall Fan Kitchen	1
0.20	Through Wall Fan Other Wet Room	1

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System	No	

22.0 Lighting

No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	85.00	5	425	7

24.0 Main Heating 1	Database	
Percentage of Heat	100.00	%
Database Ref. No.	103728	
Fuel Type	Electricity	
In Winter	0.00	
In Summer	0.00	

Summary for Input Data

elmhurst energy

Model Name	aroTHERM 3.5kW	
Manufacturer	Vaillant Group UK Ltd	
System Type	Heat Pump	
Controls SAP Code	2207	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators and Underfloor	
Underfloor Heating	Yes - Pipes in thin screed	
Flow Temperature	Enter value	
Flow Temperature Value	35.00	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1										
Heat source 2										
Heat source 3										
Heat source 4										
Heat source 5										

28.0 Water Heating

Water Heating	Main Heating 1	
SAP Code	901	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
Cold Water Source	From mains	
Bath Count	1	
Immersion Only Heating Hot Water	No	
28.3 Waste Water Heat Recovery System		
29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.32	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	
31.0 Thermal Store	None	

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
			0	0
			0	0
			0	0

Appendix 4

Technical information

Be ready for the energy change

Vaillant Comfort for your home

Air-to-water heat pumps

A safe investment in the future

State-of-the-art heating technology with minimal environmental impact

Vaillant is continuously advancing the development of heat pump technology. The Vaillant research and development teams constantly strive to develop the most efficient and quiet heat pumps on the market, thoroughly testing them in our own testing centres for durability and performance. For example, we have climate and hail chambers where we can test for robustness and reliability in extreme conditions. Vaillant also manufactures only in Europe, so we can guarantee you and your customers receive the high quality expected from a Vaillant appliance.

Vaillant offers a great new model in our portfolio of air-to-water heat pumps with the introduction of the aroTHERM plus. This award-winning heat pump is the first in our range to use natural refrigerant R290. This refrigerant, commonly used in many household appliances, has a very low Global Warming Potential (GWP) that offers many advantages over refrigerants traditionally used in heat pumps.

The new aroTHERM plus heat pump has technical features for improved efficiency, as well as higher flow temperatures, so it's perfect for new and existing heating systems (including hybrid). It's also impressively quiet in operation and has been accredited by Quiet Mark*.

*Models 3.5, 5, 7 and 12kW

Always the right choice

Reliability and performance of the highest standards ensure peace of mind for your customers. It's so quiet, they won't even know it's on.

High performance

The aroTHERM plus heat pump has been designed to deliver the very best performance with low running costs, making it suitable for radiators as well as underfloor heating. With a flow temperature of up to 75°C, the aroTHERM plus can deliver more usable hot water with high hot water comfort levels and removes the need for direct electric immersion to sterilise the water, protecting from legionella.

Higher energy-efficiency

With a SCOP of up to 5.03, the aroTHERM plus is extremely energy efficient, enabling high energy savings against certain fossil fuels.
The aroTHERM plus can also be combined with photovoltaic systems and integrated into smart power grids (SG-ready), so your customers can enjoy the benefits of variable electricity tariffs.

Super quiet

With sound power as low as 54 dB for easier planning and siting, the aroTHERM plus is suitable for use in densely built-up terraced housing estates.

Natural refrigerant

Already fulfilling the next NZEB requirements, the aroTHERM plus uses monobloc technology with a hermetically sealed refrigerant circuit using the natural refrigerant, R290, to deliver the one of the lowest GWP of 3.

Why R290?
R290 is a natural refrigerant with a very low GWP* of three. This offers the following advantages:

- future-proof, as not affected by the F-Gas Regulation
- higher flow temperature of up to 75°C
- higher hot water comfort and protection against legionella without electric auxiliary heating
- wider performance envelope with operating temperature ranging between -25°C and +46°C
- Already fulfilling the next NZEB requirements, the aroTHERM plus uses monobloc technology with a hermetically sealed refrigerant circuit using natural refrigerant R290 to deliver the one of the lowest GWP of 3
- Reduced refrigerant charge compared to R410a and R32

Natural refrigerants are already used in many areas of our daily lives, e.g. in refrigerators and heat pump tumble-driers

Natural refrigerant GWP 3

Model calculation
R290 (aroTHERM plus)
0.6 kg R290 x 3 GWP **= 1.8 kg CO_2**

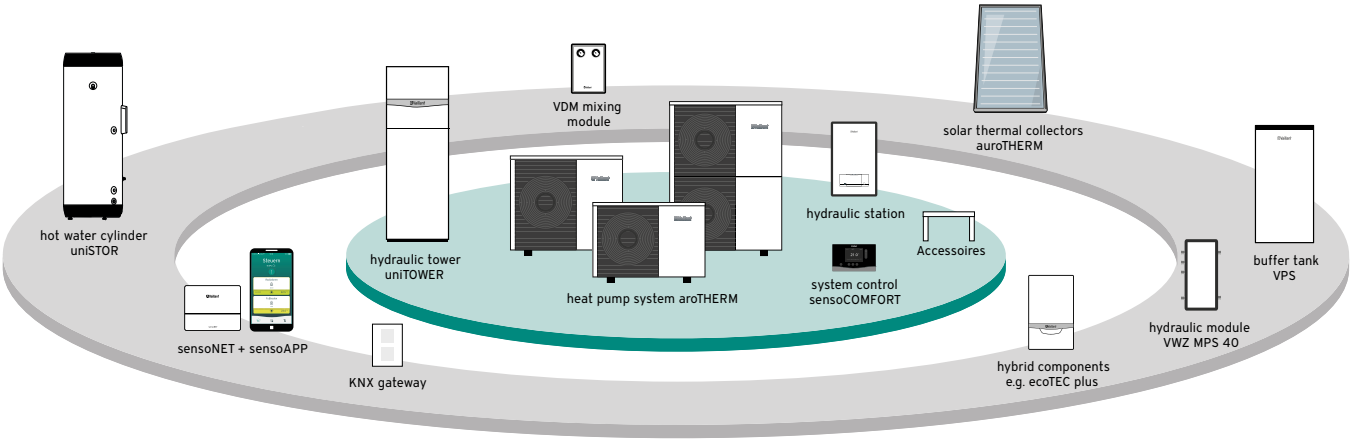
15 km journey by car

*Comparison of refrigerant GWP values:

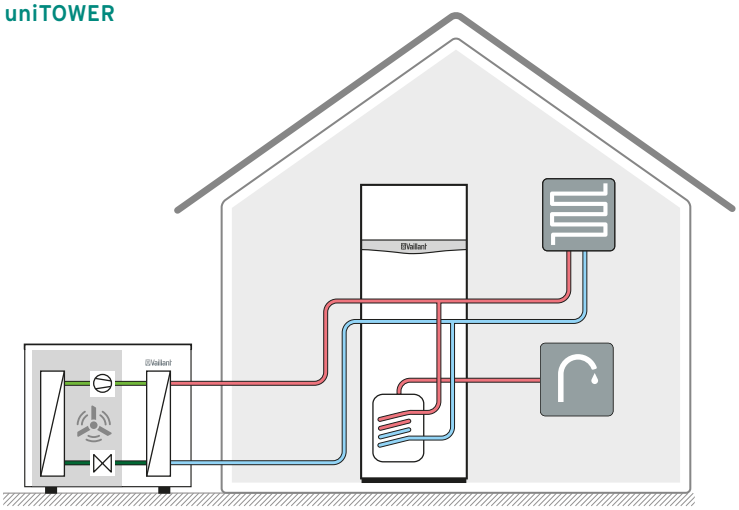
CO_2	1
R290	3
R32	675
R410a	2,088

Introducing the perfect partner

Your customers have widely differing wishes and needs. We offer the system components that enable you to fulfil them all – whether they wish to integrate photovoltaics, a solar-thermal system or smart home technology. All conveniently manageable with a single controller – the new sensoCOMFORT. This enables you to quickly commission the system and lets your customers change daily settings at the flick of a wrist.

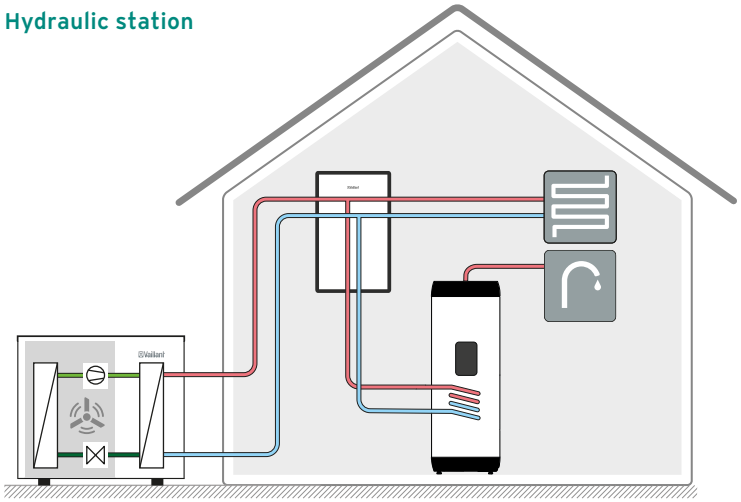


uniTOWER



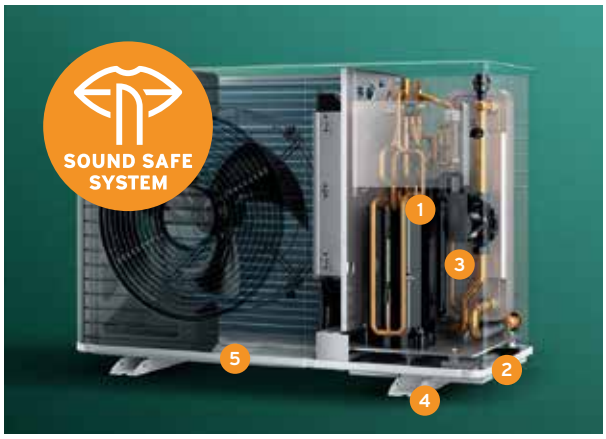
The uniTOWER is an integrated 190 litre cylinder with hydraulic components which can easily provide sufficient hot water for the needs of a family of five, including the use of rain showers. Thanks to its space-saving dimensions, the system is the perfect choice for new buildings. Installed indoors, the uniTOWER is about the size of a fridge freezer and saves valuable space in the room where it's installed.

Hydraulic station



In the case of higher hot water demand, the aroTHERM plus can be used together with a wall-mounted hydraulic station and a wide range of accessories, including the uniSTOR heat pump cylinders and buffer tanks.

Features and benefits



aroTHERM plus

1. Hermetically sealed – no refrigerant certification required
2. Floating floor design absorbs vibration and reduces noise
3. Vortex sensor for accurate performance analysis
4. Weatherproof material and paint make it an ideal choice for coastal areas
5. Integrated tray and trace heater to ensure clear condensation run

uniTOWER

1. 190-litre storage cylinder capacity, corresponds to up to 380-litres of usable hot water output
2. Hydraulic components already integrated, e.g. 15-litre expansion vessel
3. System accessory options, ready for integration, e.g. heating zone packs, 18-litre buffer or system separation plate heat exchanger
4. Modulating electric auxiliary heater with up to 6 kW
5. 3-way diverter valve
6. Electric wiring interface

Hydraulic module

1. Hydraulic components already integrated, including 10-litre expansion vessel
2. Modulating electric auxiliary heater with up to 6 kW
3. 3-way diverter valve
4. Continued use of existing hot water storage cylinders
5. Electric wiring interface

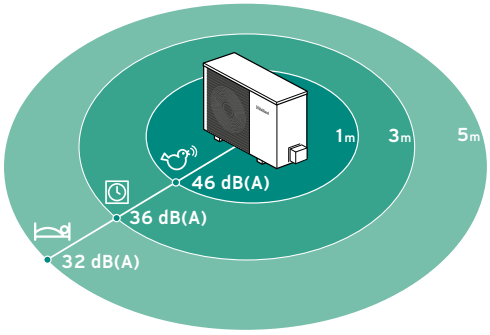
Heat pump interface

- Suitable for standard set-up and hybrid systems
- Heating system components can be placed to suit property layout
- Compatible with all Vaillant heat pump accessories including back-up heater, heat exchanger module and uniSTOR heat pump cylinders

SCOP and heating output

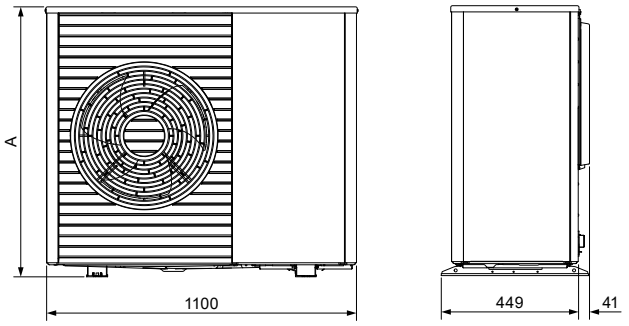
aroTHERM output		35°C flow		40°C flow		45°C flow		50°C flow		55°C flow	
		Output	SCOP	Output	SCOP	Output	SCOP	Output	SCOP	Output	SCOP
3.5kW	-5°C	4.2	4.41	4.1	4.03	4	3.65	3.9	3.37	3.8	3.10
	-3°C	4.6		4.4		4.3		4.2		4	
	0°C	4.7		4.7		4.6		4.5		4.4	
	2°C	4.9		4.9		4.9		4.7		4.6	
5kW	-5°C	6.3	4.48	6	4.13	5.6	3.77	5.5	3.41	5.4	3.06
	-3°C	6.8		6.4		6.1		5.9		5.8	
	0°C	6.9		6.7		6.6		6.4		6.2	
	2°C	7.1		7		6.9		6.7		6.5	
7kW	-5°C	8.2	4.36	8.1	4.13	8	3.91	7.5	3.65	7	3.39
	-3°C	8.8		8.6		8.4		7.9		7.4	
	0°C	9.5		9.3		9.1		8.6		8.1	
	2°C	10		9.8		9.6		9		8.5	
10kW	-5°C	9.9	5.03	9.7	4.58	9.4	4.13	9.1	3.85	8.8	3.58
	-3°C	10.7		10.3		10		9.6		9.2	
	0°C	11.9		11.6		11.3		10.7		10.2	
	2°C	12.8		12.5		12.1		11.5		10.9	
12kW	-5°C	13.1	4.88	12.8	4.55	12.5	4.21	11.7	3.92	10.8	3.63
	-3°C	13.9		13.4		12.9		12.1		11.2	
	0°C	15.2		14.6		14.1		13.2		12.3	
	2°C	16		15.5		14.9		13.9		13	

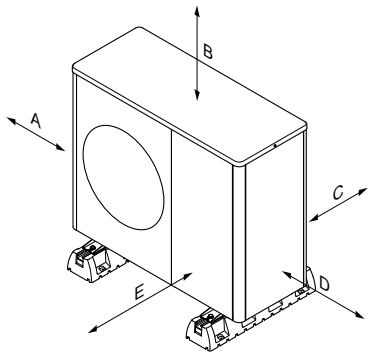
Sound power



Model	Sound Power Level A7/W55	Sound Pressure Level		
		1m distance	3m distance	5m distance
aroTHERM plus 3.5kW	54 dB	46 dB(A)	36 dB(A)	32 dB(A)
aroTHERM plus 5kW	54 dB	46 dB(A)	36 dB(A)	32 dB(A)
aroTHERM plus 7kW	55 dB	47 dB(A)	37 dB(A)	33 dB(A)
aroTHERM plus 10kW	60 dB	52 dB(A)	42 dB(A)	38 dB(A)
aroTHERM plus 12kW	60 dB	52 dB(A)	42 dB(A)	38 dB(A)

Dimensions and clearances



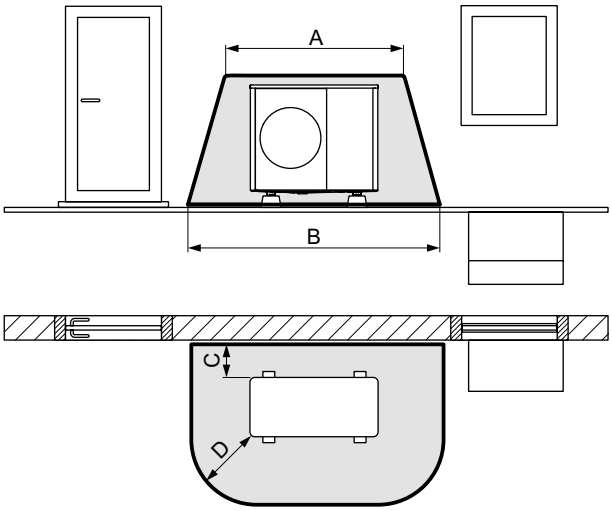


aroTHERM plus	Unit	Dimension A
3.5kW	mm	765
5kW	mm	765
7kW	mm	965
10kW	mm	1565
12kW	mm	1565

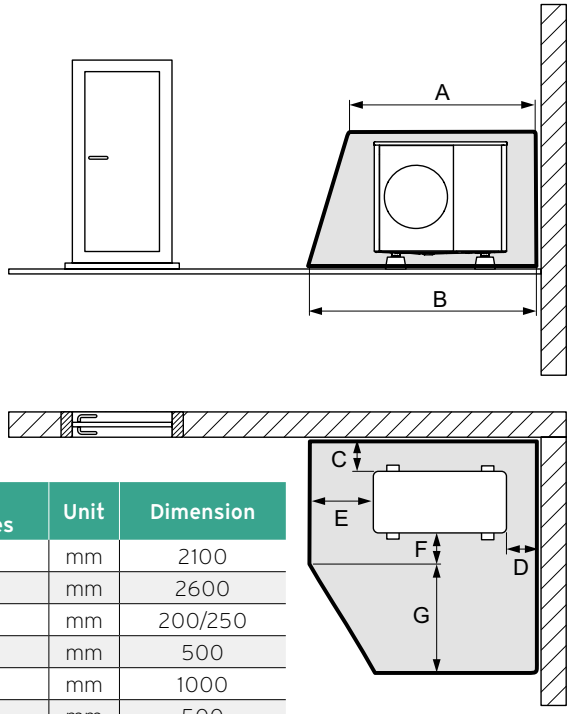
Minimum clearance	Unit	Heating mode	Heating and cooling mode
A	mm	100	100
B	mm	1000	1000
C	mm	200	250
D	mm	500	500
E	mm	600	600

R290 clearances

Clearances required for any drains, light wells or other openings



Minimum clearances	Unit	Dimension
A	mm	2100
B	mm	3100
C	mm	200/250
D	mm	1000

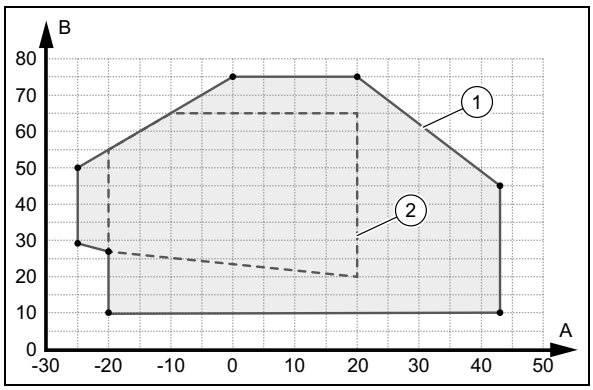


Minimum clearances	Unit	Dimension
A	mm	2100
B	mm	2600
C	mm	200/250
D	mm	500
E	mm	1000
F	mm	500
G	mm	1800

Application limits

heating mode

In heating mode, the product works at outdoor temperatures of -25 °C to 46 °C



A Outdoor temperature

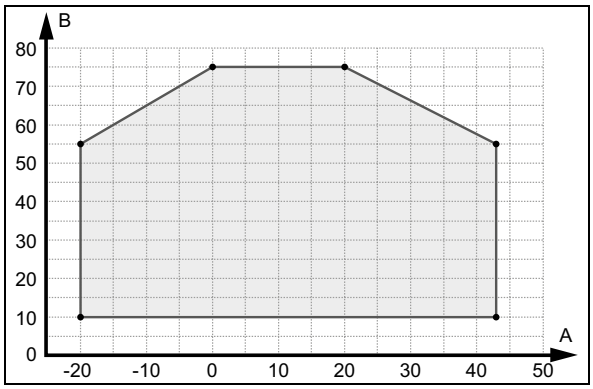
B Heating water temperature

1 Application limits, heating mode

2 Area of application, in accordance with EN 14511

DHW mode

For domestic hot water generation, the product works at outdoor temperatures of -20 °C to 46 °C.



A Outdoor temperature

B Heating water temperature

Technical specifications

aroTHERM plus	Unit	3.5kW VWL 35 / 6	5kW VWL 55 / 6	7kW VWL 75 / 6	10kW VWL 105 / 6	12kW VWL 125 / 6
General						
Width	mm	1,100				
Height	mm	765		965	1,565	
Depth	mm	450				
Weight, ready for operation	kg	114		128	194	
Connection, heating circuit		G 1 1/4"				
Rated voltage	V	230 V (+10%/- 15%), 50 Hz, 1~/N/PE				
Rated current, maximum	A	14.3		15.0	23.3	
Fuse size		16			25	
Fuse type	A	C/D				
RCD type		A				
eBUS (2-core communication cable)	mm2	0.75				
Maximum length eBUS cable (communication cable)	m	50				
IP rating		IP 15 B				
Fan, power consumption	W	40			50	
Fan quantity		1			2	
Fan, air flow , maximum	m^3 /h	2,300			5,100	
Heating pump, power consumption	W	2 - 50			3 - 87	
Heating circuit						
Heating water temperature, minimum/maximum	° C	20 - 75				
Basic length of the heating water pipe, maximum, between the outdoor unit and indoor unit	m	20				
Operating pressure, minimum	bar	0.50				
Operating pressure, maximum	bar	3.00				
Volume flow, minimum	l/h	400		540	995	
Volume flow, maximum	l/h	860		1,205	2,065	
Water volume, in the outdoor unit	l	1.5		2.0	2.5	
Water volume, in the heating circuit, minimum, thawing mode, activated/deactivated back-up heater	l	15 / 40		20 / 55	45 / 150	
Remaining feed pressure, hydraulic	kPa (mbar)	56.0 (560.0)		44.0 (440.0)	55.0 (550.0)	

aroTHERM plus	Unit	3.5kW VWL 35 / 6	5kW VWL 55 / 6	7kW VWL 75 / 6	10kW VWL 105 / 6	12kW VWL 125 / 6
Refrigerant circuit						
Fluid type		R290				
Fluid fill quantity	kg	0.6		0.9	1.3	
Refrigerant, Global Warming Potential (GWP)		3				
CO_2 equivalent	t	0.0018		0.0027	0.0039	
Permissable operating pressure	bar	31.5				
Compressor type		Rotary piston			Scroll compressor	
Compressor oil type		Specific polyalkylene glycol (PAG				
Compressor, control		Electronic				

Noise emissions, heating mode						
Sound power, EN 12102, EN 14511 LWA, A7/W35	dB(A)	51		53	58	
Sound power, EN 12102, EN 14511 LWA, A7/W45	dB(A)	53			58	
Sound power, EN 12102, EN 14511 LWA, A7/W55	dB(A)	54		55	60	

Efficiency		
Energy efficiency class 35°C	(A+++ to F)	A+++
Energy efficiency class 55°C	(A+++ to F)	A++
Combination with uniTOWER		
Energy efficiency class	(A+++ to F)	A++
Energy efficiency class for hot water supply	(A+ to F)	A

uniTOWER	Unit	VIH QW 190 / 6
Total storage cylinder capacity	l	188
Temperature hot water (max. – with auxiliary heating)	°C	55 - 75
Dimensions, unpacked (height/width/depth)	mm	1880 x 599 x 693
Weight, unpacked	kg	175
Auxiliary electric heater	kW	6kW (230V/50Hz) / 9kW (400V/50Hz)

Hydraulic station	Unit	VWZ MEH 97
Dimensions, unpacked (height/width/depth)	mm	720 x 440 x 350
Weight, unpacked	kg	15
Power electric backup heater	kW	6 kW (230V/50Hz) / 9 kW (400V/50Hz)

Description	Article number
aroTHERM plus with heat pump interface	
aroTHERM plus 3.5kW - VWL 35 / 6	0010037211
aroTHERM plus 5kW - VWL 55 / 6	0010037212
aroTHERM plus 7kW - VWL 75 / 6	0010037213
aroTHERM plus 10kW - VWL 105 / 6	0010037214
aroTHERM plus 12kW - VWL 125 / 6	0010037215
aroTHERM plus with hydraulic module	
aroTHERM plus 3.5kW - VWL 35 / 6	0010037206
aroTHERM plus 5kW - VWL 55 / 6	0010037207
aroTHERM plus 7kW - VWL 75 / 6	0010037208
aroTHERM plus 10kW - VWL 105 / 6	0010037209
aroTHERM plus 12kW - VWL 125 / 6	0010037210
aroTHERM plus with uniTOWER	
aroTHERM plus 3.5kW - VWL 35 / 6	0010037201
aroTHERM plus 5kW - VWL 55 / 6	0010037202
aroTHERM plus 7kW - VWL 75 / 6	0010037203
aroTHERM plus 10kW - VWL 105 / 6	0010037204
aroTHERM plus 12kW - VWL 125 / 6	0010037205

Compatible with

uniSTOR

sensoCOMFORT

VRC 700

Accessories	Article number
aroTHERM connection kit for ground install	0010027971
aroTHERM connection kit for ground install extension	0010027972
aroTHERM connection kit for wall install	0010027974
aroTHERM straight pipe connection kit	0010027976
750mm flexihose for air-to-water heat pump (pair)	0020165288
Snow Spacer	0010027984
Wall bracket for insulated wall	0020250224
Wall bracket for non-insulated wall	0020250225
Anti-vibration feet large	0020250226
Anti-vibration rubber feet small	0020252091
Coding resistor active cooling	0020269259
Discharge vessel	0020145563
aroTHERM 45 litre buffer	0010038365
aroTHERM heat exchanger module	0020222285
aroTHERM inline 6kW back-up heater	0020222286
VR 10 temperature sensor	306787
WH40 low-loss header (flow rates up to 3,000 litres per hour)	306720
WH95 low-loss header (flow rates up to 8,000 litres per hour)	306721
VR 32/B eBUS coupler (includes housing)	0020235465
VR 32 eBUS coupler	0020139895
Ball filter valve 28mm	0010038133
uniTOWER accessories	
uniTOWER decoupling module (small) for 3.5 - 7kW model	0010027982
uniTOWER decoupling module (large) for 10 and 12kW model	0010027973
uniTOWER 1" adapter connection kit	0020269275
18l Buffer cylinder for uniTOWER	0020269273
uniTOWER multi-zone kit - 1 direct zone	0020170507
uniTOWER extension set - 2 direct zones	0020170509
uniTOWER extension set - 1 mixed zone	0020170508
Circulation set without pump	0020170502
Circulation set with pump	0020170503
2l brine expansion vessel	0010030975

Description	Pack contents	Article number
VRC 700		
VRC 700 wired, weather compensating programmable room thermostat	-	0020236291
VRC 700f wireless, weather compensating, programmable room thermostat	-	0020259829
One wired heating zone and hot water system	VRC 700, VR 70	0020236292
One wireless heating zone and hot water system	VRC 700f, VR 70	0020259830
One wired heating zone and solar thermal hot water system	VRC 700, VR 70, VR 11	0020236295
One wireless heating zone and solar thermal hot water system	VRC 700f, VR 70, VR 11	0020259833
Two wired heating zones and hot water system	VRC 700, VR 70, VR 91	0020236293
Two wireless heating zones and hot water system	VRC 700f, VR 70, VR 91f	0020259831
Two wired heating zones and solar thermal hot water system	VRC 700, VR 70, VR 11, VR 91	0020259834
Two wireless heating zones and solar thermal hot water system	VRC 700f, VR 70, VR 11, VR 91f	0020259835
Three wired heating zones and hot water system	VRC 700, VR 71, two VR 91	0020236294
Three wireless heating zones and hot water system	VRC 700f, VR 71, two VR 91f	0020259832
VR 70 wiring centre for up to two zones	-	0020184844
VR 71 wiring centre for up to three zones	-	0020184847
VR 91 wired, additional room thermostat	-	0020171334
VR 91f wireless, additional room thermostat	-	0020231566
VR 40 two-in-seven multifunction module	-	0020017744
VR 11 solar collector NTC	-	306788
VR 10 immersion or contact sensor bare ends	-	306787
VR 32 eBUS coupler	-	0020139895
sensoCOMFORT		
sensoCOMFORT wired weather compensating programmable room thermostat	-	0010036819
sensoCOMFORT RF wireless weather compensating programmable room thermostat	-	0010036820
One wired heating zone and hot water system	sensoCOMFORT, VR 71	0010036821
One wireless heating zone and hot water system	sensoCOMFORT RF, VR 71	0010036826
Two wired heating zones and hot water system	sensoCOMFORT, VR 71, VR 92	0010036822
Two wireless heating zones and hot water system	sensoCOMFORT RF, VR 71, VR 92f	0010036827
Three wired heating zones and hot water system	sensoCOMFORT, VR 71, 2x VR 92	0010036823
Three wireless heating zones and hot water system	sensoCOMFORT RF, VR 71 and 2x VR 92f	0010036828
Four wired heating zones and hot water system	sensoCOMFORT, VR 71, VR 70, 3x VR 92	0010036824
Five wired heating zones and hot water system	sensoCOMFORT, VR 71, VR 70, 4x VR 92	0010036825
VR 10 immersion or contact sensor bare ends	-	306787
VR 32 eBUS coupler	-	0020139895
VR 70 wiring centre	-	0020184844
VR 71 wiring centre	-	0020184847
VR 92 wired additional room thermostat	-	0020260925
VR 92f wireless additional room thermostat	-	0020260940
sensoNET internet gateway	-	0020260963
VR 40 two-in-seven multifunctional module	-	0020017744
VR 32/B eBUS coupler (includes housing)	-	0020235465

Our experience is your guarantee

For over 140 years, Vaillant has been among the technology leaders when it comes to innovative heating solutions, with specific expertise in the area of heat pumps for more than 40 years. Our proprietary solutions - many of which are patented - have made this technology reliable, efficient and suitable for everyday life. More than 200,000 heat pumps installed around the world prove this in use each day. Benefit from our experience:

- Products developed in Germany and manufactured exclusively in the EU
- 100% test for each heat pump on the production line
- Toughest weather conditions simulated at our own test centres, in cold chambers with temperatures down to –25°C
- Vaillant heat pumps are among the quietest on the market
- High level of safety due to use of playground standards
- Quality management as per EN ISO 9001 and EN ISO 14001

Climatic chambers simulate all possible operating conditions

Optimisation of components in the acoustic lab

Renewable service and technical enquiries
For technical assistance:
Telephone: 0330 100 3540
Email: aftersales@vaillant.co.uk

General enquiries
If you have a general enquiry our friendly reception staff will happily point you in the right direction:
Telephone: 0345 602 2922

Training enquiries
Vaillant provides many different training courses. For more information:
Telephone: 0345 601 8885
Email: training@vaillant.co.uk

VaillantUK
vaillantuk
VaillantUK
vaillant.uk
Vaillant UK

Vaillant

Heating Hot water Renewables

Vaillant Group UK Ltd.
Nottingham Road, Belper, Derbyshire DE56 1JT
Telephone 0345 602 2922
www.vaillant.co.uk/renewables
info@vaillant.co.uk

VALTB2BSATHERM0420

Appendix 5

Flood map for planning

Your reference	Location (easting/northing)	Created
Narcissus	**525153/185186**	**20 Jun 2023 12:34**

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following:**

- bigger that 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood map for planning

Your reference
Narcissus

Location (easting/northing)
525153/185186

Scale
1:2500

Created
20 Jun 2023 12:34

- Selected area
- Flood zone 3
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Water storage area

0 20 40 60m