39 Fitzjohn's Avenue London NW3 5JY

Energy and Sustainability Statement

Prepared For: 39 Fitzjohn's Avenue LTD

Prepared By:



DSA ENGINEERING

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1. Executive Summary

In support of the planning application for the proposed development at 39 Fitzjohn's Avenue, and to comply with the London Plan and Camden Council's requirements on environmental sustainability and efficient energy design an Energy and Sustainability Statement has been produced.

The Energy Statement contained herein describes the recommended solution to service the proposed development in the most energy efficient and sustainable manner, following the Be Lean, Be Clean, Be Green hierarchy as stipulated by the Greater London Authority (GLA).

The conversion, extension, and refurbishment of the development will result in new and more efficient heating plant being installed, glazing being replaced with double glazed units, improvement fabric efficiency throughout, and water saving techniques to ensure the proposals are in line with Camden's policy requirements set out in Section 2 of this report.

The results of this study recommend the installation of a photovoltaic panel array with an installed capacity of 18.72 kWp to further reduce the carbon emissions from the proposed development.

In line with London Plan guidance, carbon emissions calculations have been produced for the existing unrefurbished condition of the development. The existing development will comprise of a refurbishment and will therefore be assessed against PartL1B of the building regulations, and will be required to provide 'consequential improvements' as part of the works in line with building regulations.

The table below shows the carbon emissions after each stage of the hierarchy.

	Carbon dioxide emissions for domestic buildings (Tonnes of CO2 per annum)	
	Regulated	Unregulated
Baseline: Existing Building	85.25	107.00
After energy demand reduction	42.68	107.00
After heat network / CHP	42.68	107.00
After renewable energy	36.37	107.00

Table 1 Carbon Dioxide Emissions after each stage of the Energy Hierarchy for domestic buildings (existing floors)

The table below shows the different savings at each stage of the energy hierarchy.

	Regulated domestic carbon dioxide savings	
	(Tonnes of CO ₂ per annum)	(%)
Savings from energy demand reduction	42.56	49.9%
Savings from heat network / CHP	0.00	0.0%
Savings from renewable energy	6.31	7.4%
Cumulative on site savings	48.88	57.33%

Table 2 Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for domestic buildings

Through energy efficiency techniques as well as the implementation of renewable technologies as mentioned above, the refurbishment of the existing floors of the proposed development will reduce annual carbon emissions by 48.88 tons of CO_2 . This accounts for a reduction of approximately 57.33% of the building's expected regulated energy carbon emissions.

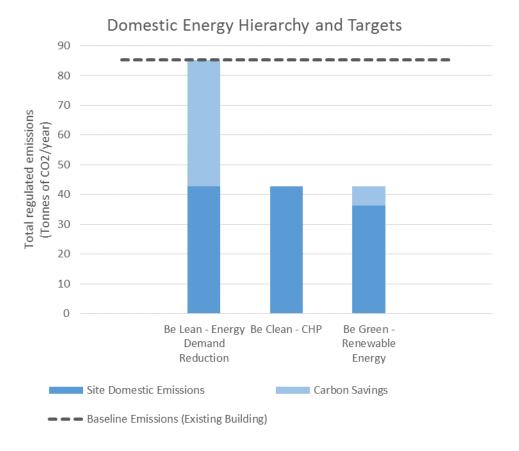


Figure 1 The Domestic Energy Hierarchy



2. Introduction

In support of the planning application, an Energy and Sustainability Statement study that examines the potential for reduction of carbon emissions for the proposed development at 39 Fitzjohn's Avenue, Hampstead NW3, has been compiled on request of the Applicant.

The existing house is a detached part 2 and part 3 storey private dwelling with accommodation at basement, ground, first, and second floors with additional accommodation in the roof space which will be converted into 20 apartments.

In addition there is an existing standalone dwelling that will be refurbished internally, but will remain as a single family dwelling.

In accordance with Part L of the Building Regulation the existing floors which will be refurbished will be assessed against Part L1B (existing dwellings), and have been modelled to show carbon emissions for reference only.

Camden Council has specific requirements with regards to reductions on carbon emissions for all work to existing building as listed in the Local Plans Policies CC1 and CC2 on Sustainability, this includes:

- Improvements to the buildings overall efficiency that should constitute approximately 10% of the overall project cost.
- All developments are expected to provide a 20% reduction in carbon dioxide emissions from on-site renewable energy
- Developments involving the conversion of 5 or more dwellings will be expected to be designed in line with BREEAM Domestic Refurbishment
- Developments are encouraged to achieve at least 60% of the unweighted credits in the Energy and Water categories, as well as 40% of the Materials category.

This report demonstrates how this development will strive to comply with the Camden Council guidance on energy and sustainability.

A separate BREEAM Pre-Assessment has been prepared demonstrating the development targeting a level of 'Excellent' and the minimum percentages for Energy, Water and Materials indicated above.



3. Establishing Baseline CO₂ Emissions for existing building

Part L 2013 calculations have been performed by using approved modelling SAP 2012 software (FSAP) in order to predict the carbon emissions of unrefurbished condition of the existing building.

To establish the baseline CO2 emissions for the existing development, estimates of the existing performance of the building elements and services have been assessed from the existing EPC for the building produced at the time the property was purchased. (See Appendix 4 for a copy of this EPC).

A sample of typical apartments have been selected and SAP 2012 calculations have been produced to obtain an area weighted average carbon emission rate for the whole development. (See Appendix 1 for SAP 2012 worksheets).

Table 6 below shows the carbon emission rate for the existing building.

Baseline Emi	ssion Rate f	or Domestic
Baseline	35.11	kgCO2/m²

Table 3 Annual carbon emissions



4. Energy Efficiency Measures "Be Lean" and Sustainability Strategies

The energy efficiency measures for the refurbishment will be maximised through the use of passive design features.

Chapter 4 of Camden's CPG on Sustainability has been followed to ensure the energy efficiency of the existing building is improved in line with planning guidance. The features to improve energy efficiency proposed for this development are:

- Draught proofing (to improve the air tightness of the building)
- Energy efficient lighting
- Upgrading to double glazing
- Improved insulation to walls
- New roof with efficient u-values
- New heating plant and controls

Building fabric U-values

Improvements to the existing fabric elements of the building will be achieved wherever possible. Existing windows will be upgraded and replaced with new double glazed windows, and existing walls will have thermal insulation improved to reduce heat loss. A new roof will be provided with uvalues better than Part L 2013 building regulations.

Although the majority of the building is existing, the thermal elements of the building will have significantly better u-values to help reduce the energy consumption of the building (except in cases where the new elements need to match the existing in appearance).

Below is a list of the building regulations, and the more stringent target U-values for this development:

Element	Building Regulations (W/m²K)	Proposed for 39 Fitzjohn's Ave (W/m²K)
Wall	0.30	0.25
Floor	0.25	0.20
Roof	0.20	0.18
Windows	2.0	1.8

Table 4 U-Values as proposed for the proposed development comparison to Part L 2013

Air permeability

The air permeability (i.e. the tightness to the outdoor elements) of a building affects the heating and cooling demand of the building (and thereby affects the demand for natural gas and electricity). This development will achieve an air permeability which will be significantly more energy efficient than that of the existing unrefurbished property. The target air permeability rate for this development is 10.0 m³/h/m².

The limiting factors which could make it difficult to achieve this air permeability rate are the openings throughout the existing building. The developer and the design team will required the contractor to build an airtight building in order to achieve the target set above.

Natural Ventilation

All windows to the apartments will be openable to allow for purge ventilation.

Mechanical Ventilation

All apartment units will be provided with whole house ventilation with heat recovery, to reduce the heating loads required to heat the fresh air supply into the unit. The design has been based on NUAIRE MRXBOX95-WM1 units with a thermal heat recovery efficiency of 91% and a specific fan power of 0.8 W/l/s. The proposed fan has been selected with variable speed drives and will be controlled on a trickle/boost setting via a local light switch.

HVAC systems

The efficiency of the mechanical systems has a significant impact on the amount of energy which the building consumes in order to deliver the required heating and cooling loads. Highly efficient equipment will be specified for this development, and wherever practically possible equipment from the government's Energy Technology List will be selected.

New ultra-low NOx highly efficient condensing boilers will be installed to each flat to provide the space heating and domestic hot water for each of the apartments. These will be located within dedicated utility cupboards and will have flues to the closest external walls. The space heating will be delivered to the apartments through an underfloor heating system providing a more efficient and even distribution of heat.

Variable speed drives will be provided for all motors in fans, AHUs, pumps etc.

Lighting systems

Lighting represents a significant portion of the annual carbon emissions of this development. In order to maximise the natural light and reduce the energy consumed in order to generate artificial light, the following energy efficiency measures have been specified:

- Energy efficient lighting specified for all areas (LEDs);
- Sub-metering of lighting which automatically warns of "out of range" values;
- Manual On / Automatic off switching for lighting; and
- PIR sensors in relevant zones (e.g. BOH areas/corridors/plant rooms/stores).

The table below shows the savings on regulated carbon emissions after the 'Lean' stage of the energy hierarchy for the new build element of the development.

	Regulated domestic carbon dioxide savings	
	(Tonnes of CO ₂ per annum)	(%)
Savings from energy demand reduction	42.56	49.9%

Table 5 Carbon emissions after the Be Lean Stage



5. Decentralised Energy (DE) Networks – Be Clean

5.1. District Heating

System Description

The London Plan's Energy Hierarchy and Camden Council's guidance encourages developments to connect to existing decentralised energy (DE) networks where these exist or are proposed in the vicinity of the scheme. These systems combine the energy demands and supplies of nearby developments to more efficiently serve the building service requirements of the community as a whole.

Technical Viability

The figure below is an excerpt from the London Heat Map highlighting any existing and proposed DE networks. The black dot in the indicates the location of the proposed development at 39 Fitzjohn's Avenue, and shows that the site currently sits outside the reach of any existing or proposed networks and also outside the catchment areas for zones of DH potential.

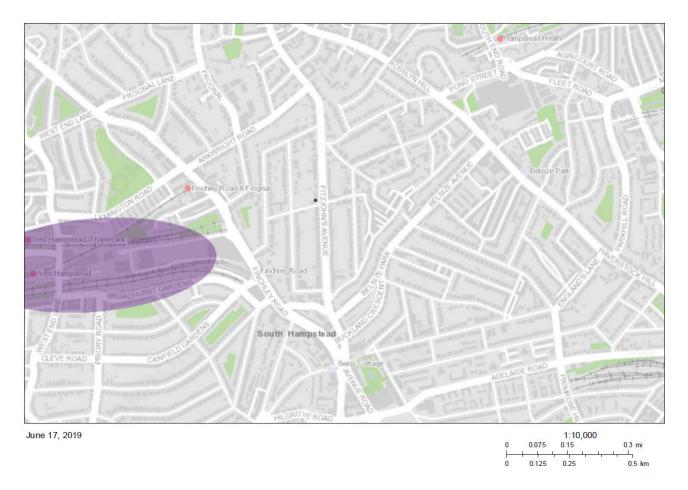


Figure 2 London Heat Map showing that there are no existing or proposed networks near the proposed development.

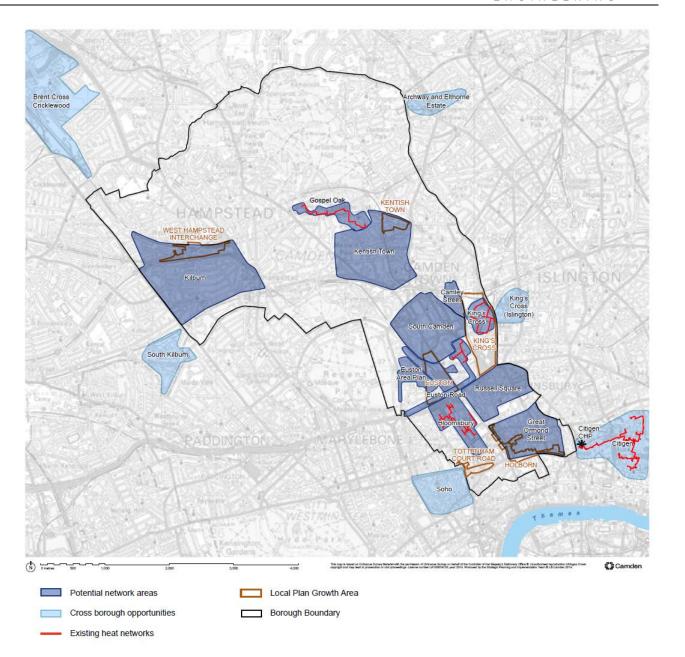


Figure 3 Camden Borough Wide District Energy Networks

Both the London Heat Map, and the Camden energy network map shows that the site sits outside the reach of any existing or proposed district energy centres. There is a new energy network cluster being studied close to the site, however the development site is outside this zone and outside the reach of the proposed and future energy network corridors.

Therefore, connecting to an existing DE network is not a feasible solution for this development.

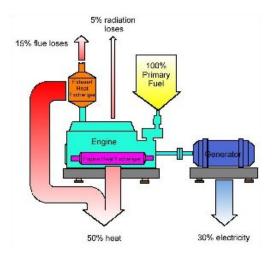


5.2. Combined Heat and Power (CHP)

CHP Description

Combined Heat and Power, or CHP as it is more commonly referred to, is the simultaneous generation of usable heat and power in a single process. In other words, it utilises the heat produced in electricity generation rather than releasing it wastefully into the atmosphere. In typical conventional power generation, much of the total energy input is wasted. CHP systems, where the heat produced in electricity generation is put to good use, can reach efficiencies up to 85%. A CHP can provide a secure and highly efficient method of generating electricity and heat at the point of use. Due to utilisation of heat from electricity generation and the avoidance of transmission losses because electricity is generated on site, CHP achieves a significant reduction in primary energy usage compared with power stations and heat only boilers. Typically a good CHP scheme can deliver an increase of around 20% in efficiency against the separate energy system it replaces and can result in savings of up to 50% of the annual CO_2 emissions from the site.





Bio-fuel CHP unit

Typical CHP process

Feasibility

For a CHP to be practical for a development there should be a steady demand for hot water and electricity. A CHP should be designed to cope with 100% of the heat base load of a building (i.e. a load that is continuous and steady all year round), with boilers to supply the peaks in demand during the colder months of the year. The only demand for heat that remains constant year round is domestic hot water.

The proposed development will comprise of residential units, which will have a constant demand for domestic hot water. In order for a CHP to be economically and technically viable there needs to be a significant number of dwellings to cover the capital costs, provide enough heat demand to justify the provision of a CHP, and allow for a plant room large enough required to house the CHP and centralised boiler system.

The proposed refurbishment of an existing building has a limited amount of central plant space. The provision of a central CHP and boiler system would require a large basement plantroom and flue risers to the roof.

The decarbonisation of the UK electrical grid will also reduce the benefits of carbon reduction of a gas fired CHP plant, whilst still coming at a premium in installation cost and plant space.

A CHP to provide the base load for the entire development is therefore not practical for this development.

The tables below shows the savings on regulated carbon emissions after the 'Be Clean' stage of the energy hierarchy for the new build element of the development.

	Regulated domestic carbon dioxide savings	
	(Tonnes of CO ₂ per annum)	(%)
Savings from energy demand reduction	42.56	49.9%
Savings from heat network / CHP	0.00	0.0%

Table 6 Carbon emissions after the Be Clean Stage



6. Low & Zero Carbon Technologies Feasibility Study - Be Green

The definition of 'renewable energy' used in the National Planning Policy Framework is:

"those energy flows that occur naturally and repeatedly in the environment – from the wind, the fall of water, the movement of the oceans, from the sun and also from biomass and deep geothermal heat. Low carbon technologies are those that can help reduce emissions (compared to conventional use of fossil fuels)."

This definition has been widened by the UK Government by the use of the term 'Low or Zero Carbon Energy Technologies" (LZCs) within the revised ADL documents. The carbon emissions reduction from applying these technologies when compared to the conventional technologies has also been accepted as 'renewable energy' under the GLA methodology.

In the following pages, the technical viability, indicative costs, and contribution towards the carbon emissions reduction are considered for the following systems:

- 1. Wind Turbines;
- 2. Ground Sourced Heating;
- 3. Air Sourced Heat Pumps;
- 4. Solar Photovoltaic (PV) panels; and
- **5.** Solar Water Heating Systems.



6.1. Wind Turbines

System Description

Wind turbines are modern, high-technology descendants of the old technology windmills that have been around for centuries. The difference is that now the kinetic energy of the wind is used to turn a turbine to generate electricity as opposed to moving water or turning a grist mill wheel. There are two types of wind turbine, one being the horizontal-axis variety which faces up-stream or downstream of the wind and where the rotational movement of the blade is connected to a generator to create electricity. The other type is the vertical-axis design, which is the most flexible type of wind turbine and is best suited for the more urban sites as it operates in any wind direction.





Horizontal-axis wind turbine

Vertical Axis Wind Turbine

Technical Viability

One of the big issues with wind turbines is the available wind speed. Apart from the direction, approximately 4.0 m/s wind velocity is required as a minimum before the turbine will begin to generate electricity.

Additionally, if this option were used for this development, the building would need wind turbines installed to the rear garden protruding higher than the buildings roof. Wind turbines in urban centres can generate acoustic complaints from both the occupants and the surrounding commercial / residential units.

Wind turbines are therefore not recommended for this development.

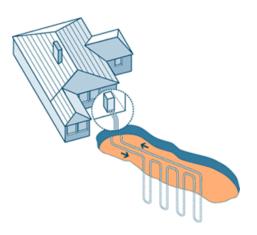
Wind Turbines		
Land Use	Foundation unless building mounted	
Planning Issues	Potentially a problem with gaining planning permission	
Noise	Problematic	
Tariffs	FiT 8.46 (4.91 for export) pence/kWh	



6.2. Ground Source Heat Pump

System Description

Ground source heat pumps take advantage of the stable ground temperatures of 10-12°C to provide energy efficient heating and cooling to a building. The energy flow is driven by the temperature difference between the ground and the circulating fluid which can be used to reject heat into the ground and deliver heating or cooling to the building.







System Schematic

Horizontal Pipe

Vertical Pipe Drilling Rig

Technical Viability

Proposals to install a Closed Loop Ground Source Heat Pump and/or a direct borehole system to satisfy a large percentage of the heating demand for the building could be a cost-effective option. This system also offers the option of providing "free-cooling" to its occupants via the use of the constant 12°C deep-earth temperature.

This technology can benefit from the Renewable Heat Incentive.

The development consists of refurbishing an existing building and therefore there are limited locations for the installation of a GSHP outside the building footprint. There is a garden to the rear of the property which could hold a number of boreholes.

An initial estimate of the peak capacity for a GSHP system has been carried out, and the peak capacity required for the proposed development is 145kW. A system of this size would require approximately 24 boreholes at 8-10 meter centres. An indicative layout for the available space in the rear garden shows that an array of approximately 15 (5x3) boreholes could be installed in the available space (taken into consideration root protection zones, etc), short of the 24 boreholes required.

A GSHP system is therefore not a viable solution for the proposed development.

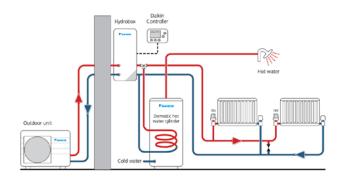
Ground Source Heat Pumps		
Land Use Below ground, minimal impact on future use of land		
Planning Issues	Minimal	
Noise	Minimal noise in plant room	
Tariffs	Renewable Heat Incentive 8.95/2.67 pence/kWh	



6.3. Air Source Heat Pumps

System Description

Air source heat pumps use the atmosphere as a renewable source of heat to generate heating and cooling with a refrigeration machine. The heating and cooling is accomplished by moving refrigerant through the heat pump's various indoor and outdoor coils and components. A compressor, condenser, expansion valve and evaporator are used to change states of the refrigerant from liquid to hot gas and then back from gas to liquid. The refrigerant is used to heat or cool coils in a fan coil unit located in the conditioned space. An external heat exchanger is used to heat or cool the refrigerant by absorbing heat from or rejecting heat to the outside air. This use of outside air is considered renewable, and has lead to the term "Air Source" Heat Pump.





Integrated Heating, Cooling, and DHW ASHP Configuration

Combined 4-Pipe Heat Pump Unit

Technical Viability

The COPs achievable with modern ASHPs means that these units will produce about 80% of its energy output from the air, a renewable and clean energy source.

Air sourced heating could provide a large proportion of the development's annual energy demand without a large roof space requirement for mounting equipment. Heat rejection units can be located on the roof, however an internal basement plantroom holding buffer tanks, pressurisation units, and pumps would be required.

Internal central plant space in this refurbishment is limited, and any rooftop mounted equipment would exceed the proposed roof level and have be visible from neighbouring properties.

Air source heat pumps is therefore not a viable option for the Proposed Development.

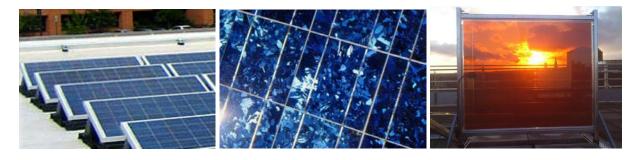
Air Source Heat Pumps		
Land Use Requires external plant area		
Planning Issues	Potential issue if located in visible position.	
Noise	Noise issues will be evident	
Tariffs Renewable Heat Incentive 2.57 pence/kWh		



6.4. Solar Photovoltaic Panels

System Description

Solar photovoltaics (PVs) convert energy from daylight into electricity using a semiconductor material such as silicon. When light hits the semiconductor, the energy in the light is absorbed, 'exciting' the electrons in the semiconductor so that they break free from their atoms. This allows the electrons to flow through the semiconductor material producing electricity.



Rooftop Installation

PV Cells

Solar Glass

Technical Viability

Solar PV panels are best mounted at an incline with a southerly orientation, although orientations between south-east and south-west are viable.

This technology can benefit from the Feed in Tariff.

The development's south roof has been identified as a potential location for photovoltaic panels. The roof will be south facing and will not be shaded by any existing or proposed developments near or around the site.

Photovoltaics are therefore a viable solution for the Proposed Development.

Photovoltaics	
Land Use	No land use (roof mounted)
	Potential issue if located in visible position. Can be
Planning Issues	located in discrete position.
Noise	None
Tariffs	FiT 2.38 (4.91 for export) pence/kWh

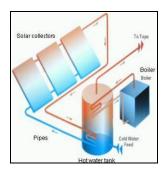


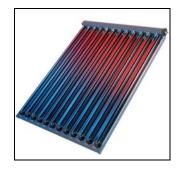
6.5. Solar Water Heating

System Description

Solar Water Heating systems convert solar radiation to heat carried by water for use in space heating or the provision of domestic hot water. Solar water heating systems normally operate with a back-up source of heat, such as gas condensing boilers. The solar water heating pre-heats the incoming water, which is topped-up by the back-up heat source when there is insufficient solar energy to reach the target water temperature.

Solar collectors are best mounted at an incline with a southerly orientation, although orientations between south-east and south-west are acceptable. As solar radiation is greatest in the summer when demand is lowest, it is not possible to meet the entire annual demand by increasing the size of the system. It is therefore recommended that a solar hot water system meet no more than 75% of the domestic hot water demand.







System Diagram

Evacuated Tube Collector

Glazed Flat Panel Collector

Technical Viability

In order for a solar panel to perform efficiently, it should be positioned between a 15 and 60 degree incline. As solar radiation is greatest in the summer when demand is lowest, it is not efficient to try to meet the entire annual demand by increasing the size of the system. It is therefore recommended that a solar water heating system meet no more than 65% of the domestic hot water demand.

This technology can benefit from the Renewable Heat Incentive.

Solar hot water systems are more cost efficient on individual dwellings, and the roof of an apartment block would be better suited with photovoltaics. The distances from the roof to individual dwellings would result in losses reducing the efficiency of this system, and the pipe runs from the roof panels to each apartment would require riser space which is also very limited in this existing development.

Therefore the installation of Solar Thermal panels is not a viable solution.

Solar Hot Water		
Land Use	No land use	
Planning Issues	Potential issue if visible. Can be located in discrete location	
Noise	None	
Tariffs	Renewable Heat Incentive 10.28 pence/kWh	



6.6. Recommended Solution

DSA therefore recommends the following renewable energy strategy for the proposed development at 36 Fitzjohn's Avenue.

Photovoltaic Panels

A photovoltaic panel array of approximately 18.72kWp capacity will also be installed on the south roof of the development to further reduce the annual carbon emissions.

The figure below indicates that there is sufficient space for a photovoltaic array of 52 panels. These can be installed at a tilt of 10% to ensure they are not visually intrusive from neighbouring sites.

The table below is a feasibility calculation indicating the expected CO2 savings from the proposed photovoltaic panel array.

Photovo	oltaics	
Number of Panels	52	
Peak Output p/ Panel	0.36	kWp
Total Peak Capacity	18.72	kWp
Area of Panels	104	m ²
Predicted Solar Radiation	1,000	kWh/m²/year
Efficiency of Panels	18.8%	
System Losses	20%	
Tilt of Panels	10%	
Carbon Factor for Electricity	0.519	kgCO ₂ /kWh
Annual Electricity Generated	15,642	kWh
Annual Carbon Savings	8.12	tonnesCO ₂

Table 7 Feasibility Calculations for Photovoltaic Panels

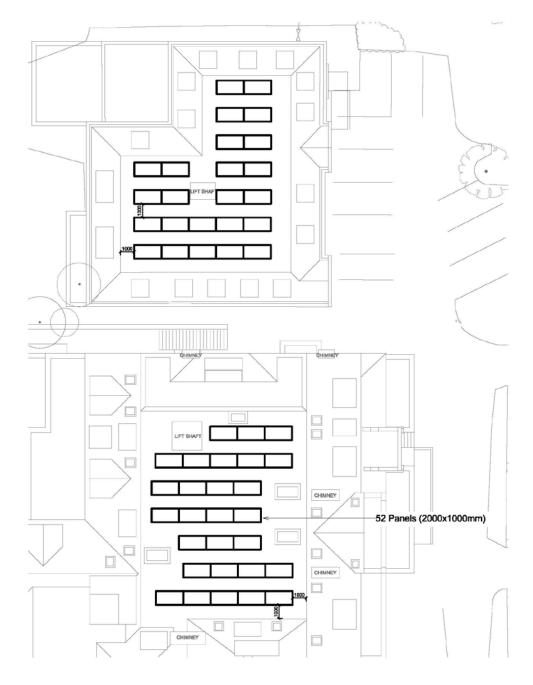


Figure 4 Roof layout showing proposed PV panels on the Roof (south facing)

The table below shows the savings on regulated carbon emissions after the 'Be Green' stage of the energy hierarchy for the new build elements.



	Regulated domestic carbon dioxide savino						
	(Tonnes of CO ₂ per annum)	(%)					
Savings from energy demand reduction	42.56	49.9%					
Savings from heat network / CHP	0.00	0.0%					
Savings from renewable energy	6.31	7.4%					

Table 8 Carbon emissions after the Be Green Stage

The carbon savings (6.31 Tonnes of CO_2) for the BE GREEN stage of the Energy Hierarchy, can be attributed to the installation of photovoltaic panels.



7. Water Efficiency Measures

Water Efficiency

Low flow and flush sanitaryware will be installed throughout to reduce the need for potable water inside the apartments. The target of 105 l/person/day has been achieved (refer to Appendix 6 for water consumption calculations).

Rainwater Harvesting

A simple rainwater harvesting system will be installed to reduce the potable water required for the irrigation of the communal gardens. A number of different options have been investigated ranging from simple water butts to a centralised communal pumped system.

The localised water butt system would be gravity fed by individual downpipes located throughout the gardens to ensure adequate coverage.

Alternatively a centralised communal system would collect all rainwater from roof areas, and store this in an underground buried tank in the garden. This would then be pumped and used to feed a number of taps located throughout the gardens to serve for irrigation only.

Further development of the design will determine which system is the most appropriate option for the proposed development.

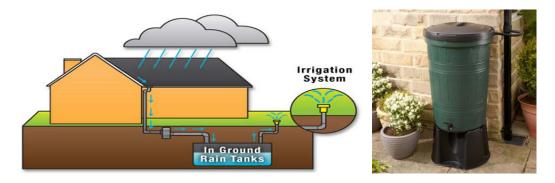


Figure 5 Examples of rainwater harvesting systems central vs localised.



8. Conclusion

In order for the development to achieve minimum requirements of energy carbon reductions in line with planning policies and to comply with minimum energy requirements for BREEAM the proposed development must demonstrate a carbon reduction.

In order to maximise carbon reductions, the design team has followed the "Be Lean, Be Clean, Be Green" energy hierarchy as advised by the London Plan. This included reducing the buildings energy demand through energy efficient techniques, exploring the possibility of using decentralised energy systems, and including renewable energy technologies on site.

The results of this study recommend the installation of a photovoltaic panel array with an installed capacity of 18.72 kWp.

This will result in the following carbon emissions following the Be Lean, Be Clean, Be Green energy hierarchy for both regulated and unregulated use. The table below shows the carbon emissions for the development after each stage of the energy hierarchy.

	Carbon dioxide emissions for domestic buildings (Tonnes of CO2 per annum)						
	Regulated	Unregulated					
Baseline: Existing Building	85.25	107.00					
After energy demand reduction	42.68	107.00					
After heat network / CHP	42.68	107.00					
After renewable energy	36.37	107.00					

Table 9 Carbon Dioxide Emissions after each stage of the Energy Hierarchy

The table below shows the different savings at each stage of the energy hierarchy for the development.

	Regulated domestic savings	
	(Tonnes of CO ₂ per annum)	(%)
Savings from energy demand reduction	42.56	49.9%
Savings from heat network / CHP	0.00	0.0%
Savings from renewable energy	6.31	7.4%
Cumulative on site savings	48.88	57.33%

Table 10 Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for domestic buildings

Through energy efficiency techniques as well as the implementation of renewable technologies as mentioned above, the proposed development will reduce annual carbon emissions by 48.88 tons of CO_2 . This account for a reduction of approximately 57.33% of the existing buildings expected regulated energy carbon emissions.

Although the development will provide a 7.4% reduction of carbon emissions from the installation of photovoltaic panels, due to specific restrictions on feasibility of installing renewable technologies

and limited roof space, the proposed development will fall short of the expected 20% carbon reduction by renewable energy's expected by Camden.

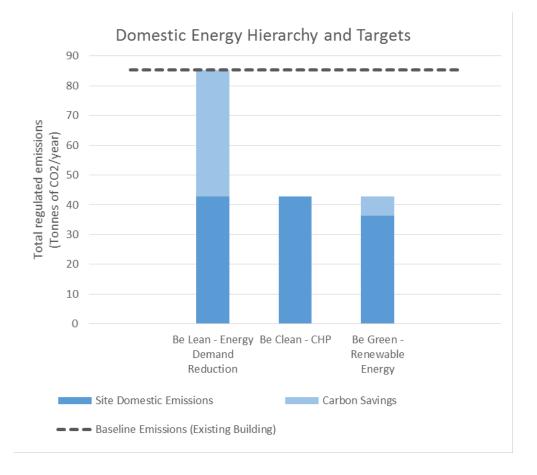


Figure 6 The Domestic Energy Hierarchy

39 Fitzjohn's Avenue Hampstead NW3 **Energy and Sustainability Statement**



9. Appendix9.1. Appendix 1 – Baseline SAP Worksheets

		User Details:				
Assessor Name: Software Name:	Stroma FSAP 2012		Number: e Version:	Versio	on: 1.0.4.18	
		Property Address: L	.G01			
Address :	39, Fitzjohns Avenue, LO	NDON, NW3 5JY				
1. Overall dwelling dime	ensions:					
Basement		Area(m²)	Av. Height(r	n) (2a) =	Volume(m³	(3a)
Ground floor			b) x 3.2	(2b) =	422.4	(3b)
	1a)+(1b)+(1c)+(1d)+(1e)+			(25) -	422.4	(36)
·	<i>1a)</i> +(1 <i>b)</i> +(1 <i>c)</i> +(1 <i>a)</i> +(1 <i>c)</i> +(` ') 3a)+(3b)+(3c)+(3d)+(3e)-	+ (3n) -		¬(E)
Dwelling volume			5a) 1 (5b) 1 (5c) 1 (5d) 1 (5c)	·····(011) =	844.8	(5)
2. Ventilation rate:	main second		total		m³ per hou	r
Number of chimneys	heating heating	g + 0	= 0	x 40 =	0	(6a)
Number of open flues	0 + 0	+ 0	= 0	x 20 =	0	(6b)
Number of intermittent fa	ans		0	x 10 =	0	(7a)
Number of passive vents	s		0	x 10 =	0	(7b)
Number of flueless gas t	fires		0	x 40 =	0	(7c)
				Air ch	anges per ho	our
	eys, flues and fans = (6a)+(6b) been carried out or is intended, proc		0 otinuo from (0) to (16)	÷ (5) =	0	(8)
Number of storeys in t		eed to (17), otherwise cor	iunde nom (9) to (16)		2	(9)
Additional infiltration				[(9)-1]x0.1 =	0.1	(10)
Structural infiltration: (0.25 for steel or timber frame	or 0.35 for masonry	construction		0.35	(11)
if both types of wall are p deducting areas of open	present, use the value corresponding	g to the greater wall area (after			
•	floor, enter 0.2 (unsealed) or	· 0.1 (sealed), else er	nter 0		0	(12)
If no draught lobby, er	,	, ,,			0.05	(13)
Percentage of window	s and doors draught stripped	d			100	(14)
Window infiltration		0.25 - [0.2 x	(14) ÷ 100] =		0.05	(15)
Infiltration rate		(8) + (10) + (11) + (12) + (13) + (15) =	=	0.55	(16)
Air permeability value	, q50, expressed in cubic me	tres per hour per squ	are metre of envelo	pe area	0	(17)
If based on air permeabi	ility value, then $(18) = [(17) \div 20]$]+(8), otherwise (18) = (16))		0.55	(18)
	es if a pressurisation test has been o	done or a degree air perm	eability is being used			_
Number of sides shelter	ed	(20) = 1 - [0.	075 v (19)] –		2	(19)
Shelter factor	ating shalter factor	(20) = 1 - [0.0] $(21) = (18) \times$			0.85	(20)
Infiltration rate incorpora Infiltration rate modified	•	(21) = (10) X	(20) -		0.47	(21)
Jan Feb	Mar Apr May Jur	n Jul Aug	Sep Oct No	ov Dec		
l l	1 ' 1 ' 1	i j Juli j Aug j	Geb Oct INC	V Dec	I	
Monthly average wind sp	peed ITOHI TABIE /				İ	

4.9

4.4

4.3

3.8

3.8

3.7

4.3

4.5

4.7

5

(22)m=

(22a)m = 1.2	27 1.25	(22)m ÷	1.1	1.08	0.95	0.95	0.92	1	1.08	1.12	1.18		
						<u> </u>		ļ				J	
· —	filtration ra	· ` _				. ´	<u> </u>	`		1		7	
Calculate e	6 0.58 effective air	0.57 change	0.51 rate for t	0.5 he appli	0.44 Cable ca	0.44 Se	0.43	0.47	0.5	0.53	0.55		
	nical ventila	_	, ato 707 ti	το αρρικ	<i>3</i> 4870 04							0.5	(23
If exhaust a	air heat pump	using Appe	endix N, (2	3b) = (23a) × Fmv (6	equation (N	N5)) , othe	rwise (23b) = (23a)			0.5	(23
If balanced	with heat rec	overy: effic	iency in %	allowing for	or in-use f	actor (from	n Table 4h	ı) =				0	(23
a) If bala	inced mech	anical ve	entilation	with hea	at recove	ery (MVI	HR) (24a	a)m = (2	2b)m + (23b) × [1 – (23c)) ÷ 100]	
(24a)m= 0	0	0	0	0	0	0	0	0	0	0	0]	(24
b) If bala	inced mech	anical ve	entilation	without	heat red	covery (N	/IV) (24b	o)m = (22	2b)m + (23b)			
(24b)m= 0	0	0	0	0	0	0	0	0	0	0	0]	(24
c) If who	le house ex	ktract ven	itilation c	r positiv	e input v	ventilatio	n from o	outside					
	2b)m < 0.5	<u> </u>		<u> </u>		wise (24		i 	<u> </u>	í –		٦	
(24c)m= 0.8	0.83	0.82	0.76	0.75	0.69	0.69	0.68	0.72	0.75	0.78	0.8		(24
	ıral ventilati 2b)m = 1, th								0.51				
11 (22 (24d)m= 0		0	111 = (221	o)m ome	o 0	0	0.5 + [(2	0	0.5]	0	0		(24
									U			_	(2.
(25)m= 0.8	air change	0.82	0.76	0.75	0.69	0.69	0.68	0.72	0.75	0.78	0.8	1	(25
(20)	0.00	0.02	0.10	0.10	0.00	0.00	0.00	0.72	0.70	0.10	0.0	J	(
	sses and h	eat loss	paramete	er:									
ELEMEN		/	Openin		Net Ar		U-val W/m2		A X U		k-valu		A X k
	area	ss a (m²)	Openin m		A ,r	m²	W/m2	2K	(W/		k-valu kJ/m²·		kJ/K
Win <mark>dows T</mark>	ype 1	/			A ,r	m ² x1/	W/m2 /[1/(2.8)+	2K - 0.04] =	(W/l				kJ/K (27)
Win <mark>dows T</mark> Windows T	area ype 1 ype 2	/			A ,r 4.75	m ² x1,	W/m2 /[1/(2.8)+ /[1/(2.8)+	$2K \cdot 0.04 = 0.04 = 0.04 = 0.04$	11.96 5.04				kJ/K (27) (27)
Win <mark>dows T</mark> Windows T Windows T	area ype 1 ype 2 ype 3	/			A ,r 4.75 2 4.75	x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2	W/m2 /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+	2K · 0.04] = · 0.04] = · 0.04] =	11.96 5.04 11.96				kJ/K (27) (27)
Win <mark>dows T</mark> Windows T Windows T Windows T	area Type 1 Type 2 Type 3 Type 4	/			A ,r 4.75 2 4.75 2	x1/ x1/ x1/ x1/ x1/	W/m2 /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+	$\begin{array}{l} 2K \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ 0.04] = \\ \end{array}$	11.96 5.04 11.96 5.04				kJ/K (27) (27) (27) (27)
Windows T Windows T Windows T Windows T Windows T	area Type 1 Type 2 Type 3 Type 4 Type 5	/			A ,r 4.75 2 4.75 2 2	x1/ x1/ x1/ x1/ x1/	W/m2 /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+	2K 0.04] = 0.04] = 0.04] = 0.04] = 0.04] =	11.96 5.04 11.96 5.04 5.04				kJ/K (27 (27 (27 (27 (27 (27 (27 (27 (27 (27
Windows T Windows T Windows T Windows T Windows T Windows T	area Type 1 Type 2 Type 3 Type 4 Type 5	/			A ,r 4.75 2 4.75 2 2 2	x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2	W/m2 /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+	2K 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] =	11.96 5.04 11.96 5.04 5.04 5.04				kJ/K (27 (27 (27 (27 (27 (27 (27 (27 (27 (27
Windows T Windows T Windows T Windows T Windows T Windows T	area Type 1 Type 2 Type 3 Type 4 Type 5 Type 6	a (m²)	m	2	A ,r 4.75 2 4.75 2 2 2 132	x1/ x1/ x1/ x1/ x1/ x1/ x1/ x1/	W/m2 /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+	2K 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] =	11.96 5.04 11.96 5.04 5.04 5.04 158.4				kJ/K (27 (27 (27 (27 (27 (28 (28 (28 (28 (28 (28 (28 (28 (28 (28
Windows T Windows T Windows T Windows T Windows T Windows T Floor Walls Type	area Type 1 Type 2 Type 3 Type 4 Type 5 Type 6	a (m²)		2	A ,r 4.75 2 4.75 2 2 2	x1/ x1/ x1/ x1/ x1/ x1/ x1/ x1/	W/m2 /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+	2K 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] =	11.96 5.04 11.96 5.04 5.04 5.04				kJ/K (27 (27 (27 (27 (27 (28 (29 (29 (29 (29 (29 (29 (29 (29 (29 (29
Windows T Windows T Windows T Windows T Windows T Floor Walls Type Walls Type	area Type 1 Type 2 Type 3 Type 4 Type 5 Type 6 Type 6	2 (m²)	m	2	A ,r 4.75 2 4.75 2 2 2 132	x1/ x1/ x1/ x1/ x1/ x1/ x1/ x1/	W/m2 /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+	2K 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] =	11.96 5.04 11.96 5.04 5.04 5.04 158.4				kJ/K (27 (27 (27 (27 (27 (28 (29 (29 (29 (29 (29 (27 (27 (29 (29 (29 (29 (29 (29 (29 (29 (29 (29
Windows T Windows T Windows T Windows T Windows T Floor Walls Type Walls Type	area Type 1 Type 2 Type 3 Type 4 Type 5 Type 6 Type 6 Type 6	2 0	16.25	5	A ,r 4.75 2 4.75 2 2 2 2 132 15.75	x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2	W/m2 /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ 1.2	2K - 0.04] = - 0.04] =	11.96 5.04 11.96 5.04 5.04 5.04 158.4 26.78				kJ/K (27 (27 (27 (27 (27 (27 (28 (29) (29)
Windows T Windows T Windows T Windows T Windows T Windows T Floor Walls Type	area Type 1 Type 2 Type 3 Type 4 Type 5 Type 6 Type 6 Type 6	2 0 2	16.25	5	A ,r 4.75 2 4.75 2 2 2 132 15.75 36	x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2	W/m2 /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ 1.2 1.7	2K - 0.04] = - 0.04] = - 0.04] = - 0.04] = - 0.04] = - 0.04] = - = - = - = - =	11.96 5.04 11.96 5.04 5.04 5.04 158.4 26.78				kJ/K (27 (27 (27 (27 (27 (27 (28 (29) (29) (29)
Windows T Floor Walls Type Walls Type Walls Type	area Type 1 Type 2 Type 3 Type 4 Type 5 Type 6 Type 6 Type 6	2 0 2	16.25 4	5	A ,r 4.75 2 4.75 2 2 132 15.75 36	x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2	W/m2 /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ 1.2 1.7	2K - 0.04] = - 0.04] =	11.96 5.04 11.96 5.04 5.04 5.04 158.4 26.78 61.2				kJ/K (27 (27 (27 (27 (27 (28 (29 (29 (29
Windows T Windows T Windows T Windows T Windows T Windows T Walls Type Walls Type Walls Type Walls Type Walls Type	area Type 1 Type 2 Type 3 Type 4 Type 5 Type 6 Type 6 Type 6 Type 6 Type 6 Type 6 Type 7 Type	2 0 2 2 8	16.25 4 16.25	5	A ,r 4.75 2 4.75 2 2 132 15.75 36 15.75	x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2	W/m2 /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ /[1/(2.8)+ 1.2 1.7 1.7	2K 0.04] = 0.	11.96 5.04 11.96 5.04 5.04 5.04 158.4 26.78 61.2 26.78				kJ/K (27 (27 (27 (27 (27 (27 (28 (29 (29 (29 (29 (29
Windows T Windows T Windows T Windows T Windows T Windows T Walls Type Walls Type Walls Type Walls Type Walls Type Walls Type Total area	area Type 1 Type 2 Type 3 Type 4 Type 5 Type 6 Type 7 Type 7 Type 8 Type 8 Type 9 Type 8 Type 9 Type	2 0 2 2 8 s, m ² dows, use e	16.29 4 16.29 0 4	5 5 mdow U-va	A ,r 4.75 2 4.75 2 15.75 36 15.75 22 14 276 alue calcul	x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2	W/m2 /[1/(2.8)+	2 K - 0.04 = - 0.04 =	11.96 5.04 11.96 5.04 5.04 5.04 158.4 26.78 61.2 26.78 37.4 23.8	k)	kJ/m²-		kJ/K (27 (27 (27 (27 (27 (27 (28 (29 (29 (29 (29 (29
Windows T Walls Type Walls Type Walls Type Walls Type Walls Type Total area * for windows ** include the	area Type 1 Type 2 Type 3 Type 4 Type 5 Type 6 Type 7 Type 7 Type 7 Type 8 Type 8 Type 8 Type 9 Type	2 0 2 2 8 s, m ² dows, use e	16.25 4 16.25 0 4 effective winternal wall	5 5 mdow U-va	A ,r 4.75 2 4.75 2 15.75 36 15.75 22 14 276 alue calcul	x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2	W/m2 /[1/(2.8)+	2 K - 0.04 = - 0.04 =	11.96 5.04 11.96 5.04 5.04 5.04 158.4 26.78 61.2 26.78 37.4 23.8	k)	kJ/m²-	h 3.2	kJ/K (27 (27 (27 (27 (27 (28 (29 (29 (29 (29 (31
Windows T Walls Type Walls Type Walls Type Walls Type Walls Type Total area * for windows ** include the Fabric heaf	area Type 1 Type 2 Type 3 Type 4 Type 5 Type 6 Type 7 Type 7 Type 8 Type 8 Type 9 Type 8 Type 9 Type	2 0 2 2 8 s, m ² dows, use en sides of in = S (A x	16.25 4 16.25 0 4 effective winternal wall	5 5 mdow U-va	A ,r 4.75 2 4.75 2 15.75 36 15.75 22 14 276 alue calcul	x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2	W/m2 /[1/(2.8)+	2K - 0.04] = -	11.96 5.04 11.96 5.04 5.04 5.04 158.4 26.78 61.2 26.78 37.4 23.8	k)	kJ/m²-		kJ/K (27) (27) (27) (27) (27) (28) (29) (29) (29) (29) (31)

Can be used instead of a decisied calculated using Appendix K 141. (38)	oon he wood inste	ad of a da	tailed color	ulation										
Velociality of thermal bridging are not known (36) = 0.05 x (31) Total flabric heat loss A77.73 (37) Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)					usina An	nendix I	K						41.4	7(36)
Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5) Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	•	•	,			•	•						71.7	(00)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec 235.87 232.81 229.35 213.06 208.8 193.51 193.51 193.51 193.52 200.03 208.8 216.32 222.84	Total fabric he	at loss		, ,	,	,			(33) +	(36) =			477.73	(37)
(38) (38) (38) (38) (38) (38) (38) (38) (38) (38) (38) (38) (39) (39) (39) (39) (39) (39) (39) (39) (40) (41) (41) (41) (42) (43) (44) (44) (44) (45) (45) (46) (46) (47) (48)	Ventilation hea	at loss ca	alculated	l monthly	y				(38)m	= 0.33 × (25)m x (5)	,		
Heat transfer coefficient, W/K (39)ms 713.8 710.34 707.08 690.79 697.5 697.53 671.24 671.24 671.24 671.25 687.53 694.08 700.56 Average Sum(39)212e 689.97 (39) Heat loss parameter (HLP), W/m?K (40)ms 2.7 2.69 2.88 2.62 2.6 2.54 2.54 2.54 2.53 2.57 2.6 2.63 2.65 Average = Sum(40)2712e 2.61 (40) Number of days in month (Table 1a) Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec (41)ms 31 28 31 30 31 30 31 30 31 31 30 31 30 31 30 31 30 31 30 31 30 31 (41) 4. Water heating energy requirement: *** Assumed occupancy, N if TFA 713.9, N = 1 + 1.76 × 11 - exp(-0.000349 × (TFA -13.9)2)] + 0.0013 × (TFA -13.9) Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec (42) if TFA \$13.9, N = 1 + 1.76 × 11 - exp(-0.000349 × (TFA -13.9)2)] + 0.0013 × (TFA -13.9) if TFA \$13.9, N = 1 and the state usage in litres per day. Vd.average = (25 × N) + 36 Reduce the annual average hot water usage by 5% if his diverling is designed to achieve a water use target or not more that 125 litres per person per day for each month Vd.m = (actor from Table (cx (43)) Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Hot water usage in fitnes per day for each month Vd.m = (actor from Table (cx (43)) Length of the vater usage in fitnes per day for each month Vd.m = (actor from Table (cx (43)) Length of the vater usage - calculated monthly = 4.190 × Vd.m × mm × DTm / 3600 kW/h/month (see Tables 1b. 1b. 1c. 1d) ### Lineary content of hot water used - calculated monthly = 4.190 × Vd.m × mm × DTm / 3600 kW/h/month (see Tables 1b. 1b. 1c. 1d) ### Lineary content of hot water used - calculated monthly = 4.190 × Vd.m × mm × DTm / 3600 kW/h/month (see Tables 1b. 1b. 1c. 1d) ### Lineary content of hot water heating at point of use (no hot water storage), enter 0 in boxes (49) to (61) ### Lineary content of hot water heating at point of use (no hot water storage), enter 0 in boxes (49) to (61) ### Lineary content of hot water heating at point of use (no hot water storage) enter 0 in boxes (49) to (61) ### Lineary content of hot water heating	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
T13.6 T10.34 T10.34 T07.08 E90.79 E87.53 G71.24 E71.24 E67.98 G77.76 E87.53 E94.05 T00.56	(38)m= 235.87	232.61	229.35	213.06	209.8	193.51	193.51	190.25	200.03	209.8	216.32	222.84		(38)
Heat loss parameter (HLP), W/m²K	Heat transfer of	coefficier	nt, W/K	-		-	-	-	(39)m	= (37) + (3	38)m	-		
Heat loss parameter (HLP), W/m²K	(39)m= 713.6	710.34	707.08	690.79	687.53	671.24	671.24	667.98	677.76	687.53	694.05	700.56		
Average = Sum(40) 27/12 2.61 (40)	Heat loss para	meter (H	HLP), W/	m²K								12 /12=	689.97	(39)
Number of days in month (Table 1a) Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	(40)m= 2.7	2.69	2.68	2.62	2.6	2.54	2.54	2.53	2.57	2.6	2.63	2.65		_
4. Water heating energy requirement: **Note: TFA > 13.9, N = 1 +1.76 x [1 - exp(-0.000349 x (TFA -13.9)2]] + 0.0013 x (TFA -13.9) if TFA ≥ 13.9, N = 1 +1.76 x [1 - exp(-0.000349 x (TFA -13.9)2]] + 0.0013 x (TFA -13.9) if TFA ≥ 13.9, N = 1 +1.76 x [1 - exp(-0.000349 x (TFA -13.9)2]] + 0.0013 x (TFA -13.9) if TFA ≥ 13.9, N = 1 Annual average hot water usage in littes per day Vd, average = (25 x N) + 36 Reduce the annual average hot vater usage by 5% if the dwelling is designed to achieve a water use larget of not more that 125 litres per person per day (all water use, hot and cold) Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Hot water usage in littes per day for each month Vd.m = 16ctor from Table 6 x (43) (44)m= 118.22 113.92 109.62 105.32 101.02 96.72 96.72 101.02 105.32 109.62 113.92 118.22 Total = Sum(44): • = 1289.86 (44) Energy content of hot water used - calculated monthly = 4.190 x Vd,m x mm x DTm /3600 kWh/month (see Tables 1b, 1c, 1d) (45)m= 175.32 153.33 158.22 137.94 132.36 114.22 105.84 121.45 122.9 143.23 156.35 169.78 Total = Sum(45): • = 1690.95 (45) If instantaneous water heating at point of use (no hot water storage), enter 0 in boxes (46) to (61) (46)m= 28.3 23 23.73 20.89 19.85 17.13 15.88 18.22 18.44 21.48 23.45 25.47 (46) Water storage loss: Storage volume (litres) including any solar or WWHRS storage within same vessel 300 (47) If community heating and no tank in dwelling, enter 110 litres in (47) Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47) Water storage loss: 1.69 (48) Energy lost from water storage, kWh/year (48) x (49) = 0.91 (60) b) If manufacturer's declared loss factor is known (kWh/day): 0 (51) If community heating see section 4.3 Volume factor from Table 2a 0 (52)	Number of day	/s in moi	nth (Tab	le 1a)						Average =	Sum(40) ₁ .	12 /12=	2.61	(40)
4. Water heating energy requirement: Assumed occupancy; N if TFA > 13.9, N = 1 + 1.76 x [1 - exp(-0.000349 x (TFA - 13.9)2)] + 0.0013 x (TFA - 13.9) if TFA £ 13.9, N = 1 + 1.76 x [1 - exp(-0.000349 x (TFA - 13.9)2)] + 0.0013 x (TFA - 13.9) if TFA £ 13.9, N = 1 Annual average hot water usage in littes per day Vd, average = (25 x N) + 36 Reduce the annual average hot water usage by 5% if the dwelling is designed to achieve a water use target or not more that 125 litres per person per day (all water use, hot and cold) Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Hot water usage in litres per day for each month Vd.m = (actor from Table 6 x (43)) (44)m= 118.22 113.92 109.62 105.32 101.02 96.72 96.72 101.02 105.32 109.62 113.92 118.22 Energy content of hot water used - calculated monthly = 4.190 x Vd,m x nm x DTm / 3600 kWh/month (see Tables 1b, 1c, 1d) (45)m= 175.32 153.33 158.22 137.94 132.36 114.22 105.84 121.45 122.9 143.23 156.35 169.78 Total = Sum(45)v = 1690.95 (45) If instantaneous water heating at point of use (no hot water storage), enter 0 in boxes (46) to (61) (46)m= 26.3 23 23.73 20.69 19.85 17.13 15.88 18.22 18.44 21.48 23.45 25.47 (46) Water storage loss: Storage volume (litres) including any solar or WWHRS storage within same vessel 300 (47) If community heating and no tank in dwelling, enter 110 litres in (47) Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47) Water storage loss: a) If manufacturer's declared loss factor is known (kWh/day): 1.69 (48) Temperature factor from Table 2b (0.54 (49) 0.91 (0.54 (49) 0.91 (0.55 (0.54 (49) 0.91 (0.55 (0.54 (49) 0.91 (0.55 (0	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
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Assumed occupancy, N if TFA > 13.9, N = 1 + 1.76 x [1 - exp(-0.000349 x (TFA - 13.9)2)] + 0.0013 x (TFA - 13.9) if TFA £ 13.9, N = 1 Annual average hot water usage in litres per day Vd, average = (25 x N) + 36 Reduce the annual average hot water usage by 5% if the dwelling is designed to achieve a water use target of not more that 125 litres per person per day [all water use, hot and cold) Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Hot water usage in litres per day for each month Vd.m = factor from Table (c x (43)) (44)m= 118.22 113.92 109.62 105.32 101.02 96.72 96.72 101.02 105.32 109.62 113.92 118.22 Total = Sum(44) = 1289.66 (44) Energy content of hot water used - cakculated monthly = 4.190 x Vd.m x nm x DTm / 3600 kWh/month (see Tables 1b, c. td) (45)m= 175.32 153.33 158.22 137.94 132.36 114.22 105.84 121.45 122.9 143.23 156.35 169.78 Total = Sum(45) = 1690.95 (45) If instantaneous water heating at point of use (no hot water storage), enter 0 in boxes (46) to (61) (46)m= 26.3 23 23.73 20.69 19.85 17.13 15.88 18.22 18.44 21.48 23.45 25.47 Water storage loss: Storage volume (litres) including any solar or WWHRS storage within same vessel 300 (47) If community heating and no tank in dwelling, enter 110 litres in (47) Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47) Water storage loss: a) If manufacturer's declared loss factor is known (kWh/day): 1.69 (48) Temperature factor from Table 2b (50) Energy lost from water storage, kWh/year (48) x (49) = 0.91 (50) b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) 0 (51) If community heating see section 4.3 Volume factor from Table 2a		-	_				-	-	-	-	-	-		
if TFA > 13.9, N = 1 + 1.76 x [1 - exp(-0.000349 x (TFA -13.9)2)] + 0.0013 x (TFA -13.9) if TFA £ 13.9, N = 1 Annual average hot water usage in litres per day Vd. average = (25 x N) + 36 Reduce the annual average hot water usage by 5% if the dwelling is designed to achieve a water use target or not more that 125 litres per person per day (all water usa, hot and cold) Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Hot water usage in litres per day for each month Vd.m = (actor from Table c x (43)) (44)m= 118.22 113.92 109.62 105.32 101.02 96.72 96.72 101.02 105.32 109.62 113.92 118.22 Energy content of hot water used - calculated monthly = 4.190 x Vd.m x nm x DTm / 3600 kWh/month (see Tables 1b, 1c, 1d) (45)m= 175.32 153.33 158.22 137.94 132.36 114.22 105.84 121.45 122.9 143.23 156.35 169.78 Total = Sum(45) v = 1690.95 (45) If instantaneous water heating at point of use (no hot water storage), enter 0 in boxes (46) to (61) (46)m= 26.3 23 23.73 20.69 19.85 17.13 15.88 18.22 18.44 21.48 23.45 25.47 (46) Water storage loss: Storage volume (litres) including any solar or WWHRS storage within same vessel 300 (47) If community heating and no tank in dwelling, enter 110 litres in (47) Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47) Water storage loss: a) If manufacturer's declared loss factor is known (kWh/day): 1.69 0.54 (48) Energy lost from water storage, kWh/year (48) x (49) = 0.91 0.91 (50) b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) 0 (51) If community heating see section 4.3 Volume factor from Table 2a 0 (52)	4. Water heat	ting ene	rgy requi	irement:								kWh/ye	ear:	
if TFA > 13.9, N = 1 + 1.76 x [1 - exp(-0.000349 x (TFA -13.9)2)] + 0.0013 x (TFA -13.9) if TFA £ 13.9, N = 1 Annual average hot water usage in litres per day Vd average = (25 x N) + 36 Reduce the annual average hot water usage by 5% if the divelling is designed to achieve a water use target or not more that 125 litres per person per day (all water use, hot and cold) Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Hot water usage in litres per day for each month Vd.m = (actor from Table c x (43) (44)m= 118.22 113.92 109.62 105.32 101.02 96.72 96.72 101.02 105.32 109.62 113.92 118.22 Energy content of hot water used - calculated monthly = 4.190 x Vd.m x nm x DTm / 3600 kWh/month (see Tables 1b, 1c, 1d) (45)m= 175.32 153.33 158.22 137.94 132.36 114.22 105.84 121.46 122.9 143.23 156.35 169.78 Total = Sum(45) ₁₋₁₂ = 1690.95 (45) If instantaneous water heating at point of use (no hot water storage), enter 0 in boxes (46) to (61) (46)m= 26.3 23 23.73 20.69 19.85 17.13 15.88 18.22 18.44 21.48 23.45 25.47 (46) Water storage loss: Storage volume (litres) including any solar or WWHRS storage within same vessel 300 (47) If community heating and no tank in dwelling, enter 110 litres in (47) Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47) Water storage loss: a) If manufacturer's declared loss factor is known (kWh/day): 1.69 0.54 (48) Energy lost from water storage, kWh/year (48) x (49) = 0.91 0.91 0.50 0.54 0.91 0.91 0.50 0.54 0.91 0.91 0.50 0.54 0.91	Assumed occu	inancy	N								2	00		(42)
Annual average hot water usage in litres per day Vd, average = (25 x N) + 36 Reduce the annual average hot water usage by 5% if the dwelling is designed to achieve a water use target of not more that 125 litres per person per day (all water use, hot and cold) Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Hot water usage in litres per day for each month Vd, m = factor from Table c x (43) (44)m= 118.22 113.92 109.62 105.32 101.02 96.72 96.72 101.02 105.32 109.62 113.92 118.22 Total = Sum(44), n =	if TFA > 13.9	9, N = 1		[1 - exp	(-0.0003	849 x (TF	FA -13.9)2)] + 0.0	0013 x (TFA -13.		09		(42)
Reduce the annual average hot water usage by 5% if the dwelling is designed to achieve a water use target of not more that 125 litres per person per day (all water use, hot and cold) Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec		· ·	ator upo	vo in litro	o por de	v Vd ov	25000	(OE V NI)	26					(40)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec										se target o		7.47		(43)
Hot water usage in litres per day for each month Vd,m = (actor from Table 1c x (43)) (44)m= 118.22 113.92 109.62 105.32 101.02 96.72 96.72 101.02 105.32 109.62 113.92 118.22 Total = Sum(44) ₁₋₁₂ = 1289.66 (44) Energy content of hot water used - calculated monthly = 4.190 x Vd,m x nm x DTm / 3600 kWh/month (see Tables 1b, 1c, 1d) (45)m= 175.32 153.33 158.22 137.94 132.36 114.22 105.84 121.45 122.9 143.23 156.35 169.78 Total = Sum(45) ₁₋₁₂ = 1690.95 (45) If instantaneous water heating at point of use (no hot water storage), enter 0 in boxes (46) to (61) (46)m= 26.3 23 23.73 20.69 19.85 17.13 15.88 18.22 18.44 21.48 23.45 25.47 (46) Water storage loss: Storage volume (litres) including any solar or WWHRS storage within same vessel 300 (47) If community heating and no tank in dwelling, enter 110 litres in (47) Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47) Water storage loss: a) If manufacturer's declared loss factor is known (kWh/day): 1.69 (48) Temperature factor from Table 2b (50) Energy lost from water storage, kWh/year (48) x (49) = 0.91 (50) b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) 0 (51) If community heating see section 4.3 Volume factor from Table 2a 0 0 (52)	not more that 125	litres per _l	person per	day (all w	rater use, l	hot and co	ld)							
(44)me					_				Sep	Oct	Nov	Dec		
Energy content of hot water used - calculated monthly = 4.190 x Vd,m x nm x DTm / 3600 kWh/month (see Tables 1b, 1c, 1d) (45)m= 175.32 153.33 158.22 137.94 132.36 114.22 105.84 121.45 122.9 143.23 156.35 169.78 Total = Sum(44)_112	Hot water usage in	n litres per	day for ea	ach month	Vd,m = fa		Table 1c x	(43)						
Energy content of hot water used - calculated monthly = 4.190 x Vd,m x nm x DTm / 3600 kWh/month (see Tables 1b, 1c, 1d) (45)m= 175.32 153.33 158.22 137.94 132.36 114.22 105.84 121.45 122.9 143.23 156.35 169.78 Total = Sum(45) ₁₋₁₂ = 1690.95 (45) If instantaneous water heating at point of use (no hot water storage), enter 0 in boxes (46) to (61) (46)m= 26.3 23 23.73 20.69 19.85 17.13 15.88 18.22 18.44 21.48 23.45 25.47 (46) Water storage loss: Storage volume (litres) including any solar or WWHRS storage within same vessel 300 (47) If community heating and no tank in dwelling, enter 110 litres in (47) Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47) Water storage loss: a) If manufacturer's declared loss factor is known (kWh/day): 1.69 (48) Energy lost from water storage, kWh/year (48) x (49) = 0.91 (50) b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) 0 (51) If community heating see section 4.3 Volume factor from Table 2a 0 (52)	(44)m= 118.22	113.92	109.62	105.32	101.02	96.72	96.72	101.02	105.32	109.62	113.92	118.22		_
(45)m= 175.32 153.33 158.22 137.94 132.36 114.22 105.84 121.45 122.9 143.23 156.35 169.78 Total = Sum(45) ₁₋₁₂ = 1690.95 (45) If instantaneous water heating at point of use (no hot water storage), enter 0 in boxes (46) to (61) (46)m= 26.3 23 23.73 20.69 19.85 17.13 15.88 18.22 18.44 21.48 23.45 25.47 (46) Water storage loss: Storage volume (litres) including any solar or WWHRS storage within same vessel 300 (47) If community heating and no tank in dwelling, enter 110 litres in (47) Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47) Water storage loss: a) If manufacturer's declared loss factor is known (kWh/day): 1.69 (48) Temperature factor from Table 2b (49) Energy lost from water storage, kWh/year (48) x (49) = 0.91 (50) b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) 0 (51) If community heating see section 4.3 Volume factor from Table 2a 0 (52)	Eneray content of	hot water	used - cal	culated mo	onthly = 4.	190 x Vd.r	m x nm x E	OTm / 3600			()		1289.66	(44)
It instantaneous water heating at point of use (no hot water storage), enter 0 in boxes (46) to (61) (46)m= 26.3 23 23.73 20.69 19.85 17.13 15.88 18.22 18.44 21.48 23.45 25.47 (46) Water storage loss: Storage volume (litres) including any solar or WWHRS storage within same vessel 300 (47) If community heating and no tank in dwelling, enter 110 litres in (47) Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47) Water storage loss: a) If manufacturer's declared loss factor is known (kWh/day): 1.69 (48) Temperature factor from Table 2b (48) x (49) = 0.91 (50) b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) 0 (51) If community heating see section 4.3 Volume factor from Table 2a 0 (52)	-			1			1		Ι		1	,		
If instantaneous water heating at point of use (no hot water storage), enter 0 in boxes (46) to (61) (46)m= 26.3 23 23.73 20.69 19.85 17.13 15.88 18.22 18.44 21.48 23.45 25.47 Water storage loss: Storage volume (litres) including any solar or WWHRS storage within same vessel 300 (47) If community heating and no tank in dwelling, enter 110 litres in (47) Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47) Water storage loss: a) If manufacturer's declared loss factor is known (kWh/day): 1.69 (48) Temperature factor from Table 2b 0.54 (49) Energy lost from water storage, kWh/year (48) x (49) = 0.91 (50) b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) 0 (51) If community heating see section 4.3 Volume factor from Table 2a 0 (52)	(10)111= 170.02	100.00	100.22	107.01	102.00		100.01	121110				l	1690.95	(45)
Water storage loss: Storage volume (litres) including any solar or WWHRS storage within same vessel 300 (47) If community heating and no tank in dwelling, enter 110 litres in (47) Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47) Water storage loss: a) If manufacturer's declared loss factor is known (kWh/day): 1.69 (48) Temperature factor from Table 2b 0.54 (49) Energy lost from water storage, kWh/year (48) × (49) = 0.91 (50) b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) 0 (51) If community heating see section 4.3 Volume factor from Table 2a 0 (52)	If instantaneous w	/ater heatii	ng at point	of use (no	hot water	storage),	enter 0 in	boxes (46			,			 ` ^
Storage volume (litres) including any solar or WWHRS storage within same vessel If community heating and no tank in dwelling, enter 110 litres in (47) Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47) Water storage loss: a) If manufacturer's declared loss factor is known (kWh/day): Temperature factor from Table 2b Energy lost from water storage, kWh/year (48) × (49) = (49) Energy lost from water storage, kWh/year (48) × (49) = (50) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) If community heating see section 4.3 Volume factor from Table 2a (52)	` '		23.73	20.69	19.85	17.13	15.88	18.22	18.44	21.48	23.45	25.47		(46)
If community heating and no tank in dwelling, enter 110 litres in (47) Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47) Water storage loss: a) If manufacturer's declared loss factor is known (kWh/day): Temperature factor from Table 2b Energy lost from water storage, kWh/year b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) If community heating see section 4.3 Volume factor from Table 2a O (52)	•		والمراجع المراجع المراجع			/\// IDC							1	(4-)
Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47) Water storage loss: a) If manufacturer's declared loss factor is known (kWh/day): Temperature factor from Table 2b Energy lost from water storage, kWh/year b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) If community heating see section 4.3 Volume factor from Table 2a O (48) × (49) = O (50) (51)	_	, ,		•			_		ame ves	sei		300		(47)
Water storage loss: a) If manufacturer's declared loss factor is known (kWh/day): Temperature factor from Table 2b Energy lost from water storage, kWh/year b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) If community heating see section 4.3 Volume factor from Table 2a (48) × (49) = 0.91 (50) (51)	•	•			•			` '	ers) ente	er 'O' in <i>(</i>	47)			
Temperature factor from Table 2b Energy lost from water storage, kWh/year (48) x (49) = 0.91 (50) b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) If community heating see section 4.3 Volume factor from Table 2a 0 (52)			not mate	, (u.i.o ii	.0.4400	- Total Ital	10000		0.0, 0	3. O (,			
Energy lost from water storage, kWh/year (48) x (49) = 0.91 (50) b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) 0 (51) If community heating see section 4.3 Volume factor from Table 2a 0 (52)	a) If manufact	urer's de	eclared l	oss facto	or is kno	wn (kWł	n/day):				1.	69		(48)
b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) If community heating see section 4.3 Volume factor from Table 2a 0 (52)	Temperature fa	actor fro	m Table	2b							0.	54		(49)
Hot water storage loss factor from Table 2 (kWh/litre/day) If community heating see section 4.3 Volume factor from Table 2a 0 (52)	•••		_	-				(48) x (49)) =		0.	91		(50)
If community heating see section 4.3 Volume factor from Table 2a 0 (52)	•			-									· 	(54)
Volume factor from Table 2a 0 (52)		-			e∠ (KVV	n/ntre/da	ay <i>)</i>					U		(51)
Temperature factor from Table 2b 0 (53)	•	•										0		(52)
	Temperature fa	actor fro	m Table	2b								0		(53)

Energy lost from water storage, kWh/year	(47) x (51) x (52) x (53) =	= 0		(54)
Enter (50) or (54) in (55)		0.9)1	(55)
Water storage loss calculated for each month	$((56)m = (55) \times (41)m$			
(56)m= 28.29 25.55 28.29 27.38 28.29 27.38 28.29	28.29 27.38 28	28.29 27.38	28.29	(56)
If cylinder contains dedicated solar storage, (57)m = (56)m x [(50) – (H11)] ÷	(50), else (57)m = (56)m w	vhere (H11) is from	n Appendix H	
(57)m= 28.29 25.55 28.29 27.38 28.29 27.38 28.29	28.29 27.38 28	28.29 27.38	28.29	(57)
Primary circuit loss (annual) from Table 3		0		(58)
Primary circuit loss calculated for each month (59)m = (58) ÷	365 × (41)m			
(modified by factor from Table H5 if there is solar water hea	ting and a cylinder the	ermostat)		
(59)m= 23.26 21.01 23.26 22.51 23.26 22.51 23.26	23.26 22.51 23	3.26 22.51	23.26	(59)
Combi loss calculated for each month (61)m = (60) \div 365 × (4	1)m			
(61)m= 0 0 0 0 0 0	0 0	0 0	0	(61)
Total heat required for water heating calculated for each mon	$h (62)m = 0.85 \times (45)$)m + (46)m + (57)m + (59)r	m + (61)m
(62)m= 226.87 199.9 209.78 187.83 183.91 164.11 157.3	173 172.79 19	94.78 206.24	221.34	(62)
Solar DHW input calculated using Appendix G or Appendix H (negative quan	ity) (enter '0' if no solar cor	ntribution to water	heating)	
(add additional lines if FGHRS and/or WWHRS applies, see A	ppendix G)			
(63)m= 0 0 0 0 0 0	0 0	0 0	0	(63)
Output from water heater				
(64)m= 226.87 199.9 209.78 187.83 183.91 164.11 157.3	173 172.79 19	94.78 206.24	221.34	
	Output from water	heater (annual) ₁	12	2297.95 (64)
Heat gains from water heating, kWh/month 0.25 / [0.85 x (45)	m + (61)m] + 0.8 x [(4	46)m + (57)m -	+ (59)m]	
- ',				
(65)m= 99.53 88.23 93.85 85.78 85.25 77.89 76.43		8.87 91.9	97.7	(65)
	81.63 80.78 88	8.87 91.9	97.7	, ,
include (57)m in calculation of (65)m only if cylinder is in the	81.63 80.78 88	8.87 91.9	97.7	, ,
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a):	81.63 80.78 88	8.87 91.9	97.7	, ,
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts	81.63 80.78 80 dwelling or hot wate	91.9 er is from comm	97.7 nunity heatin	, ,
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul	81.63 80.78 80 dwelling or hot wate	8.87 91.9	97.7	, ,
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 185.11 185.11 185.11 185.11 185.11 185.11	81.63 80.78 80 80 80 80 80 80 80 80 80 80 80 80 80	er is from comm	97.7 nunity heatin	g
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 18	81.63 80.78 80 80 80 80 80 80 80 80 80 80 80 80 80	91.9 er is from common oct Nov 85.11 185.11	97.7 nunity heatin Dec 185.11	g (66)
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 18	Aug Sep (185.11 185.11 18 also see Table 5 68.73 92.25 11	91.9 er is from comm Oct Nov 85.11 185.11	97.7 nunity heatin	g
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 185.11 185.11 185.11 185.11 185.11 185.11 185.11 185.11 185.11 185.11 Appendix L, equation L9 or L9a), (67)m= 141.8 125.95 102.43 77.55 57.97 48.94 52.88 Appliances gains (calculated in Appendix L, equation L13 or L9a).	Aug Sep (185.11 185.11 18 also see Table 5 68.73 92.25 11 13a), also see Table	91.9 er is from comm Oct Nov 85.11 185.11 17.14 136.72	97.7 nunity heatin Dec 185.11	g (66) (67)
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 18	Aug Sep (185.11 185.11 18 also see Table 5 68.73 92.25 11 13a), also see Table 5 471.73 488.45 52	91.9 er is from comm Oct Nov 85.11 185.11	97.7 nunity heatin Dec 185.11	g (66)
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 18	Aug Sep (185.11 185.11 18 also see Table 5 68.73 92.25 11 13a), also see Table 5 471.73 488.45 52 a), also see Table 5	Oct Nov 85.11 136.72 17.14 136.72 5 24.05 568.98	97.7 nunity heatin Dec 185.11 145.75	(66) (67) (68)
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 18	Aug Sep (185.11 185.11 18 also see Table 5 68.73 92.25 11 13a), also see Table 5 471.73 488.45 52 a), also see Table 5	91.9 er is from comm Oct Nov 85.11 185.11 17.14 136.72	97.7 nunity heatin Dec 185.11	g (66) (67)
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul	Aug Sep (185.11 185.11 18 185.11 185.11 185.11 18 18 18 18 18 18 18 18 18 18 18 18 1	91.9 er is from comm Oct Nov 85.11 185.11 17.14 136.72 5 5 24.05 568.98	97.7 nunity heatin Dec 185.11 145.75 611.21	(66) (67) (68) (69)
include (57)m in calculation of (65)m only if cylinder is in the state of the state	Aug Sep (185.11 185.11 18 also see Table 5 68.73 92.25 11 13a), also see Table 5 471.73 488.45 52 a), also see Table 5	Oct Nov 85.11 136.72 17.14 136.72 5 24.05 568.98	97.7 nunity heatin Dec 185.11 145.75	(66) (67) (68)
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul	Aug Sep (185.11 185.11 18 also see Table 5 68.73 92.25 11 13a), also see Table 5 471.73 488.45 52 a), also see Table 5 56.6 56.6 5	Oct Nov 85.11 136.72 15 24.05 568.98 56.6 56.6 3 3	97.7 nunity heatin Dec 185.11 145.75 611.21 56.6	(66) (67) (68) (69) (70)
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul	Aug Sep (185.11 185.11 18 also see Table 5 68.73 92.25 11 13a), also see Table 5 471.73 488.45 52 a), also see Table 5 56.6 56.6 5	Oct Nov 85.11 136.72 15 24.05 568.98 56.6 56.6 3 3	97.7 nunity heatin Dec 185.11 145.75 611.21	(66) (67) (68) (69)
include (57)m in calculation of (65)m only if cylinder is in the standard sequence of (65)m only if cylinder is in the standard sequence of (65)m only if cylinder is in the standard sequence of (65)m only if cylinder is in the standard sequence of (65)m only if cylinder is in the standard sequence of (65)m only if cylinder is in the standard sequence of (66)m. Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 185	Aug Sep (185.11 185.11 186.73 92.25 11113a), also see Table 5 471.73 488.45 52 a), also see Table 5 56.6 56.6 5	Oct Nov 85.11 185.11 17.14 136.72 5 24.05 56.6 56.6 3 3 23.41 -123.41	97.7 nunity heatin Dec 185.11 145.75 611.21 56.6 3 -123.41	(66) (67) (68) (69) (70) (71)
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 18	Aug Sep (185.11 185.11 18 also see Table 5 68.73 92.25 11 13a), also see Table 5 3 471.73 488.45 52 a), also see Table 5 56.6 56.6 5 3 3 1 -123.41 -123.41 -12 3 109.71 112.19 11	Oct Nov 85.11 185.11 17.14 136.72 24.05 568.98 56.6 56.6 3 3 23.41 -123.41 19.44 127.64	97.7 nunity heatin Dec 185.11 145.75 611.21 56.6 3 -123.41	(66) (67) (68) (69) (70)
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 18	Aug Sep (185.11 185.11 186.11 185.11 185.11 185.11 185.11 186.73 92.25 11 13a), also see Table 5 471.73 488.45 52 a), also see Table 5 56.6 56.6 5	Oct Nov 85.11 185.11 17.14 136.72 24.05 568.98 56.6 56.6 3 3 23.41 -123.41 19.44 127.64	97.7 nunity heatin Dec 185.11 145.75 611.21 56.6 3 -123.41	(66) (67) (68) (69) (70) (71)
include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 18	Aug Sep (185.11 185.11 18 185.11 185.11 185.11 185.11 185.11 18 18 18 18 18 18 18 18 18 18 18 18 1	Oct Nov 85.11 185.11 17.14 136.72 5 24.05 568.98 23.41 -123.41 19.44 127.64 m + (71)m + (72)r	97.7 nunity heatin Dec 185.11 145.75 611.21 56.6 3 -123.41	(66) (67) (68) (69) (70) (71)

Solar gains are calculated using solar flux from Table 6a and associated equations to convert to the applicable orientation.

Orientation:	Access Factor Table 6d		Area m²		Flux Table 6a		g_ Table 6b		FF Table 6c		Gains (W)	
North 0.9	x 1	x	2	x	10.63	x	0.76	x	0.7	=	20.37	(74)
North 0.9	x 1	X	2	x	10.63	х	0.76	х	0.7	=	20.37	(74)
North 0.9	x 1	X	2	x	20.32	х	0.76	х	0.7	=	38.92	(74)
North 0.9	x 1	X	2	x	20.32	x	0.76	x	0.7	=	38.92	(74)
North 0.9	x 1	X	2	x	34.53	х	0.76	х	0.7	=	66.13	(74)
North 0.9	x 1	X	2	x	34.53	х	0.76	х	0.7	=	66.13	(74)
North 0.9	x 1	X	2	x	55.46	x	0.76	х	0.7	=	106.23	(74)
North 0.9	x 1	X	2	x	55.46	x	0.76	x	0.7	=	106.23	(74)
North 0.9	x 1	X	2	x	74.72	x	0.76	x	0.7	=	143.1	(74)
North 0.9	x 1	X	2	x	74.72	x	0.76	x	0.7	=	143.1	(74)
North 0.9	x 1	X	2	x	79.99	x	0.76	x	0.7	=	153.19	(74)
North 0.9	x 1	X	2	x	79.99	x	0.76	x	0.7	=	153.19	(74)
North 0.9	x 1	X	2	x	74.68	x	0.76	x	0.7	=	143.02	(74)
North 0.9	x 1	X	2	x	74.68	x	0.76	x	0.7	=	143.02	(74)
North 0.9	x 1	X	2	x	59.25	x	0.76	X	0.7	=	113.47	(74)
North 0.9	x 1	X	2	X	59.25	Х	0.76	X	0.7	=	113.47	(74)
North 0.9	x 1	x	2	х	41.52	x	0.76	x	0.7	=	79.51	(74)
North 0.9	x 1	X	2	х	41.52	×	0.76	х	0.7	=	79.51	(74)
North 0.9	x 1	x	2	x	24.19	x	0.76	x	0.7	=	46.33	(74)
North 0.9	x 1	X	2	x	24.19	Х	0.76	x	0.7	=	46.33	(74)
North 0.9	x 1	X	2	x	13.12	X	0.76	x	0.7	=	25.12	(74)
North 0.9	x1	X	2	х	13.12	x	0.76	x	0.7	=	25.12	(74)
North 0.9	x 1	X	2	X	8.86	X	0.76	X	0.7	=	16.98	(74)
North 0.9	x 1	X	2	X	8.86	X	0.76	X	0.7	=	16.98	(74)
West 0.9	x 1	X	4.75	X	19.64	х	0.76	х	0.7	=	134	(80)
West 0.9	x 1	X	2	X	19.64	х	0.76	X	0.7	=	18.81	(80)
West 0.9	x 1	X	4.75	X	19.64	X	0.76	х	0.7	=	134	(80)
West 0.9	x 1	X	2	X	19.64	x	0.76	X	0.7	=	18.81	(80)
West 0.9	x 1	X	4.75	X	38.42	x	0.76	X	0.7	=	262.14	(80)
West 0.9	x 1	X	2	X	38.42	x	0.76	X	0.7	=	36.79	(80)
West 0.9	x 1	X	4.75	X	38.42	x	0.76	X	0.7	=	262.14	(80)
West 0.9	x 1	X	2	X	38.42	x	0.76	X	0.7	=	36.79	(80)
West 0.9	x 1	X	4.75	X	63.27	x	0.76	x	0.7	=	431.71	(80)
West 0.9		X	2	x	63.27	х	0.76	x	0.7	=	60.59	(80)
West 0.9	x 1	X	4.75	x	63.27	х	0.76	X	0.7	=	431.71	(80)
West 0.9	x 1	X	2	x	63.27	x	0.76	x	0.7	=	60.59	(80)
West 0.9	X 1	X	4.75	X	92.28	x	0.76	X	0.7	=	629.62	(80)
West 0.9	x 1	X	2	x	92.28	х	0.76	X	0.7	=	88.37	(80)
West 0.9	x 1	X	4.75	X	92.28	X	0.76	X	0.7	=	629.62	(80)

West	0.9x	1		X	2	X	9	2.28	X	0.76	X	0.7	=	88.37	(80)
West	0.9x	1		X	4.75	x	1	13.09	X	0.76	x	0.7	=	771.62	(80)
West	0.9x	1		X	2	x	1	13.09	X	0.76	X	0.7	=	108.3	(80)
West	0.9x	1		X	4.75	×	1	13.09	X	0.76	X	0.7	=	771.62	(80)
West	0.9x	1		X	2	x	1	13.09	X	0.76	X	0.7	=	108.3	(80)
West	0.9x	1		X	4.75	x	1	15.77	X	0.76	X	0.7	=	789.89	(80)
West	0.9x	1		X	2	×	1	15.77	X	0.76	X	0.7	=	110.86	(80)
West	0.9x	1		X	4.75	×	1	15.77	x	0.76	X	0.7	=	789.89	(80)
West	0.9x	1		X	2	×	1	15.77	x	0.76	X	0.7	=	110.86	(80)
West	0.9x	1		X	4.75	×	1	10.22	X	0.76	X	0.7	=	752.01	(80)
West	0.9x	1		X	2	×	1	10.22	x	0.76	X	0.7	=	105.55	(80)
West	0.9x	1		X	4.75	x	1	10.22	x	0.76	X	0.7	=	752.01	(80)
West	0.9x	1		X	2	×	1	10.22	x	0.76	X	0.7	=	105.55	(80)
West	0.9x	1		X	4.75	x	9	4.68	x	0.76	x	0.7	=	645.96	(80)
West	0.9x	1		X	2	×	9	4.68	x	0.76	X	0.7	_ =	90.66	(80)
West	0.9x	1		X	4.75	x	9	4.68	x	0.76	X	0.7	=	645.96	(80)
West	0.9x	1		X	2	×	9	4.68	x	0.76	X	0.7	=	90.66	(80)
West	0.9x	1		X	4.75	X	7	3.59	Х	0.76	X	0.7		502.09	(80)
West	0.9x	1		X	2	= x	7	3.59	х	0.76	Х	0.7	=	70.47	(80)
West	0.9x	1		X	4.75	×	7	3.59	x	0.76	Х	0.7	=	502.09	(80)
West	0.9x	1		X	2	X	7	3.59	x	0.76	Х	0.7	=	70.47	(80)
West	0.9x	1		X	4.75	×	4	5.59	Х	0.76	Х	0.7	=	311.05	(80)
West	0.9x	1		X	2	= ×	4	5.59	Х	0.76	Х	0.7	=	43.66	(80)
West	0.9x	1		X	4.75	×	4	5.59	x	0.76	Х	0.7	<u> </u>	311.05	(80)
West	0.9x	1		x	2	×	4	5.59	x	0.76	х	0.7	=	43.66	(80)
West	0.9x	1		X	4.75	×	2	4.49	x	0.76	X	0.7	=	167.09	(80)
West	0.9x	1		X	2	×	2	4.49	x	0.76	X	0.7	<u> </u>	23.45	(80)
West	0.9x	1		X	4.75	×	2	4.49	x	0.76	X	0.7	=	167.09	(80)
West	0.9x	1		X	2	×	2	4.49	x	0.76	X	0.7	=	23.45	(80)
West	0.9x	1		X	4.75	×	1	6.15	x	0.76	X	0.7	=	110.2	(80)
West	0.9x	1		X	2	×	1	6.15	x	0.76	i x	0.7		15.47	(80)
West	0.9x	1		X	4.75	×		6.15	x	0.76	X	0.7		110.2	(80)
West	0.9x	1		X	2	×	1	6.15	x	0.76	X	0.7	=	15.47	(80)
	_										_				
Solar g	ains in v	watts, ca	alculat	ted	for each mo	onth			(83)m	= Sum(74)m	.(82)m				
(83)m=	346.35	675.7	1116.	86	1648.42 204	6.03 2	2107.88	2001.15	1700	1304.15	802.0	7 431.32	285.28		(83)
Total g	ains – ir	nternal a	nd so	lar	(84)m = (73)	3)m +	(83)m	, watts						-	
(84)m=	1382.66	1700.31	2096.	07	2560.14 288	8.69 2	2892.87	2756.42	2471	.66 2118.34	1683.9	99 1385.95	1294.85		(84)
7. Me	an interi	nal temp	eratu	re (heating sea	son)									
Temp	erature	during h	eating	g pe	eriods in the	living	area	from Tab	ole 9,	Th1 (°C)				21	(85)
Utilisa	tion fac	tor for ga	ains fo	or li	ving area, h	1,m (see Ta	ble 9a)							_
	Jan	Feb	Ма	ır	Apr N	1ay	Jun	Jul	Αι	ug Sep	Oct	Nov	Dec]	
·-										· · · · · · · · · · · · · · · · · · ·					

(86)m= 0.98 0.97 0.94 0.9 0.84 0.75 0.66 0.7 0.84 0.93 0.97	0.98		(86)
Mean internal temperature in living area T1 (follow steps 3 to 7 in Table 9c)			
(87)m= 16.45 16.77 17.42 18.34 19.25 20.05 20.48 20.4 19.71 18.54 17.36	16.42		(87)
Temperature during heating periods in rest of dwelling from Table 9, Th2 (°C)			
(88)m= 18.91 18.91 18.92 18.95 18.96 19 19 19 18.98 18.96 18.95	18.93		(88)
Utilisation factor for gains for rest of dwelling, h2,m (see Table 9a)			
(89)m= 0.97 0.96 0.93 0.88 0.79 0.64 0.46 0.52 0.76 0.91 0.96	0.97		(89)
Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c)			
(90)m= 13.38 13.82 14.73 16.02 17.26 18.29 18.78 18.71 17.91 16.32 14.66	13.34		(90)
fLA = Living area ÷ (4)) =	0.5	(91)
Moon internal temperature (for the whole dwelling) – $f(A \times T_1 + (1 - f(A) \times T_2))$			J
Mean internal temperature (for the whole dwelling) = $fLA \times T1 + (1 - fLA) \times T2$ (92)m= 14.91 15.3 16.07 17.18 18.25 19.17 19.63 19.55 18.81 17.43 16.01	14.88		(92)
Apply adjustment to the mean internal temperature from Table 4e, where appropriate	14.00		(/
(93)m= 14.91 15.3 16.07 17.18 18.25 19.17 19.63 19.55 18.81 17.43 16.01	14.88		(93)
8. Space heating requirement			
Set Ti to the mean internal temperature obtained at step 11 of Table 9b, so that Ti,m=(76)m and	d re-calculat	е	
the utilisation factor for gains using Table 9a			
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov	Dec		
Utilisation factor for gains, hm:			
(94)m= 0.95 0.93 0.9 0.84 0.76 0.65 0.54 0.58 0.75 0.88 0.94	0.96		(94)
Useful gains, hmGm , W = (94) m x (84) m			(0.5)
	1239.88		(95)
Monthly average external temperature from Table 8 (96)m= 4.3 4.9 6.5 8.9 11.7 14.6 16.6 16.4 14.1 10.6 7.1	4.0		(96)
	4.2		(90)
Heat loss rate for mean internal temperature, Lm , W =[(39)m x [(93)m- (96)m] (97)m= 7574.38 7386.29 6769.78 5720.03 4505.43 3067.82 2034.7 2107.12 3192.18 4695.32 6183.13	7482.3		(97)
Space heating requirement for each month, kWh/month = $0.024 \times [(97)m - (95)m] \times (41)m$	7402.3		(01)
	4644.36		
Total per year (kWh/year) = Sum(98	3)1 59 12 =	27015.45	(98)
Space heating requirement in kWh/m²/year	/	102.33] (99)
		102.33](99)
9a. Energy requirements – Individual heating systems including micro-CHP)			
Space heating: Fraction of space heat from secondary/supplementary system		0	(201)
Fraction of space heat from main system(s) (202) = 1 - (201) =			(202)
,		1	╣`
Fraction of total heating from main system 1 $(204) = (202) \times [1 - (203)] =$		1	(204)
Efficiency of main space heating system 1		71 	(206)
Efficiency of secondary/supplementary heating system, %		0	(208)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov	Dec	kWh/yea	ır
Space heating requirement (calculated above)			
4655.01 3896.11 3632.04 2566.13 1717.59 0 0 0 0 2388.63 3515.57	4644.36		
$(211)m = \{[(98)m \times (204)] \} \times 100 \div (206)$			(211)
	6541.35		_
Total (kWh/year) =Sum(211) _{15,1012} =		38049.93	(211)

Space heating fuel (secondary), kWh	/month									
$= \{[(98)m \times (201)] \} \times 100 \div (208)$ $(215)m = $	Ιο	0	0	0	0	0	0	0]	
	1 "				l (kWh/yea	_			0	(215)
Water heating							, , , , , , , , , , , , , , , , , , , ,	_		`
Output from water heater (calculated a	above)	•		•					1	
226.87 199.9 209.78 187.83	183.91	164.11	157.39	173	172.79	194.78	206.24	221.34		_
Efficiency of water heater	-	ı	ı	1					60.3	(216)
(217)m= 70.42 70.39 70.32 70.15	69.8	60.3	60.3	60.3	60.3	70.06	70.31	70.43		(217)
Fuel for water heating, kWh/month (219)m = (64)m x 100 ÷ (217)m										
(219)m= 322.17 283.98 298.32 267.76	263.48	272.15	261.02	286.91	286.55	278.01	293.33	314.26		
	•			Tota	I = Sum(2	19a) ₁₁₂ =		•	3427.94	(219)
Annual totals						k'	Wh/yea	r	kWh/yea	_
Space heating fuel used, main system	1								38049.93	╛
Water heating fuel used									3427.94	
Electricity for pumps, fans and electric	keep-ho	t								
mechanical ventilation - balanced, ex	tract or p	ositive i	nput fror	n outside	•			297.54]	(230a)
central heating pump:								30		(230c)
Total electricity for the above, kWh/ye	ar			sum	of (230a).	(2 30g) =			327.54	(231)
Electricity for lighting									1001.72	(232)
10a. Fuel costs - individual heating s	vstems:									
		Fu kW	el /h/year			Fuel P (Table			Fuel Cost £/year	
Space heating - main system 1		(21	1) x			3.4	8	x 0.01 =	1324.14	(240)
Space heating - main system 2		(21	3) x			0		x 0.01 =	0	(241)
Space heating - secondary		(21	5) x			13.	19	x 0.01 =	0	(242)
Water heating cost (other fuel)		(219	9)			3.4	8	x 0.01 =	119.29	(247)
Pumps, fans and electric keep-hot		(23	1)			13.	19	x 0.01 =	43.2	(249)
(if off-peak tariff, list each of (230a) to Energy for lighting	(230g) se	eparately (23)		licable a	nd apply	fuel pri		rding to 7 x 0.01 =	Table 12a	(250)
Additional standing charges (Table 12	١		,			13.	19		120	(251)
,	•								120	(231)
Appendix Q items: repeat lines (253) a	` '									7(055)
Total energy cost		(247) + (25	50)(254)	=					1738.76	(255)
11a. SAP rating - individual heating s	ystems									
Energy cost deflator (Table 12)									0.42	(256)
Energy cost factor (ECF)	[(255) x	(256)] ÷ [((4) + 45.0]	=					2.36	(257)
SAP rating (Section 12)									67.03	(258)
12a. CO2 emissions – Individual hea	ting evet	ome incl	ıdina mi	cro-CHE						_

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating (main system 1)	(211) x	0.216 =	8218.78 (261)
Space heating (secondary)	(215) x	0.519 =	0 (263)
Water heating	(219) x	0.216 =	740.44 (264)
Space and water heating	(261) + (262) + (263) + (264) =		8959.22 (265)
Electricity for pumps, fans and electric keep-hot	(231) x	0.519 =	169.99 (267)
Electricity for lighting	(232) x	0.519 =	519.89 (268)
Total CO2, kg/year	sum	of (265)(271) =	9649.11 (272)
CO2 emissions per m ²	(272	2) ÷ (4) =	36.55 (273)
El rating (section 14)			58 (274)

13a. Primary Energy

	Energy kWh/year	Primary factor	P. Energy kWh/year
Space heating (main system 1)	(211) x	1.22	46420.91 (261)
Space heating (secondary)	(215) x	3.07	0 (263)
Energy for water heating	(219) x	1.22 =	4182.09 (264)
Space and water heating	(261) + (262) + (263) + (264) =		50603 (265)
Electricity for pumps, fans and electric keep-hot	(231) x	3.07	1005.55 (267)
Electricity for lighting	(232) x	0 =	3075.28 (268)
'Total Primary Energy	sum	of (265)(271) =	54683.83 (272)
Primary energy kWh/m²/year	(272	?) ÷ (4) =	207.14 (273)

		User D	etails:						
Assessor Name: Software Name:	Stroma FSAP 2012		Stroma Softwa	re Ve			Versic	on: 1.0.4.18	
Address :	39, Fitzjohns Avenue, LON		Address:	LG04					
1. Overall dwelling dime	· · · · · · · · · · · · · · · · · · ·	DON, INV	V3 33 I						
The Contain and Ciling Ciling		Area	a(m²)		Av. He	ight(m)		Volume(m³)
Ground floor			77	(1a) x		3.2	(2a) =	246.4	(3a)
Total floor area TFA = (1a	a)+(1b)+(1c)+(1d)+(1e)+(1	n)	77	(4)			_		
Dwelling volume				(3a)+(3b)+(3c)+(3c	d)+(3e)+	(3n) =	246.4	(5)
2. Ventilation rate:									
	main seconda heating heating	ry	other		total			m³ per hou	r
Number of chimneys		+ [0] = [0	X 4	40 =	0	(6a)
Number of open flues	0 + 0	- + -	0	Ī = [0	x	20 =	0	(6b)
Number of intermittent far	ns			Ī	0	x '	10 =	0	(7a)
Number of passive vents				Ī	0	x .	10 =	0	(7b)
Number of flueless gas fin	res			Ī	0	X 4	40 =	0	(7c)
							Air ch	anges per ho	our
	/s, flues and fans = $(6a)+(6b)+(6b)+(6a)$				0		÷ (5) =	0	(8)
Number of storeys in the	een ca <mark>rried o</mark> ut or is intended, procee ne dwelling (ns)	ed to (17), o	otherwise d	ontinue fr	om (9) to ((16)		1	(9)
Additional infiltration	ie direction (i.e.)					[(9)	-1]x0.1 =	0	(10)
Structural infiltration: 0.	25 for steel or timber frame o	r 0.35 fo	r masonr	y consti	uction			0.35	(11)
	esent, use the value corresponding t	o the great	ter wall are	a (after					_
deducting areas of opening	igs); if equal user 0.35 loor, enter 0.2 (unsealed) or 0).1 (seale	ed). else	enter 0				0	(12)
If no draught lobby, ent	,	(000	,, 0.00					0.05	(13)
Percentage of windows	and doors draught stripped							100	(14)
Window infiltration			0.25 - [0.2	x (14) ÷ 1	00] =			0.05	(15)
Infiltration rate			(8) + (10)	+ (11) + (1	12) + (13) -	+ (15) =		0.45	(16)
•	q50, expressed in cubic metro	-	•	•	etre of e	nvelope	area	0	(17)
·	ity value, then $(18) = [(17) \div 20] + (18)$							0.45	(18)
	s if a pressurisation test has been do	ne or a deg	gree air pei	meability	is being u	sed			٦,,,,
Number of sides sheltere Shelter factor	a		(20) = 1 -	0.075 x (²	19)1 =			2	(19)
Infiltration rate incorporat	ing shelter factor		(21) = (18)		/,1			0.85	(20)
Infiltration rate modified for			() (-)	(- /				0.36	(21)
	Mar Apr May Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind sp	eed from Table 7			-			•	•	
 	4.9 4.4 4.3 3.8	3.8	3.7	4	4.3	4.5	4.7		
Wind Frage (OC.)))	1	1		1	1	1	I	
Wind Factor $(22a)m = (22a)m = 1.27$ 1.25	2)m ÷ 4 1.23	0.95	0.92	1	1.08	1.12	1.18		
(220)111- 1.21 1.20	1.20 1.1 1.00 0.95	0.90	0.84	- 1	1.00	1.12	1.10	I	

0.49	0.48	0.47	0.42	0.41	0.36	0.36	0.35	0.38	0.41	0.43	0.45		
Calculate effec		_	rate for t	he appli	cable ca	se	<u> </u>				ļ		
If mechanica												0.5	(23
If exhaust air he) = (23a)			0.5	(23
If balanced with		•	-	_								0	(23
a) If balance					1	· ` `	- ` ` - 	í `	 		i i	÷ 100]	(0.4
24a)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24
b) If balance					1		- ^ ` 	í `	 	- 			(0.4
24b)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24
c) If whole h	ouse extra า < 0.5 × (•					E v (22h	.\			
$\frac{11 (220)11}{24c)m} = 0.74$	0.73	(23D), t	0.67	0.66	0.61	0.61	0.6 = (22)	0.63	0.66	0.68	0.7		(24
.,	<u>_</u>	_	ļ.		<u> </u>			<u> </u>	0.00	0.00	0.7		(2.
d) If natural if (22b)m	ventilation n = 1, ther								0.5]				
24d)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24
Effective air	change ra	ate - er	nter (24a	or (24k	o) or (24	c) or (24	d) in bo	x (25)				l	
5)m= 0.74	0.73	0.72	0.67	0.66	0.61	0.61	0.6	0.63	0.66	0.68	0.7		(2
3. Heat losses		t loop	0 11 0 12 0 1										
LEMENT	Gross area (r	;	Openin m	gs	Net Ar A ,r		U-val W/m2		A X U (W/I	<)	k-value kJ/m²-l		A X k kJ/K
Vin <mark>dows</mark> Type	: 1				1.3	x1/	/[1/(2.8)+	0.04] =	3.27				(27
/in <mark>dows</mark> Type	: 2				1.3	x1/	/[1/(2.8)+	0.04] =	3.27				(27
Vindows Type	3				1.3	X1/	/[1/(2.8)+	0.04] =	3.27				(27
Vindows Type	4				2.25	x1/	/[1/(2.8)+	0.04] =	5.67	٦			(27
/indows Type	5				2.25	x1,	/[1/(2.8)+	0.04] =	5.67				(27
/indows Type	6				2.25	x ₁ ,	/[1/(2.8)+	0.04] =	5.67	=			(27
/alls Type1	16.64	\neg	7.1		9.54	x	1.7		16.22	=		$\neg \vdash$	(29
Jollo Typo2	19	=	4.85	=	14.15	5 X	1.7	=	24.06	=		-	(29
/alls Type2		=								_		=	
	5.5		1.3		4.2	x	1.7		7.14				(29
/alls Type3	5.5	=	1.3	=	4.2	x x	1.7	= [= [7.14	<u> </u>		┪┝	(29
/alls Type3 /alls Type4	15	m²	2.25		12.75	5 x	1.7	= [7.14 21.68				(2
/alls Type3 /alls Type4 otal area of e	15 lements, r		2.25		12.75 56.14	5 x	1.7	=	21.68	as aiven in	paragraph	3.2	(29
/alls Type3 /alls Type4 otal area of e	15 lements, r	vs, use e	2.25	ndow U-va	12.75 56.14 alue calcul	5 x	1.7	=	21.68	as given in	paragraph	3.2	(29
/alls Type3 /alls Type4 otal area of e for windows and include the area	15 lements, I roof window as on both si	vs, use e ides of in	2.25 effective winternal wali	ndow U-va	12.75 56.14 alue calcul	x 4 lated using	1.7	= [//[(1/U-valu	21.68	ns given in	paragraph	3.2	(29
/alls Type3 /alls Type4	15 Ilements, I roof window as on both sies, W/K =	vs, use e ides of in S (A x	2.25 effective winternal wali	ndow U-va	12.75 56.14 alue calcul	x 4 lated using	1.7	= [//[(1/U-valu) + (32) =	21.68	·			(3:
/alls Type3 /alls Type4 otal area of e for windows and include the area abric heat los	15 Ilements, I roof window as on both si ss, W/K = Cm = S(A	vs, use e ides of in S (A x x k)	2.25 effective winternal walk U)	ndow U-va	12.75 56.14 alue calcul	x 4 lated using	1.7	= [//[(1/U-valu) + (32) = ((28)	21.68 ue)+0.04] a	2) + (32a).		108.12	(3)
/alls Type3 /alls Type4 otal area of e for windows and include the area abric heat los eat capacity	15 Ilements, I roof window as on both si ss, W/K = Cm = S(A paramete sments wher	vs, use e ides of in S (A x x x k) er (TMF re the de	2.25 effective winternal walk U) $P = Cm \div$ tails of the	ndow U-va Is and part - TFA) ir	12.75 56.14 alue calcul titions	x 4 lated using	1.7 formula 1 (26)(30	= [//[(1/U-valu) + (32) = ((28) Indica	21.68 ue)+0.04] a (30) + (32 tive Value	2) + (32a). : Low	(32e) =	108.12 7721.6	(3)
/alls Type3 /alls Type4 otal area of e for windows and include the area abric heat los eat capacity of hermal mass or design assess	15 Ilements, I roof window as on both sites, W/K = Cm = S(A parameter siments where ad of a detail	vs, use e ides of in S (A x A x k) er (TMF re the de iled calcu	2.25 effective winternal walk U) P = Cm ÷ tails of the ulation.	ndow U-va ls and part - TFA) ir constructi	12.75 56.14 alue calcul titions n kJ/m²K	x t known pro	1.7 formula 1 (26)(30	= [//[(1/U-valu) + (32) = ((28) Indica	21.68 ue)+0.04] a (30) + (32 tive Value	2) + (32a). : Low	(32e) =	108.12 7721.6	(3:

Ventila	tion hea	at loss ca	alculated	l monthly	/				(38)m	= 0.33 × (25)m x (5))		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(38)m=	59.98	59.21	58.43	54.54	53.76	49.87	49.87	49.1	51.43	53.76	55.32	56.87		(38)
Heat tr	ansfer c	coefficier	nt, W/K						(39)m	= (37) + (3	38)m			
(39)m=	176.52	175.74	174.97	171.08	170.3	166.41	166.41	165.63	167.97	170.3	171.86	173.41		
Heat Id	ss para	meter (H	HLP), W/	m²K						Average = = (39)m ÷	Sum(39) ₁ .	12 /12=	170.88	(39)
(40)m=	2.29	2.28	2.27	2.22	2.21	2.16	2.16	2.15	2.18	2.21	2.23	2.25		
Numbe	er of day	s in moi	nth (Tab	le 1a)					,	Average =	Sum(40) ₁	12 /12=	2.22	(40)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(41)m=	31	28	31	30	31	30	31	31	30	31	30	31		(41)
4. Wa	iter heat	ting ener	rgy requi	rement:								kWh/ye	ear:	
Assum	ed occu	ipancy, I	N								2	2.4		(42)
if TF		9, N = 1		[1 - exp	(-0.0003	349 x (TF	FA -13.9)2)] + 0.0	0013 x (ΓFA -13.		4		(42)
								(25 x N)				.28		(43)
			hot water person per				-	to achieve	a water us	se target o	†			
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Hot wate			day for ea						Seh	Oct	INOV			
(44)m=	100.41	96.76	93.11	89.46	85.81	82.15	82.15	85.81	89.46	93.11	96.76	100.41		
											m(44) ₁₁₂ =		1095.39	(44)
Energy (content of	hot water	used - cal	culated mo	onthly $= 4$.	190 x Vd,r	n x nm x E	OTm / 3600	kWh/mor	th (see Ta	bles 1b, 1	c, 1d)		
(45)m=	148.91	130.23	134.39	117.16	112.42	97.01	89.9	103.16	104.39	121.65	132.8	144.21		_
If instant	taneous w	ater heatii	ng at point	of use (no	hot water	storage),	enter 0 in	boxes (46		Γotal = Su	m(45) ₁₁₂ =	= [1436.23	(45)
(46)m=	22.34	19.54	20.16	17.57	16.86	14.55	13.48	15.47	15.66	18.25	19.92	21.63		(46)
	storage													
_		` ,					•	within sa	ame ves	sel		300		(47)
Otherw	ise if no	stored	nd no ta hot wate		_			(47) ombi boil	ers) ente	er '0' in (47)			
	storage anufact		eclared l	oss facto	or is kno	wn (kWh	n/dav):				1	.69		(48)
,			m Table			(.,, , , .					.54		(49)
•			storage		ear			(48) x (49)) =			.91		(50)
b) If m	anufact	urer's de	eclared o	ylinder l	oss fact									, ,
			factor fr		e 2 (kWl	h/litre/da	ıy)					0		(51)
	-	reating s from Tal	ee section	on 4.3										(52)
			m Table	2b								0		(53)
•			storage		ear			(47) x (51)	x (52) x (53) =		0		(54)
•.		(54) in (5	-	, y ,				, , , , , , , , , , , , , , , , , , ,	. , (•		.91		(55)
Water	storage	loss cal	culated f	or each	month			((56)m = (55) × (41)ı	m				
(56)m=	28.29	25.55	28.29	27.38	28.29	27.38	28.29	28.29	27.38	28.29	27.38	28.29		(56)
	•							•		i				

If cylinder contains dedicated solar storage, (57)m = (56)m x [(50) – (H11)] ÷ (50), else (57)m = (56)m where (H11) is from Appendix H	
(57)m= 28.29 25.55 28.29 27.38 28.29 27.38 28.29 27.38 28.29 27.38 28.29 27.38 28.29	(57)
Primary circuit loss (annual) from Table 3 Primary circuit loss calculated for each month (59)m = (58) ÷ 365 × (41)m	(58)
(modified by factor from Table H5 if there is solar water heating and a cylinder thermostat)	
(59)m= 23.26 21.01 23.26 22.51 23.26 22.51 23.26 23.26 23.26 22.51 23.26 22.51 23.26	(59)
Combi loss calculated for each month (61)m = (60) \div 365 × (41)m	
(61)m= 0 0 0 0 0 0 0 0 0 0 0 0	(61)
Total heat required for water heating calculated for each month $(62)m = 0.85 \times (45)m + (46)m + (57)m + (59)m +$	(61)m
(62)m= 200.46 176.8 185.94 167.05 163.98 146.9 141.45 154.71 154.28 173.21 182.69 195.76	(62)
Solar DHW input calculated using Appendix G or Appendix H (negative quantity) (enter '0' if no solar contribution to water heating)	
(add additional lines if FGHRS and/or WWHRS applies, see Appendix G)	
(63)m= 0 0 0 0 0 0 0 0 0 0 0	(63)
Output from water heater	
(64)m= 200.46 176.8 185.94 167.05 163.98 146.9 141.45 154.71 154.28 173.21 182.69 195.76	
Output from water heater (annual) ₁₁₂ 2043	(64)
Heat gains from water heating, kWh/month 0.25 $'$ [0.85 \times (45)m + (61)m] + 0.8 \times [(46)m + (57)m + (59)m]	
(65)m= 90.75 80.55 85.93 78.87 78.62 72.17 71.13 75.54 74.62 81.69 84.07 89.19	(65)
in <mark>clude</mark> (57)m in calculation of (65)m only if cylinder is in the dwelling or hot water is from community heating	
5. Internal gains (see Table 5 and 5a):	
Mateballa seina (Tabla E) Wate	
Metabolic gains (Table 5), Watts	
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	
	(66)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	(66)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	(66) (67)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec (66)m= 144.21	` '
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec (66)m= 144.21	` '
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec (66)m= 144.21	(67)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec (66)m= 144.21	(67)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec (66)m= 144.21	(67)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec (66)m= 144.21	(67)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec (66)m= 144.21 144	(67) (68) (69)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	(67) (68) (69)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	(67) (68) (69) (70)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	(67) (68) (69) (70)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	(67) (68) (69) (70)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	(67) (68) (69) (70)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	(67) (68) (69) (70) (71)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	(67) (68) (69) (70) (71)

Table 6b

Table 6c

Table 6a

m²

Table 6d

(W)

											_		_
East	0.9x	1	X	1.3	X	19.64	X	0.76	X	0.7	=	24.45	(76)
East	0.9x	1	X	1.3	X	19.64	x	0.76	X	0.7	=	24.45	(76)
East	0.9x	1	X	2.25	X	19.64	X	0.76	X	0.7	=	42.32	(76)
East	0.9x	1	x	2.25	X	19.64	x	0.76	X	0.7	=	21.16	(76)
East	0.9x	1	x	1.3	x	38.42	x	0.76	X	0.7	=	47.83	(76)
East	0.9x	1	X	1.3	X	38.42	x	0.76	X	0.7	=	47.83	(76)
East	0.9x	1	x	2.25	x	38.42	x	0.76	X	0.7	=	82.78	(76)
East	0.9x	1	x	2.25	X	38.42	x	0.76	X	0.7	=	41.39	(76)
East	0.9x	1	X	1.3	X	63.27	x	0.76	X	0.7	=	78.77	(76)
East	0.9x	1	x	1.3	x	63.27	x	0.76	X	0.7	=	78.77	(76)
East	0.9x	1	X	2.25	x	63.27	x	0.76	X	0.7	=	136.33	(76)
East	0.9x	1	X	2.25	x	63.27	x	0.76	X	0.7	=	68.16	(76)
East	0.9x	1	x	1.3	x	92.28	x	0.76	X	0.7	=	114.88	(76)
East	0.9x	1	X	1.3	X	92.28	x	0.76	X	0.7	=	114.88	(76)
East	0.9x	1	X	2.25	X	92.28	x	0.76	X	0.7	=	198.83	(76)
East	0.9x	1	x	2.25	x	92.28	x	0.76	X	0.7	=	99.41	(76)
East	0.9x	1	X	1.3	X	113.09	x	0.76	X	0.7	=	140.79	(76)
East	0.9x	1	X	1.3	X	113.09	X	0.76	X	0.7	=	140.79	(76)
East	0.9x	1	x	2.25	х	113.09	x	0.76	x	0.7	=	243.67	(76)
East	0.9x	1	x	2.25	х	113.09	x	0.76	x	0.7	=	121.83	(76)
East	0.9x	1	x	1.3	X	115.77	X	0.76	x	0.7	=	144.12	(76)
East	0.9x	1	x	1.3	x	115.77	Х	0.76	x	0.7	=	144.12	(76)
East	0.9x	1	x	2.25	x	115.77	X	0.76	x	0.7	=	249.44	(76)
East	0.9x	1	x	2.25	x	115.77	x	0.76	x	0.7	=	124.72	(76)
East	0.9x	1	X	1.3	x	110.22	X	0.76	X	0.7	=	137.21	(76)
East	0.9x	1	x	1.3	X	110.22	X	0.76	X	0.7	=	137.21	(76)
East	0.9x	1	x	2.25	X	110.22	x	0.76	X	0.7	=	237.48	(76)
East	0.9x	1	X	2.25	x	110.22	X	0.76	X	0.7	=	118.74	(76)
East	0.9x	1	x	1.3	x	94.68	x	0.76	X	0.7	=	117.86	(76)
East	0.9x	1	X	1.3	X	94.68	X	0.76	X	0.7	=	117.86	(76)
East	0.9x	1	x	2.25	X	94.68	X	0.76	X	0.7	=	203.99	(76)
East	0.9x	1	x	2.25	x	94.68	x	0.76	X	0.7	=	101.99	(76)
East	0.9x	1	x	1.3	X	73.59	x	0.76	X	0.7	=	91.61	(76)
East	0.9x	1	x	1.3	X	73.59	x	0.76	X	0.7	=	91.61	(76)
East	0.9x	1	x	2.25	X	73.59	x	0.76	X	0.7	=	158.56	(76)
East	0.9x	1	x	2.25	x	73.59	x	0.76	X	0.7	=	79.28	(76)
East	0.9x	1	x	1.3	x	45.59	x	0.76	X	0.7	=	56.75	(76)
East	0.9x	1	x	1.3	x	45.59	x	0.76	X	0.7	=	56.75	(76)
East	0.9x	1	x	2.25	x	45.59	x	0.76	X	0.7	=	98.23	(76)
East	0.9x	1	x	2.25	x	45.59	x	0.76	X	0.7	=	49.11	(76)
East	0.9x	1	x	1.3	x	24.49	x	0.76	X	0.7	=	30.49	(76)

East	о о . Г					1			1		–				7(70)
	0.9x	1		X	1.3	J X	_	4.49	X	0.76	×	0.7	_ =	30.49	(76)
East	0.9x	1		X	2.25	J X	_	4.49	X	0.76	X	0.7	╡ -	52.76	(76)
East	0.9x	1		X	2.25	J X	_	4.49	X	0.76	→ ×	0.7	_ =	26.38	(76)
East	0.9x	1		X	1.3	」 ^X	\vdash	6.15	X	0.76	→ ×	0.7	=	20.11	(76)
East	0.9x	1		X	1.3	X	1	6.15	X	0.76	×	0.7	_ =	20.11	(76)
East -	0.9x	1		X	2.25	X	1	6.15	X	0.76	×	0.7	=	34.8	(76)
East	0.9x	1		X	2.25	X	1	6.15	X	0.76	X	0.7	=	17.4	(76)
South	0.9x	1		X	1.3	X	4	6.75	X	0.76	X	0.7	=	29.1	(78)
South	0.9x	1		X	2.25	X	4	6.75	X	0.76	X	0.7	=	50.37	(78)
South	0.9x	1		X	1.3	X	7	6.57	X	0.76	X	0.7	=	47.66	(78)
South	0.9x	1		X	2.25	X	7	6.57	X	0.76	X	0.7	=	82.49	(78)
South	0.9x	1		X	1.3	X	9	7.53	X	0.76	X	0.7	=	60.71	(78)
South	0.9x	1		X	2.25	X	9	7.53	X	0.76	X	0.7	=	105.07	(78)
South	0.9x	1		X	1.3	X	1	10.23	X	0.76	X	0.7	=	68.61	(78)
South	0.9x	1		x	2.25	X	1	10.23	x	0.76	X	0.7	=	118.76	(78)
South	0.9x	1		x	1.3	x	1	14.87	X	0.76	x	0.7	=	71.5	(78)
South	0.9x	1		X	2.25	X	1	14.87	X	0.76	x	0.7	=	123.75	(78)
South	0.9x	1		X	1.3	X	1	10.55	Х	0.76	X	0.7	=	68.81	(78)
South	0.9x	1		x	2.25	x	1	10.55	x	0.76	x	0.7	_	119.09	(78)
South	0.9x	1		x	1.3	х	10	08.01	x	0.76	х	0.7	_ =	67.23	(78)
South	0.9x	1		x	2.25	X	10	08.01	x	0.76	х	0.7	=	116.36	(78)
South	0.9x	1		x	1.3	x	10	04.89	Х	0.76	x	0.7		65.29	(78)
South	0.9x	1	7	x	2.25	j x	10	04.89	X	0.76	X	0.7	=	113	(78)
South	0.9x	1		x	1.3	x	1/	01.89	X	0.76	х	0.7	=	63.42	(78)
South	0.9x	1		x	2.25	x	10	01.89	x	0.76	x	0.7	=	109.76	(78)
South	0.9x	1		x	1.3	x	8	2.59	X	0.76	x	0.7	=	51.4	(78)
South	0.9x	1		x	2.25	x	8	2.59	x	0.76	x	0.7	=	88.97	(78)
South	0.9x	1		x	1.3	x	5	5.42	x	0.76	x	0.7	=	34.49	(78)
South	0.9x	1		x	2.25	x	5	5.42	x	0.76	x	0.7	=	59.7	(78)
South	0.9x	1		x	1.3	j×	4	10.4	x	0.76	×	0.7		25.15	(78)
South	0.9x	1		x	2.25	j×	4	10.4	x	0.76	×	0.7	_ =	43.52	(78)
	_			'		_									_
Solar ga	ains in	watts, ca	alcula	ted	for each mor	ıth			(83)m	= Sum(74)m .	(82)m			_	
(83)m=	191.84	349.97	527.	81	715.37 842.3	3 8	350.3	814.22	72	0 594.23	401.2	2 234.31	161.08		(83)
Total ga	ins – i	nternal a	and so	olar	(84)m = (73) i	m + (83)m	, watts							
(84)m=	804.04	955.61	1109	.25	1260.99 1352.	17 1:	329.28	1276.48	1192	2.63 1088.78	931.8	803.77	759.07		(84)
7. Mea	ın inter	nal temp	eratu	ıre (heating seas	on)									
Tempe	rature	during h	neatin	g pe	eriods in the I	iving	area f	rom Tab	ole 9,	Th1 (°C)				21	(85)
Utilisat	ion fac	tor for g	ains f	or li	ving area, h1	,m (s	ee Ta	ble 9a)							_
	Jan	Feb	Ma	ar	Apr Ma	ıy	Jun	Jul	A	ug Sep	Oct	Nov	Dec		
(86)m=	0.93	0.9	0.8	6	0.79 0.7		0.58	0.46	0.9	5 0.67	0.83	0.91	0.93		(86)
Mean i	nterna	l temper	ature	in li	ving area T1	(follo	w ste	ps 3 to 7	in T	able 9c)					
(87)m=	17.38	17.75	18.3	-	19.2 19.9	· —	20.49	20.76	20.		19.31	18.22	17.33		(87)
_								I							

(88)m= 19.1	5 19.15	19.16	19.19	19.2	19.23	19.23	19.23	19.22	19.2	19.18	19.17		(88)
Utilisation f	actor for q	ains for	rest of d	welling,	h2,m (se	e Table	9a)						
(89)m= 0.92	 	0.83	0.75	0.63	0.47	0.31	0.35	0.57	0.78	0.88	0.92		(89)
Mean inter	nal temper	ature in	the rest	of dwelli	na T2 (fo	ollow ste	eps 3 to 7	7 in Tabl	e 9c)	<u> </u>			
(90)m= 14.7		16.1	17.23	18.17	18.86	19.13	19.1	18.63	17.42	15.91	14.65		(90)
				<u> </u>		Į.		f	LA = Livin	g area ÷ (4	1) =	0.39	(91)
Mean inter	nal temper	ature (fo	r the wh	ole dwe	llina) = fl	LA × T1	+ (1 – fL	A) x T2			L		
(92)m= 15.7		16.99	17.99	18.85	19.5	19.76	19.73	19.27	18.16	16.81	15.7		(92)
Apply adjus	stment to t	he mear	internal	l temper	ature fro	m Table	4e, whe	ere appro	opriate				
(93)m= 15.7	5 16.22	16.99	17.99	18.85	19.5	19.76	19.73	19.27	18.16	16.81	15.7		(93)
8. Space h	eating req	uirement											
Set Ti to th			•		ed at ste	ep 11 of	Table 9	o, so tha	t Ti,m=(76)m and	d re-calc	ulate	
the utilisation					1	11	Δ	0	0-4	Mari	Data		
Jar Utilisation f		Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(94)m= 0.88	 	0.79	0.71	0.61	0.49	0.36	_0.4	0.57	0.75	0.84	0.89		(94)
Useful gair					00	0.00	311	0.0.	0.1.0	0.0.	0.00		(-)
(95)m= 705.1		877.07	898.65	829.18	646.07	461.57	472.34	624.91	695.02	678.43	672.5		(95)
Monthly av	erage exte	ernal tem	perature	e from Ta	able 8								
(96)m= 4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2		(96)
Heat loss r	ate for me	an intern	al tempe	erature,	Lm , W =	=[(39)m	x [(93)m	– (96)m]				
(97)m= 2020.	87 1988.58	1835.62	1555.9	1217.77	814.88	526.47	551.73	868.66	1287.06	1668.48	1993.61		(97)
0	tina roquir												
		_	r each n	nonth, k	Wh/mont	th = 0.02	24 x [(97))m – (95)m] x (4 ⁻	_			
(98)m= 978.9		713.16	r each m 473.22	289.11	Wh/mont 0	th = 0.02	24 x [(97)) <mark>m – (9</mark> 5 0)m] x (4 ² 440.48	1)m 712.84	982.91		
		_					0	0	440.48	_	L	5386.17	(98)
	795.52	713.16	473.22	289.11			0	0	440.48	712.84	L	5386.17	(98)
(98)m= 978.9	795.52	713.16 ement in	473.22 kWh/m²	289.11 ² /year	0	0	0 Tota	0 I per year	440.48	712.84	L		===
Space hea	795.52 ting requirerequirementing:	713.16 ement in	473.22 kWh/m²	289.11 P/year eating s	o vystems i	0 ncluding	0 Tota	0 I per year	440.48	712.84	L		(99)
Space hea	795.52 ting requirerequirementing:	713.16 ement in	473.22 kWh/m²	289.11 P/year eating s	o vystems i	0 ncluding	0 Tota	0 I per year	440.48	712.84	L		===
Space hea	795.52 ting requirementing: space hea	713.16 ement in nts – Indiat from se	kWh/m² ividual h	289.11 P/year eating s y/supple	o vystems i	ncluding system	0 Tota	0 I per year	440.48	712.84	L	69.95	(99)
Space hea 9a. Energy r Space hea Fraction of	795.52 ting require requirementing: space hea	713.16 ement in nts – Indi	kWh/m² ividual h econdary	289.11 P/year eating s y/supple em(s)	o vystems i	ncluding system	0 Tota	0 I per year CHP)	440.48 (kWh/year	712.84	L	69.95	(99)
Space hea 9a. Energy r Space hea Fraction of	795.52 ting require requirementing: space hea total heati	713.16 ement in nts – Indi at from se at from m	kWh/m² ividual h econdary nain syst	289.11 2/year eating si y/supple em(s) stem 1	o vystems i	ncluding system	0 Tota	0 I per year CHP)	440.48 (kWh/year	712.84	L	69.95 0 1	(99)
Space hear 9a. Energy r Space hear Fraction of Fraction of	ting require requirementing: space heat total heati	ement in nts – Indiat from seat from mng from acce heat	kWh/m² ividual h econdary nain systemain systeming system	289.11 P/year eating s y/supple em(s) stem 1 em 1	ystems i	ncluding system	0 Tota	0 I per year CHP)	440.48 (kWh/year	712.84	L	0 1 1	(99) (201) (202) (204)
Space hear 9a. Energy r Space hear Fraction of Fraction of Efficiency of	ting requirementing: space heatotal heation main space freedom in space fr	ement in nts – Indiat from seat from mng from acce heat	kWh/m² ividual h econdary nain systemain systeming system	289.11 P/year eating s y/supple em(s) stem 1 em 1	ystems i	ncluding system	0 Tota	0 I per year CHP) - (201) = 02) × [1 -	440.48 (kWh/year	712.84	L	0 1 1 71	(99) (201) (202) (204) (206) (208)
Space hear 9a. Energy r Space hear Fraction of Fraction of Efficiency of Efficiency of	ting require requirementing: space heatotal heation main space heatof secondary	ement in nts – Indiat from seat from mager heat try/supplement	kWh/m² ividual h econdary nain syst main syst ing syste ementar Apr	289.11 2/year eating s y/supple em(s) stem 1 em 1 y heating	ystems in the state of the stat	ncluding system	0 Tota micro-C	0 I per year CHP)	440.48 (kWh/year	712.84) = Sum(96	8)15,912 =	0 1 1 71 0	(99) (201) (202) (204) (206) (208)
Space hear 9a. Energy of Space hear Fraction of Fraction of Efficiency of Efficiency of Jar	ting requirementing: space heatotal heation main space freedom space heatotal heation freedom secondary.	ement in nts – Indiat from seat from mager heat try/supplement	kWh/m² ividual h econdary nain syst main syst ing syste ementar Apr	289.11 2/year eating s y/supple em(s) stem 1 em 1 y heating	ystems in the state of the stat	ncluding system	0 Tota micro-C	0 I per year CHP) - (201) = 02) × [1 -	440.48 (kWh/year	712.84) = Sum(96	8)15,912 =	0 1 1 71 0	(99) (201) (202) (204) (206) (208)
Space hear 9a. Energy r Space hear Fraction of Fraction of Efficiency of Efficiency of Jar Space hear	ting requirementing: space heatotal heation main space from the space heatotal heation from Februing requirementing requirements at 1795.52	ement in at from so at from mace heat ary/supplement (compared to the following from a	kWh/m² ividual h econdary nain systemain systementar Apr ealculatee	289.11 P/year eating s y/supple em(s) stem 1 em 1 y heating May d above 289.11	ystems in mentary g system Jun	ncluding system	0 Tota micro-C (202) = 1 - (204) = (2	0 I per year CHP) - (201) = 02) × [1 -	440.48 (kWh/year	712.84) = Sum(96	8) _{15,912} =	0 1 1 71 0	(99) (201) (202) (204) (206) (208)
Space hear 9a. Energy I Space hear Fraction of Fraction of Efficiency of Efficiency of Space hear 978.9 (211)m = {[(ting requirementing: space heatotal heation main space from the space heatotal heation from Februing requirementing requirements at 1795.52	ement in at from se at from m ng from ace heat ary/supple Mar ement (c 713.16	kWh/m² ividual h econdary nain systemain systementar Apr ealculatee	289.11 P/year eating s y/supple em(s) stem 1 em 1 y heating May d above 289.11	ystems in mentary g system Jun	ncluding system	0 Tota micro-C (202) = 1 - (204) = (2	0 I per year CHP) - (201) = 02) × [1 -	440.48 (kWh/year	712.84) = Sum(96	8) _{15,912} =	0 1 1 71 0	(99) (201) (202) (204) (206) (208) ear
Space hear 9a. Energy I Space hear Fraction of Fraction of Efficiency of Efficiency of Space hear 978.9 (211)m = {[(ting requirementing: space heatotal heation secondar Februing requirementing: space heatotal heation space heatotal heation secondar Februing requirementing	ement in at from se at from m ng from ace heat ary/supple Mar ement (c 713.16	kWh/m² ividual h econdary nain systemain systementar Apr ealculatee 473.22 00 ÷ (20	289.11 P/year eating s y/supple em(s) stem 1 em 1 y heating May d above 289.11	ystems in mentary g system Jun 0	ncluding system n, % Jul 0	0 Tota micro-C (202) = 1 - (204) = (204) Aug 0	0 I per year CHP) - (201) = 02) × [1 - 1	440.48 (kWh/year (203)] = Oct 440.48	712.84) = Sum(90 Nov	Dec 982.91	0 1 1 71 0	(99) (201) (202) (204) (206) (208) ear
Space hear 9a. Energy I Space hear Fraction of Fraction of Efficiency of Efficiency of Space hear 978.9 (211)m = {[(ting requirementing: space heatotal heation frequirementing space heatotal heation frequirementing requirementing requirementi	ement in nts – Indiat from seat from mace heat ry/supplement (c 713.16) 3 x 1 1004.45	kWh/m² ividual h econdary nain systemain systementar Apr ealculated 473.22 00 ÷ (20 666.51	289.11 Plysupple em(s) stem 1 y heating May d above 289.11 06) 407.2	ystems in mentary g system Jun 0	ncluding system n, % Jul 0	0 Tota micro-C (202) = 1 - (204) = (204) Aug 0	0 I per year CHP) - (201) = 02) × [1 - 1	440.48 (kWh/year (203)] = Oct 440.48	712.84) = Sum(90 Nov 712.84	Dec 982.91	0 1 1 71 0 kWh/y	(99) (201) (202) (204) (206) (208) ear
Space hear 9a. Energy of Space hear 9a. Energy of Space hear Fraction of Fraction of Efficiency of Efficiency of Space hear 978.9 (211)m = {[(1378.1378.1378.1378.1378.1378.1378.1378.	ting requirementing: space heatotal heation frequirementing: space heatotal heation frequirementing requirementing requirementing requirementing requirementing requirementing requirementing requirementing fuel (sq. (201)] } x 1	ement in the Indian from some at from mace heat try/supplement (continuation) X 1 1004.45 econdar 00 ÷ (20	kWh/m² ividual h econdary nain systemain systementar Apr ealculated 473.22 00 ÷ (20 666.51	289.11 Plyear eating signs of the second signs	ystems in mentary g system Jun 0	ncluding system Jul 0	0 Tota micro-C (202) = 1 - (204) = (0 I per year CHP) - (201) = 02) × [1 - 6 Sep 0 I (kWh/yea	440.48 (kWh/year (203)] = Oct 440.48 620.39 ar) =Sum(2	712.84) = Sum(96 Nov 712.84 1004 211) _{15,1012}	Dec 982.91	0 1 1 71 0 kWh/y	(99) (201) (202) (204) (206) (208) ear
Space hear 9a. Energy I Space hear Fraction of Fraction of Efficiency of Efficiency of Space hear 978.9 (211)m = {[((ting requirementing: space heatotal heation frequirement total heation frequirement total heation frequirement frequirement from the frequirement fr	ement in the secondary of the secondary	kWh/m² ividual h econdary nain systemain systementar Apr ealculated 473.22 00 ÷ (20 666.51	289.11 Plysupple em(s) stem 1 y heating May d above 289.11 06) 407.2	ystems in mentary g system Jun 0	ncluding system n, % Jul 0	0 Tota micro-C (202) = 1 - (204) = (204) Aug 0 Tota	0 I per year CHP) - (201) = 02) × [1 - 1] Sep 0 I (kWh/yea	440.48 (kWh/year (203)] = Oct 440.48 620.39 ar) = Sum(2	712.84) = Sum(96 Nov 712.84 1004 211) _{15,1012}	Dec 982.91	69.95 0 1 1 71 0 kWh/y	(99) (201) (202) (204) (206) (208) ear (211)
Space hear 9a. Energy of Space hear 9a. Energy of Space hear Fraction of Fraction of Efficiency of Efficiency of Space hear 978.9 (211)m = {[(1378.1378.1378.1378.1378.1378.1378.1378.	ting require requirementing: space heatotal heation fraction requirement total heation fraction requirement requirement from a repuirement requirement	ement in the Indian from some at from mace heat try/supplement (continuation) X 1 1004.45 econdar 00 ÷ (20	kWh/m² ividual h econdary nain systemain systementar Apr ealculated 473.22 00 ÷ (20 666.51	289.11 Plyear eating signs of the second signs	ystems in mentary g system Jun 0	ncluding system Jul 0	0 Tota micro-C (202) = 1 - (204) = (204) Aug 0 Tota	0 I per year CHP) - (201) = 02) × [1 - Sep 0 I (kWh/yea	440.48 (kWh/year (203)] = Oct 440.48 620.39 ar) = Sum(2	712.84) = Sum(96 Nov 712.84 1004 211) _{15,1012}	Dec 982.91	0 1 1 71 0 kWh/y	(99) (201) (202) (204) (206) (208) ear

Water heating Output from water heater (calculated)	ahova)									
200.46 176.8 185.94 167.05		146.9	141.45	154.71	154.28	173.21	182.69	195.76		
Efficiency of water heater									60.3	(216)
(217)m= 68.92 68.78 68.49 67.86	66.72	60.3	60.3	60.3	60.3	67.61	68.52	68.97		(217)
Fuel for water heating, kWh/month										
(219) m = (64) m x $100 \div (217)$ m (219)m = 290.85 257.05 271.5 246.18	245.78	243.62	234.58	256.57	255.85	256.17	266.62	283.85	1	
				Tota	I = Sum(2	19a) ₁₁₂ =			3108.61	(219)
Annual totals						k\	Wh/yeaı	r	kWh/year	_
Space heating fuel used, main system	າ 1								7586.16	
Water heating fuel used									3108.61	
Electricity for pumps, fans and electric	keep-hot									
mechanical ventilation - balanced, ex	ctract or pc	sitive i	nput fron	n outside	Э			76	7	(230
central heating pump:								30	<u></u>	(230
Total electricity for the above, kWh/ye	ar			sum	of (230a).	(230g) =			106	(231)
Electricity for lighting									489.75] (232)
10a. Fuel costs - individual heating s	vstems:							_		J` '
Total Fuor Costs Individual Housing S	yotomo.									
		Fu kW	el /h/ye <mark>ar</mark>			Fuel P (Table			Fuel Cost £/year	
Spa <mark>ce he</mark> ating - main system 1		(21	1) x			3.4	8	x 0.01 =	264	(240)
Spa <mark>ce he</mark> ating - main system 2		(21	3) x			0		x 0.01 =	0	(241)
Space heating - secondary		(21	5) x			13.	19	x 0.01 =	0	(242)
Water heating cost (other fuel)		(219	9)			3.4	8	x 0.01 =	108.18	_](247)
Pumps, fans and electric keep-hot		(23	1)			13.	19	x 0.01 =	13.98	」 (249)
(if off-peak tariff, list each of (230a) to	(230a) ser	parately	v as app	licable a	nd apply			rdina to		」 ` ′
Energy for lighting	(=009) 00	(232				13.		x 0.01 =	64.6	(250)
Additional standing charges (Table 12	<u>'</u>)								120	(251)
Appendix Q items: repeat lines (253)	and (254) :	as need	ded							_
Total energy cost	, ,		50)(254)	=					570.76	(255)
11a. SAP rating - individual heating s	systems									
Energy cost deflator (Table 12)									0.40	(256)
		256)] ± [((4) + 45 01	_					0.42	_
. , ,	$[(255) \times ($		(. ,]						1.96	(257)
Energy cost factor (ECF)	[(255) x (, ,,, ,,,							70.50]
Energy cost factor (ECF) SAP rating (Section 12)			udina mi	cro-CHE)				72.59	(258)
Energy cost factor (ECF)		ms inclu		cro-CHF)					(258)
Energy cost factor (ECF) SAP rating (Section 12)		ms inclu	uding mi n ergy /h/year	cro-CHF		Emiss kg CO	ion fac 2/kWh	tor	72.59 Emissions kg CO2/yea	

Space heating (secondary)	(215) x	0.519 =	0 (263	33)
Water heating	(219) x	0.216 =	671.46 (264	34)
Space and water heating	(261) + (262) + (263) + (264) =		2310.07 (265	35)
Electricity for pumps, fans and electric keep-hot	(231) x	0.519 =	55.02 (267	57)
Electricity for lighting	(232) x	0.519 =	254.18 (268	38)
Total CO2, kg/year	sum	of (265)(271) =	2619.26 (272	7 2)
CO2 emissions per m²	(272	2) ÷ (4) =	34.02 (273	⁷ 3)
El rating (section 14)			71 (274	7 4)

13a. Primary Energy

	Energy kWh/year	Primary factor	P. Energy kWh/year
Space heating (main system 1)	(211) x	1.22 =	9255.11 (261)
Space heating (secondary)	(215) x	3.07	0 (263)
Energy for water heating	(219) x	1.22 =	3792.51 (264)
Space and water heating	(261) + (262) + (263) + (264) =		13047.62 (265)
Electricity for pumps, fans and electric keep-hot	(231) x	3.07 =	325.43 (267)
Electricity for lighting	(232) x	0 =	1503.52 (268)
'Tot <mark>al Pri</mark> mary Energ <mark>y</mark>	sum	of (265)(271) =	14876.57 (272)
Primary energy kWh/m²/year	(272	2) ÷ (4) =	193.2 (273)

		User D	Details:						
Assessor Name: Software Name:	Stroma FSAP 2012		Stroma Softwa	are Ve			Versic	on: 1.0.4.18	
Address :	39, Fitzjohns Avenue, LON		Address:	GF03					
1. Overall dwelling dimens	•	DON, IN	773 33 1						
		Are	a(m²)		Av. He	ight(m)		Volume(m³	•)
Ground floor			121	(1a) x		3.2	(2a) =	387.2	(3a)
Total floor area TFA = (1a)-	+(1b)+(1c)+(1d)+(1e)+(1	n)	121	(4)			_		_
Dwelling volume				(3a)+(3b)+(3c)+(3c	l)+(3e)+	.(3n) =	387.2	(5)
2. Ventilation rate:									
	main seconda heating heating	ry	other		total			m³ per hou	r
Number of chimneys		+ [0] = [0	X 4	40 =	0	(6a)
Number of open flues	0 + 0	= +	0	Ī = Ī	0	x	20 =	0	(6b)
Number of intermittent fans				Ī	0	x	10 =	0	(7a)
Number of passive vents				Ī	0	x ·	10 =	0	(7b)
Number of flueless gas fires	s			Ī	0	X 4	40 =	0	(7c)
							Air ch	nanges per ho	our
Infiltration due to chimneys,					0		÷ (5) =	0	(8)
If a pressurisation test has been Number of storeys in the	n carried out or is intended, proceed	ed to (17),	otherwise o	continue fr	rom (9) to ((16)			7 (0)
Additional infiltration	dwelling (ris)					[(9)	-1]x0.1 =	0	(9) (10)
	5 for steel or timber frame o	r 0.35 fo	r masonr	y consti	ruction			0.35	(11)
	ent, use the value corresponding t	o the grea	ter wall are	a (after					 `
deducting areas of openings	s); if equal user 0.35 or, enter 0.2 (unsealed) or () 1 (coal	ad) also	ontor O					7(42)
If no draught lobby, enter	,). I (Seal	eu), eise	enter o				0.05	(12)
•	and doors draught stripped							100	(14)
Window infiltration	and doors araagin surpped		0.25 - [0.2	x (14) ÷ 1	100] =			0.05	(15)
Infiltration rate			(8) + (10)	+ (11) + (1	12) + (13) -	+ (15) =		0.45	(16)
Air permeability value, q5	50, expressed in cubic metro	es per ho	our per so	quare m	etre of e	nvelope	area	0	(17)
If based on air permeability	value, then $(18) = [(17) \div 20] +$	(8), otherw	vise (18) = (16)				0.45	(18)
	f a pressurisation test has been do	ne or a de	gree air pei	rmeability	is being u	sed			
Number of sides sheltered			(20) – 1	0 075 v (r	10\1			2	(19)
Shelter factor			(20) = 1 -		19)] =			0.85	(20)
Infiltration rate incorporating	_		(21) = (18)	(20) =				0.38	(21)
Infiltration rate modified for		1 11	1 0	Can	0.04	Nov	Daa		
l l	ar Apr May Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind spee		T 20	1 27	4	1 4 2	1 4 5	4.7	1	
(22)m= 5.1 5 4.9	9 4.4 4.3 3.8	3.8	3.7	4	4.3	4.5	4.7		
Wind Factor $(22a)m = (22)r$	m ÷ 4		_						
(22a)m= 1.27 1.25 1.2	23 1.1 1.08 0.95	0.95	0.92	1	1.08	1.12	1.18		

	0.48	0.47	0.42	0.41	d wind s	0.36	0.35	0.38	0.41	0.43	0.45		
alculate effec		-	rate for t	he appli	cable ca	se	<u> </u>	ļ	ļ	ļ	ļ		
If mechanica												0.5	(23
If exhaust air he) = (23a)			0.5	(23
If balanced with		•		_								0	(23
a) If balance		1				- ` ` 	- ` ` - 	ŕ	, 	- 	<u> </u>	÷ 100]	(0.4
(4a)m= 0		0	0	0	0	0	0	0	0	0	0		(24
b) If balance					1		- ^ ` ` - 	i `	r ´ `	'			(0.4
(4b)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24
c) If whole he if (22b)m				•	-				5 v (23h	.)			
4c)m= 0.74	0.73	0.72	0.67	0.66	0.61	0.61	0.6	0.63	0.66	0.68	0.7		(24
d) If natural v						<u> </u>			0.00	0.00	0.7		(-
if (22b)m									0.5]				
4d)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24
Effective air	change i	rate - en	iter (24a	or (24k	o) or (24	c) or (24	d) in box	x (25)					
(5)m= 0.74	0.73	0.72	0.67	0.66	0.61	0.61	0.6	0.63	0.66	0.68	0.7		(2
D. Hast lease	and be	at loop t	oromot										_
3. Heat losses	Gros		Openin		Net Ar	93	U-valı	110	AXU		k-value		ΑΧk
LEIVIEINI	area (m		A ,r		W/m2		(W/	K)	kJ/m ² ·l		kJ/K
/in <mark>dows</mark> Type	: 1				2.7	x1,	/[1/(2.8)+	0.04] =	6.8				(2
/in <mark>dows</mark> Type	2				1.8	x1,	/[1/(2.8)+	0.04] =	4.53	П			(2
/indows Type	3				4.4	x1,	/[1/(2.8)+	0.04] =	11.08	Ħ			(2
/indows Type	4				2.16	x1,	/[1/(2.8)+	0.04] =	5.44	5			(2
/indows Type	5				5.61	x1,	/[1/(2.8)+	0.04] =	14.13	=			(2
alls Type1	6		0		6	x	1.7	─ i	10.2	= [(2
/alls Type2	14	=	2.7	_	11.3	x	1.7	=	19.21	=			(2
/alls Type3	40.5		8		32.5	=	1.7	_	55.25	=		╡┝	(2
/alls Type4	22	=	9.93	_	12.07	=	1.7		20.52	룩 ;		╡	(2
		 m²	9.90		82.5	=	1.7		20.32				(3
otal area of e	icincino,				62.3							. 2.0	(3
	roof windo	ws. use e	ffective wi	ndow U-va	alue calcul	ated usino	formula 1	/[(1/U-valu	ie)+0.041 a	as aiven in	paragraph	1 3.2	
otal area of e for windows and include the area						ated using	ı formula 1	/[(1/U-valu	ıe)+0.04] a	as given in	paragraph	3.2	
for windows and	s on both s	sides of in	ternal wal				formula 1		ie)+0.04] a	as given in	paragraph	157.13	(3
for windows and include the area abric heat los	s on both s s, W/K =	sides of in = S (A x	ternal wal) + (32) =	(30) + (33				ऱ
for windows and include the area abric heat los eat capacity (s on both s s, W/K = Cm = S(A	sides of in = S (A x A x k)	ternal wal	ls and pan	titions) + (32) = ((28).		2) + (32a).		157.13	
for windows and include the area abric heat los eat capacity (nermal mass or design assess	es on both ses, W/K = Cm = S(A paramet cments whe	sides of in S (A x A x k) ter (TMF ere the det	ternal wall U) P = Cm ÷	ls and pan	n kJ/m²K		(26)(30)) + (32) = ((28). Indica	(30) + (3: tive Value	2) + (32a). : Low	(32e) =	157.13 11755.3	3 (3
for windows and include the area	es on both ses, W/K = Cm = S(A) parametements wheeled of a detail	sides of in S (A x A x k) ter (TMF ere the det ailed calcu	ternal wall U) P = Cm ÷ tails of the	s and pan	n kJ/m²K ion are not	t known pr	(26)(30)) + (32) = ((28). Indica	(30) + (3: tive Value	2) + (32a). : Low	(32e) =	157.13 11755.3 100	3 (3
for windows and include the area abric heat los eat capacity (nermal mass or design assess on be used instead	is on both ses, W/K = Cm = S(A) parametements whee ad of a detales: S(L: All bridging a	sides of in S (A x A x k) ter (TMF ere the det ailed calcu x Y) calcu	ternal wall U) P = Cm ÷ tails of the ulation. culated t	- TFA) ir constructu	n kJ/m²K ion are not opendix I	t known pr	(26)(30)) + (32) = ((28). Indica	(30) + (3: tive Value	2) + (32a). : Low	(32e) =	157.13 11755.3	3 (3

	1		1			1					1	I	(2.2)
(38)m= 94.26	93.04	91.82	85.71	84.48	78.37	78.37	77.15	80.82	84.48	86.93	89.37		(38)
Heat transfer		 	-			1			= (37) + (I	
(39)m= 263.76	262.54	261.32	255.21	253.98	247.87	247.87	246.65	250.32	253.98	256.43	258.87		7(20)
Heat loss para	ameter (I	HLP), W	/m²K			ī			Average = = (39)m ÷	Sum(39) ₁ · (4)	12 /12=	254.9	(39)
(40)m= 2.18	2.17	2.16	2.11	2.1	2.05	2.05	2.04	2.07	2.1	2.12	2.14		_
Number of day	ys in mo	nth (Tab	le 1a)					/	Average =	Sum(40) ₁	12 /12=	2.11	(40)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(41)m= 31	28	31	30	31	30	31	31	30	31	30	31		(41)
	-		-			-	-			-	-		
4. Water hea	iting ene	rgy requi	irement:								kWh/ye	ear:	
Assumed occ	upancy,	N								2.	.87		(42)
if TFA > 13. if TFA £ 13.		+ 1.76 x	[1 - exp	(-0.0003	349 x (TF	FA -13.9)2)] + 0.0	0013 x (T	ΓFA -13.	.9)		'	
Annual averag											2.29		(43)
Reduce the annu not more that 125	•		0,		Ū	•	to achieve	a water us	se target o	t			
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Hot water usage						- 1		Sep	Oct	INOV	Dec		
(44)m= 112.52	108.43	104.34	100.25	96.16	92.06	92.06	96.16	100.25	104.34	108.43	112.52		
, ,									Γotal = Su	M(44) ₁₁₂ =		1227.52	(44)
Ener <mark>gy cont</mark> ent o	f hot wa <mark>ter</mark>	used - cal	culated mo	onthly $= 4$.	190 x Vd,r	n x nm x E	OTm / 3600	kWh/mon	th (see Ta	bles 1b, 1	c, 1d)		
(45)m= 166.87	145.94	150.6	131.3	125.98	108.71	100.74	115.6	116.98	136.33	148.81	161.6		
If instantaneous v	vater heati	ina at point	of use (no	hot water	storage).	enter 0 in	boxes (46		Γotal = Su	m(45) ₁₁₂ =	=	1609.48	(45)
(46)m= 25.03	21.89	22.59	19.69	18.9	16.31	15.11	17.34	17.55	20.45	22.32	24.24		(46)
Water storage	1	22.59	19.09	10.9	10.51	13.11	17.54	17.55	20.43	22.52	24.24		(10)
Storage volum	ne (litres)) includir	ng any so	olar or W	/WHRS	storage	within sa	ame ves	sel		300		(47)
If community I	_			•			. ,						
Otherwise if n		hot wate	er (this in	icludes i	nstantar	neous co	mbi boil	ers) ente	er '0' in (47)			
Water storage a) If manufac		eclared I	oss facto	or is kno	wn (kWh	n/day).				1	.69		(48)
Temperature f), 10 mil	("uay).					.54		(49)
Energy lost from				ear			(48) x (49)) =			.91		(50)
b) If manufac		_	-		or is not		, , , ,				.01		(00)
Hot water stor	_			e 2 (kWl	h/litre/da	ıy)					0		(51)
If community In Volume factor	_		on 4.3									1	(50)
Temperature f			2h								0		(52) (53)
Energy lost from				aar			(47) x (51)	v (52) v (1	53) -				. ,
Enter (50) or		_	, KVVII/ yt	zai			(41) X (31)	/ X (32) X (55) –	-	0 .91		(54) (55)
Water storage	. , .	,	for each	month			((56)m = (55) × (41)r	m		.01		()
(56)m= 28.29	25.55	28.29	27.38	28.29	27.38	28.29	28.29	27.38	28.29	27.38	28.29		(56)
If cylinder contain												l ix H	\/
(57)m= 28.29	25.55	28.29	27.38	28.29	27.38	28.29	28.29	27.38	28.29	27.38	28.29		(57)
												•	

Primary circuit loss (annual) from Table 3	(58)
Primary circuit loss calculated for each month (59)m = (58) ÷ 365 × (41)m	
(modified by factor from Table H5 if there is solar water heating and a cylinder thermostat)	
(59)m= 23.26 21.01 23.26 22.51 23.26 22.51 23.26 22.51 23.26 22.51 23.26 22.51 23.26	(59)
Combi loss calculated for each month (61) m = $(60) \div 365 \times (41)$ m	
(61)m= 0 0 0 0 0 0 0 0 0 0 0 0	(61)
Total heat required for water heating calculated for each month $(62)m = 0.85 \times (45)m + (46)m + (57)m + (59)m + (61)m$	n
(62)m= 218.42 192.51 202.15 181.19 177.54 158.6 152.29 167.15 166.87 187.88 198.7 213.16	(62)
Solar DHW input calculated using Appendix G or Appendix H (negative quantity) (enter '0' if no solar contribution to water heating)	
(add additional lines if FGHRS and/or WWHRS applies, see Appendix G)	
(63)m= 0 0 0 0 0 0 0 0 0 0 0 0	(63)
Output from water heater	
(64)m= 218.42 192.51 202.15 181.19 177.54 158.6 152.29 167.15 166.87 187.88 198.7 213.16	
Output from water heater (annual) ₁₁₂ 2216.47	(64)
Heat gains from water heating, kWh/month 0.25 ´ [0.85 × (45)m + (61)m] + 0.8 x [(46)m + (57)m + (59)m]	
(65)m= 96.73 85.78 91.32 83.57 83.13 76.06 74.74 79.68 78.81 86.57 89.39 94.98	(65)
include (57)m in calculation of (65)m only if cylinder is in the dwelling or hot water is from community heating	
5. Internal gains (see Table 5 and 5a):	
Metabolic gains (Table 5), Watts	
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	
(66)m= 172.03 172.03 172.03 172.03 172.03 172.03 172.03 172.03 172.03 172.03 172.03 172.03 172.03	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	
(67)m= 93.65 83.18 67.64 51.21 38.28 32.32 34.92 45.39 60.92 77.36 90.29 96.25	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	
(68)m= 427.63 432.06 420.88 397.08 367.03 338.78 319.91 315.48 326.66 350.46 380.52 408.76	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	
(69)m= 55.07 55.07 55.07 55.07 55.07 55.07 55.07 55.07 55.07 55.07 55.07	(69)
Pumps and fans gains (Table 5a)	
(70)m= 3 3 3 3 3 3 3 3 3 3 3 3 3 3	(70)
Losses e.g. evaporation (negative values) (Table 5)	
(71)m= -114.68 -114.68 -114.68 -114.68 -114.68 -114.68 -114.68 -114.68 -114.68 -114.68 -114.68 -114.68 -114.68	(71)
Water heating gains (Table 5)	
(72)m= 130.01 127.65 122.74 116.07 111.74 105.64 100.45 107.1 109.46 116.36 124.16 127.66	(72)
Total internal gains = $(66)m + (67)m + (68)m + (69)m + (70)m + (71)m + (72)m$	
(73)m= 766.69 758.3 726.68 679.77 632.45 592.15 570.7 583.38 612.45 659.59 710.37 748.08	(73)
6. Solar gains:	
Solar gains are calculated using solar flux from Table 6a and associated equations to convert to the applicable orientation.	
Orientation: Access Factor Area Flux g_ FF Gains	
Table 6d m² Table 6a Table 6b Table 6c (W)	
South 0.9x 1 x 2.7 x 46.75 x 0.76 x 0.7 = 60.44	(78)
South 0.9x 1 x 1.8 x 46.75 x 0.76 x 0.7 = 80.59	(78)

	_		•						ı				_
South	0.9x	1	X	4.4	X	46.75	X	0.76	X	0.7	=	98.49	(78)
South	0.9x	1	X	2.7	X	76.57	X	0.76	X	0.7	=	98.98	(78)
South	0.9x	1	X	1.8	X	76.57	X	0.76	X	0.7	=	131.98	(78)
South	0.9x	1	X	4.4	X	76.57	X	0.76	X	0.7	=	161.31	(78)
South	0.9x	1	X	2.7	X	97.53	X	0.76	X	0.7	=	126.09	(78)
South	0.9x	1	x	1.8	x	97.53	x	0.76	x	0.7	=	168.12	(78)
South	0.9x	1	X	4.4	X	97.53	X	0.76	x	0.7	=	205.48	(78)
South	0.9x	1	X	2.7	X	110.23	X	0.76	X	0.7	=	142.51	(78)
South	0.9x	1	X	1.8	X	110.23	X	0.76	X	0.7	=	190.01	(78)
South	0.9x	1	X	4.4	x	110.23	X	0.76	x	0.7	=	232.23	(78)
South	0.9x	1	X	2.7	x	114.87	X	0.76	x	0.7	=	148.5	(78)
South	0.9x	1	X	1.8	X	114.87	X	0.76	X	0.7	=	198	(78)
South	0.9x	1	x	4.4	x	114.87	x	0.76	x	0.7	=	242	(78)
South	0.9x	1	x	2.7	x	110.55	x	0.76	x	0.7	=	142.91	(78)
South	0.9x	1	X	1.8	x	110.55	X	0.76	x	0.7	=	190.55	(78)
South	0.9x	1	x	4.4	x	110.55	X	0.76	x	0.7	=	232.89	(78)
South	0.9x	1	X	2.7	X	108.01	X	0.76	X	0.7	=	139.63	(78)
South	0.9x	1	X	1.8	X	108.01	X	0.76	X	0.7	=	186.18	(78)
South	0.9x	1	x	4.4	х	108.01	x	0.76	x	0.7	=	227.55	(78)
South	0.9x	1	X	2.7	х	104.89	x	0.76	x	0.7	=	135.6	(78)
South	0.9x	1	x	1.8	X	104.89	x	0.76	x	0.7	=	180.8	(78)
South	0.9x	1	x	4.4	x	104.89	Х	0.76	x	0.7	=	220.98	(78)
South	0.9x	1	x	2.7	x	101.89	X	0.76	X	0.7	=	131.71	(78)
South	0.9x	1	x	1.8	х	101.89	X	0.76	x	0.7	=	175.62	(78)
South	0.9x	1	X	4.4	X	101.89	X	0.76	X	0.7	=	214.64	(78)
South	0.9x	1	x	2.7	x	82.59	x	0.76	X	0.7	=	106.76	(78)
South	0.9x	1	X	1.8	X	82.59	X	0.76	x	0.7	=	142.35	(78)
South	0.9x	1	X	4.4	X	82.59	X	0.76	X	0.7	=	173.98	(78)
South	0.9x	1	X	2.7	X	55.42	X	0.76	X	0.7	=	71.64	(78)
South	0.9x	1	X	1.8	x	55.42	X	0.76	x	0.7	=	95.52	(78)
South	0.9x	1	×	4.4	x	55.42	x	0.76	x	0.7	=	116.75	(78)
South	0.9x	1	x	2.7	×	40.4	x	0.76	x	0.7	=	52.23	(78)
South	0.9x	1	x	1.8	x	40.4	x	0.76	x	0.7	=	69.63	(78)
South	0.9x	1	X	4.4	X	40.4	X	0.76	X	0.7	=	85.11	(78)
West	0.9x	1	×	2.16	x	19.64	x	0.76	x	0.7	=	40.62	(80)
West	0.9x	1	X	5.61	x	19.64	x	0.76	x	0.7	=	52.76	(80)
West	0.9x	1	×	2.16	x	38.42	x	0.76	x	0.7	=	79.47	(80)
West	0.9x	1	×	5.61	x	38.42	x	0.76	x	0.7	=	103.2	(80)
West	0.9x	1	×	2.16	x	63.27	x	0.76	x	0.7	=	130.88	(80)
West	0.9x	1	X	5.61	x	63.27	x	0.76	x	0.7	=	169.96	(80)
West	0.9x	1	X	2.16	x	92.28	x	0.76	X	0.7	=	190.87	(80)

14/	_													
West	0.9x	1	X	5.6	51	x	92.28	X	0.76	X	0.7	=	247.87	(80)
West	0.9x	1	X	2.1	6	x	113.09	X	0.76	x	0.7	=	233.92	(80)
West	0.9x	1	X	5.6	51	X	113.09	X	0.76	x	0.7	=	303.77	(80)
West	0.9x	1	X	2.1	6	X	115.77	X	0.76	x	0.7	=	239.46	(80)
West	0.9x	1	X	5.6	51	x	115.77	X	0.76	x	0.7	=	310.97	(80)
West	0.9x	1	X	2.1	6	X	110.22	X	0.76	x	0.7	=	227.98	(80)
West	0.9x	1	X	5.6	51	X	110.22	X	0.76	x	0.7	=	296.05	(80)
West	0.9x	1	Х	2.1	6	X	94.68	X	0.76	х	0.7	=	195.83	(80)
West	0.9x	1	X	5.6	51	X	94.68	X	0.76	x	0.7	=	254.31	(80)
West	0.9x	1	X	2.1	6	X	73.59	X	0.76	x	0.7	=	152.21	(80)
West	0.9x	1	Х	5.6	51	X	73.59	X	0.76	х	0.7	=	197.67	(80)
West	0.9x	1	х	2.1	6	X	45.59	X	0.76	x	0.7	=	94.3	(80)
West	0.9x	1	X	5.6	51	X	45.59	X	0.76	×	0.7	_	122.46	(80)
West	0.9x	1	х	2.1	6	X	24.49	X	0.76	x	0.7	=	50.65	(80)
West	0.9x	1	х	5.6	51	X	24.49	X	0.76	x	0.7	=	65.78	(80)
West	0.9x	1	X	2.1	6	X	16.15	X	0.76	×	0.7	_	33.41	(80)
West	0.9x	1	Х	5.6	51	X	16.15	X	0.76	х	0.7	=	43.38	(80)
			_ 1											
Solar g	ains in y	watts, cal	culated	for eacl	n montl	1		(83)m	n = Sum(74)m.	(82)m				
(83)m=	<mark>3</mark> 32.9		800.51	1003.49	1126.2		16.78 1077.		.53 871.86	639.8	400.34	283.76		(83)
Total ga	ains – ir	nternal an	nd solar	(84)m =	= (73)m	+ (8	33)m , watt	3						
(84)m=	1099.59	1333.24	1527.19	1683.26	1758.65	17	708.93 1648.	1 157	0.9 1484.31	1299.4	5 1110.72	1031.83		(84)
7. Mea	an inter	nal tempe	erature ((heating	seaso	2)								
						'/		_						
Tempe	erature				the liv	_	area from T	able 9	, Th1 (°C)	т	_		21	(85)
		during he	eating p	eriods ir	,	ing	area from T ee Table 9a		, Th1 (°C)				21	(85)
		during he	eating p	eriods ir	,	ing n (s		ı)	, Th1 (°C)	Oct	Nov	Dec	21	(85)
	tion fac	during he	eating points for li	eriods in	ea, h1,r	ing n (s	ee Table 9a	n) A	ug Sep	Oct	Nov 0.92	Dec 0.95	21	(85)
Utilisa (86)m=	tion fac Jan 0.94	during he tor for gai Feb	eating points for li Mar 0.88	eriods ir iving are Apr 0.82	ea, h1,r May 0.74	ing n (se	ee Table 9a Jun Jul	A 0.5	ug Sep 55 0.7		_		21	
Utilisa (86)m=	tion fac Jan 0.94	during he tor for gai Feb	eating points for li Mar 0.88	eriods ir iving are Apr 0.82	ea, h1,r May 0.74	ing n (se	ee Table 9a Jun Jul 0.63 0.52	0.5 7 in T	ug Sep 55 0.7 Table 9c)		_		21	
Utilisa (86)m= Mean (87)m=	Jan 0.94 internal	during he tor for gain Feb 0.92 tempera	eating points for line Mar 0.88 ture in l	eriods in iving are Apr 0.82 iving are	ea, h1,r May 0.74 ea T1 (i	ing n (se	ee Table 9a Jun Jul 0.63 0.52 w steps 3 to 0.43 20.73	A 0.5 7 in T 3 20.	ug Sep 55 0.7 Table 9c) 69 20.24	0.85	0.92	0.95	21	(86)
Utilisa (86)m= Mean (87)m=	Jan 0.94 internal	during he tor for gain Feb 0.92 tempera	eating points for line Mar 0.88 ture in l	eriods in iving are Apr 0.82 iving are	ea, h1,r May 0.74 ea T1 (i	ing n (se	ee Table 9a Jun Jul 0.63 0.52 w steps 3 to	A 0.5 7 in T 20. Table 9	ug Sep 55 0.7 Fable 9c) 69 20.24 9, Th2 (°C)	0.85	0.92	0.95	21	(86)
Utilisa (86)m= Mean (87)m= Tempe (88)m=	Jan 0.94 internal 17.36 erature 19.22	during he tor for gain Feb 0.92 tempera 17.74 during he 19.22	eating points for line Mar 0.88 ture in lass 18.34 eating points 19.23	eriods in Apr 0.82 iving are 19.12 eriods in 19.26	ea, h1,r May 0.74 ea T1 (i 19.83 n rest o	ing n (se	yeelling from 19.3 19.3	A 0.5 7 in T 3 20. Table 9 19.	ug Sep 55 0.7 Fable 9c) 69 20.24 9, Th2 (°C)	19.3	0.92	0.95	21	(86)
Utilisa (86)m= Mean (87)m= Tempe (88)m= Utilisa	internal 17.36 erature 19.22	during he tor for gain Feb 0.92 tempera 17.74 during he 19.22 tor for gain	eating points for line Mar 0.88 ture in lass 18.34 eating points for r	eriods in Apr 0.82 iving are 19.12 eriods in 19.26 est of do	ea, h1,r May 0.74 ea T1 (i 19.83 n rest o 19.27 welling,	n (second of following) f dw h2,	ee Table 9a Jun Jul 0.63 0.52 w steps 3 to 0.43 20.73 relling from 19.3 19.3 m (see Tab	A 0.5 7 in T 3 20. Table 9 19.	ug Sep 55 0.7 Table 9c) 69 20.24 9, Th2 (°C) 31 19.29	19.3	18.2	0.95 17.31 19.24	21	(86) (87) (88)
Utilisa (86)m= Mean (87)m= Tempe (88)m= Utilisa (89)m=	internal 17.36 erature 19.22 tion fac	tor for gain feet to for gain feet feet feet feet feet feet feet fee	eating points for line 18.34 leating points for r 0.86	eriods in Apr 0.82 iving are 19.12 eriods in 19.26 est of do	ea, h1,r May 0.74 ea T1 (i 19.83 n rest o 19.27 welling,	n (second following) following h2,	ee Table 9a Jun Jul 0.63 0.52 w steps 3 to 0.43 20.73 relling from 19.3 19.3 m (see Tab 0.53 0.36	A 0.5 7 in T 3 20. Table 9a) 0.5 0.5	ug Sep 55 0.7 Table 9c) 69 20.24 9, Th2 (°C) 31 19.29	0.85 19.3 19.27	0.92	0.95	21	(86)
Utilisa (86)m= Mean (87)m= Tempe (88)m= Utilisa (89)m= Mean	internal 17.36 erature 19.22 tion fac 0.93 internal	tor for gain feet to for gain feet feet feet feet feet feet feet fee	eating prins for line 18.34 eating prins for r 0.86 ea	Apr 0.82 iving are 19.12 eriods ir 19.26 est of do 0.79 the rest	ea, h1,r May 0.74 ea T1 (i 19.83 n rest o 19.27 welling, 0.68 of dwel	n (s follo	ee Table 9a Jun Jul 0.63 0.52 w steps 3 to 0.43 20.73 relling from 19.3 19.3 m (see Table 9a 0.53 0.36 T2 (follow see Table 9a T3 (follow see Table 9a T4 (follow see Table 9a T5 (follow see Table 9a T6 (follow see Table 9a T7 (follow see Table 9a T8 (follo	A 0.5 7 in T 3 20. Table 9 19. 0.3 steps 3	ug Sep 55 0.7 Table 9c) 69 20.24 9, Th2 (°C) 31 19.29 9 0.61 to 7 in Table	0.85 19.3 19.27 0.81 e 9c)	18.2 19.26	0.95 17.31 19.24 0.94	21	(86) (87) (88) (89)
Utilisa (86)m= Mean (87)m= Tempe (88)m= Utilisa (89)m=	internal 17.36 erature 19.22 tion fac	tor for gain feet to for gain feet feet feet feet feet feet feet fee	eating points for line 18.34 leating points for r 0.86	eriods in Apr 0.82 iving are 19.12 eriods in 19.26 est of do	ea, h1,r May 0.74 ea T1 (i 19.83 n rest o 19.27 welling,	n (s follo	ee Table 9a Jun Jul 0.63 0.52 w steps 3 to 0.43 20.73 relling from 19.3 19.3 m (see Tab 0.53 0.36	A 0.5 7 in T 3 20. Table 9 19. 0.3 steps 3	ug Sep 55 0.7 Fable 9c) 69 20.24 9, Th2 (°C) 31 19.29 89 0.61 to 7 in Table 15 18.66	0.85 19.3 19.27 0.81 e 9c) 17.43	0.92 18.2 19.26 0.9	0.95 17.31 19.24 0.94		(86) (87) (88) (89)
Utilisa (86)m= Mean (87)m= Tempe (88)m= Utilisa (89)m= Mean	internal 17.36 erature 19.22 tion fac 0.93 internal	tor for gain feet to for gain feet feet feet feet feet feet feet fee	eating prins for line 18.34 eating prins for r 0.86 ea	Apr 0.82 iving are 19.12 eriods ir 19.26 est of do 0.79 the rest	ea, h1,r May 0.74 ea T1 (i 19.83 n rest o 19.27 welling, 0.68 of dwel	n (s follo	ee Table 9a Jun Jul 0.63 0.52 w steps 3 to 0.43 20.73 relling from 19.3 19.3 m (see Table 9a 0.53 0.36 T2 (follow see Table 9a T3 (follow see Table 9a T4 (follow see Table 9a T5 (follow see Table 9a T6 (follow see Table 9a T7 (follow see Table 9a T8 (follo	A 0.5 7 in T 3 20. Table 9 19. 0.3 steps 3	ug Sep 55 0.7 Fable 9c) 69 20.24 9, Th2 (°C) 31 19.29 89 0.61 to 7 in Table 15 18.66	0.85 19.3 19.27 0.81 e 9c) 17.43	18.2 19.26	0.95 17.31 19.24 0.94	0.29	(86) (87) (88) (89)
Utilisa (86)m= Mean (87)m= Tempe (88)m= Utilisa (89)m= Mean (90)m= Mean	internal 17.36 erature 19.22 tion fac 0.93 internal 14.7	tor for gain Feb 0.92 Itempera 17.74 during her 19.22 Itempera 15.24 Itempera	eating prins for line 18.34 eating prins for r 0.86 ture in t 16.08 eating prins for r 16.08 eat	eriods in iving are Apr 0.82 iving are 19.12 eriods in 19.26 est of do 0.79 the rest 17.17	ea, h1,r May 0.74 ea T1 (i 19.83 n rest o 19.27 welling, 0.68 of dwel 18.12	n (second follows) h2, h2, conditions abiling	ee Table 9a Jun Jul 0.63 0.52 w steps 3 to 0.43 20.73 relling from 19.3 19.3 m (see Table 0.53 0.36 T2 (follow steps 3 to 8.87 19.18	A 0.5 7 in T 3 20. Table 9 19. 0.3 steps 3 19. Table 19.	ug Sep 55 0.7 Table 9c) 69 20.24 9, Th2 (°C) 31 19.29 9 0.61 to 7 in Table 15 18.66 f - fLA) × T2	0.85 19.3 19.27 0.81 e 9c) 17.43 LA = Liv	0.92 18.2 19.26 0.9 15.91 ving area ÷ (-	0.95 17.31 19.24 0.94 14.65 4) =		(86) (87) (88) (89) (90) (91)
Utilisa (86)m= Mean (87)m= [Tempe (88)m= Utilisa (89)m= Mean (90)m= Mean (92)m=	internal 17.36 erature 19.22 tion fac 0.93 internal 14.7 internal 15.48	tor for gain temperate 17.74 during her 19.22 tor for gain 15.24 temperate 15.98	eating points for line 18.34 eating points for round 16.08 eating	eriods in iving are 19.12 iving are 19.12 eriods in 19.26 est of do 0.79 the rest 17.17 r the wh	ea, h1,r May 0.74 ea T1 (i 19.83 n rest o 19.27 welling, 0.68 of dwel 18.12	n (second follows) h2, h2, ling 1	ee Table 9a Jun Jul 0.63 0.52 w steps 3 to 0.43 20.73 relling from 19.3 19.3 m (see Tab 0.53 0.36 T2 (follow see 19.18 g) = fLA × T 9.33 19.63	A 0.5 1 20. Table 9a) 0.5 1 9. Steps 3 19. Table 9a 19. T	ug Sep 55 0.7 Table 9c) 69 20.24 9, Th2 (°C) 31 19.29 9 0.61 to 7 in Tabl 15 18.66 f - fLA) × T2 6 19.12	0.85 19.3 19.27 0.81 e 9c) 17.43 LA = Liv	0.92 18.2 19.26 0.9 15.91 ving area ÷ (-	0.95 17.31 19.24 0.94		(86) (87) (88) (89)
Utilisa (86)m= Mean (87)m= Tempe (88)m= Utilisa (89)m= Mean (90)m= Mean (92)m= Apply	internal 17.36 erature 19.22 tion fac 0.93 internal 14.7 internal 15.48 adjustm	tor for gain feet to for gain feet feet feet feet feet feet feet fee	eating points for II Mar 0.88 ture in II 18.34 eating points for r 0.86 ture in t 16.08 ture (for 16.75) e mean	eriods in iving are Apr 0.82 iving are 19.12 eriods in 19.26 est of do 0.79 the rest 17.17 r the wh 17.74 internal	ea, h1,r May 0.74 ea T1 (i 19.83 n rest o 19.27 welling, 0.68 of dwel 18.12 ole dwe 18.62 tempe	ing n (see see see see see see see see see se	ee Table 9a Jun Jul 0.63 0.52 w steps 3 to 0.43 20.73 relling from 19.3 19.3 m (see Table 0.53 0.36 T2 (follow steps 3 to 8.87 19.18 g) = fLA × T 9.33 19.63 ire from Table	A 0.5 7 in T 3 20. Table 9 19. 19. 19. 19. 19. 19. 19. 19. 19. 1	ug Sep 55 0.7 Table 9c) 69 20.24 9, Th2 (°C) 31 19.29 9 0.61 to 7 in Table 15 18.66 f fLA) x T2 6 19.12 where approximation of the second of the seco	0.85 19.3 19.27 0.81 e 9c) 17.43 tLA = Livitate popriate	0.92 18.2 19.26 0.9 15.91 ving area ÷ (-	0.95 17.31 19.24 0.94 14.65 4) =		(86) (87) (88) (89) (90) (91) (92)
Utilisa (86)m= Mean (87)m= Tempe (88)m= Utilisa (89)m= Mean (90)m= Mean (92)m= Apply (93)m=	internal 17.36 erature 19.22 tion fac 0.93 internal 14.7 internal 15.48 adjustm 15.48	tor for gain temperate 17.74 during her 19.22 tor for gain 15.24 temperate 15.98 temperate 15.	eating points for line 18.34 eating points for round 16.08 eating points for round 16.08 eating points for round 16.75 e mean 16.75 e mean 16.75	eriods in iving are 19.12 iving are 19.12 eriods in 19.26 est of do 0.79 the rest 17.17 r the wh	ea, h1,r May 0.74 ea T1 (i 19.83 n rest o 19.27 welling, 0.68 of dwel 18.12	ing n (see see see see see see see see see se	ee Table 9a Jun Jul 0.63 0.52 w steps 3 to 0.43 20.73 relling from 19.3 19.3 m (see Tab 0.53 0.36 T2 (follow see 19.18 g) = fLA × T 9.33 19.63	A 0.5 7 in T 3 20. Table 9 19. 19. 19. 19. 19. 19. 19. 19. 19. 1	ug Sep 55 0.7 Table 9c) 69 20.24 9, Th2 (°C) 31 19.29 9 0.61 to 7 in Table 15 18.66 f fLA) x T2 6 19.12 where approximation of the second of the seco	0.85 19.3 19.27 0.81 e 9c) 17.43 LA = Liv	0.92 18.2 19.26 0.9 15.91 ving area ÷ (-	0.95 17.31 19.24 0.94 14.65 4) =		(86) (87) (88) (89) (90) (91)
Utilisa (86)m= Mean (87)m= Tempe (88)m= Utilisa (89)m= Mean (90)m= Mean (92)m= Apply (93)m= 8. Spa	internal 17.36 erature 19.22 tion fac 0.93 internal 14.7 internal 15.48 adjustm 15.48	tor for gain feet to for gain feet feet feet feet feet feet feet fee	eating poins for line 18.34 ture in land 19.23 ins for rand 16.08 ture (for 16.75 e mean 16.75 rement	eriods in iving are Apr 0.82 iving are 19.12 eriods in 19.26 est of do 0.79 the rest 17.17 r the wh 17.74 internal 17.74	ea, h1,r May 0.74 ea T1 (i 19.83 n rest o 19.27 welling, 0.68 of dwel 18.12 ole dwe 18.62 tempe 18.62	n (second follows) h2, h2, lling 1 ratu 1	ee Table 9a Jun Jul 0.63 0.52 w steps 3 to 0.43 20.73 relling from 19.3 19.3 m (see Table 0.53 0.36 T2 (follow steps 3 to 19.18 g) = fLA × T 9.33 19.63 re from Table 9.33 19.63	A 0.5 7 in T 3 20. Table 9 19.	ug Sep 55 0.7 Table 9c) 69 20.24 9, Th2 (°C) 31 19.29 9 0.61 to 7 in Table 15 18.66 f fLA) x T2 6 19.12 where approximation of the second of the seco	0.85 19.3 19.27 0.81 e 9c) 17.43 17.98 ppriate 17.98	0.92 18.2 19.26 0.9 15.91 ving area ÷ (0.95 17.31 19.24 0.94 14.65 4) =	0.29	(86) (87) (88) (89) (90) (91) (92)

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Apr

May

Jul

Jun

Sep

Aug

Oct

Nov

Dec

Mar

the utilisation factor for gains using Table 9a

Feb

Jan

l Itilisati	ion facto	or for a	ains hm	ı .										
(94)m=	0.89	0.86	0.81	0.74	0.65	0.53	0.39	0.42	0.6	0.76	0.86	0.9		(94)
_				1)m x (84										, ,
_			<u> </u>	<u> </u>	1148.27	902.18	649.49	667.46	889.13	992.68	955.46	930.22		(95)
Monthly	y averaç	ge exte	rnal tem	perature	from Ta	able 8		l .	l					
(96)m=	4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2		(96)
Heat lo	ss rate t	for mea	an intern	al tempe	erature,	Lm , W =	=[(39)m :	x [(93)m	– (96)m]				
(97)m= 2	2949.1 2	2907.65	2677.26	2256.43	1758.01	1172.01	751.63	789.68	1256.76	1874.09	2432.32	2906.85		(97)
· -	<u> </u>	 _					th = 0.02	24 x [(97))m – (95	í - `	 			
(98)m= 1	464.07	1186.2	1071	724.31	453.64	0	0	0	0	655.77		1470.62		_
								Tota	l per year	(kWh/year	r) = Sum(9	8) _{15,912} =	8088.95	(98)
Space	heating	require	ement in	kWh/m²	² /year								66.85	(99)
9a. Ener	rgy requ	iremen	ts – Indi	vidual h	eating sy	ystems i	ncluding	micro-C	CHP)					
Space	heating	g:												_
Fraction	n of spa	ce hea	t from se	econdar	y/supple	mentary	system						0	(201)
Fraction	n of spa	ce hea	t from m	nain syst	em(s)			(202) = 1 -	- (201) =				1	(202)
Fraction	n of tota	ıl heatir	ng from	main sys	stem 1			(204) = (2	02) x [1 –	(203)] =			1	(204)
Efficien	ncy of ma	ain spa	ce heat	ing syste	em 1								71	(206)
Efficien	cy of se	econda	ry/supple	ementar	y heating	g system	າ, %						0	(208)
Г	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/yea	⊐ ar
Space	heating	require	ement (c	alculate)								
1	464.07	1186.2	1071	724.31	453.64	0	0	0	0	655.77	1063.33	1470.62		
(211)m =	= {[(98)n	n x (20	4)] } x 1	00 ÷ (20	06)									(211)
2	2062.07	1670.7	1508.45	1020.16	638.93	0	0	0	0	923.62	1497.65	2071.29		
								Tota	I (kWh/yea	ar) =Sum(2	211),15,1012		11392.89	(211)
Space	heating	fuel (se	econdar	y), kWh/	month							•		_
= {[(98)n						i	i	i		i				
(215)m=	0	0	0	0	0	0	0	0	0	0	0	0		_
								Tota	ıl (kWh/yea	ar) =Sum(2	215) _{15,1012}	=	0	(215)
Water h	_		/	اء اد ماداد	h)									
Output f		er nea 192.51	202.15	181.19	177.54	158.6	152.29	167.15	166.87	187.88	198.7	213.16		
∟ Efficiend			ter			ļ	<u> </u>	<u> </u>	<u> </u>		<u> </u>		60.3	(216)
(217)m=		69.28	69.05	68.57	67.62	60.3	60.3	60.3	60.3	68.3	69.07	69.44		(217)
Fuel for	water h	eating.	kWh/mo	onth										
(219)m <u>=</u>	= (64)m	•												
(219)m= 3	314.72	277.86	292.75	264.25	262.53	263.02	252.56	277.2	276.73	275.08	287.68	306.96		_
								Tota	ıl = Sum(2				3351.36	(219)
Annual		uol uos	d main	ovotom.	1					k'	Wh/year		kWh/year	7
Space h	•			system	ı								11392.89	_
Water he	eating fu	uel use	d										3351.36	
Electricit	ty for pu	mps, fa	ans and	electric	keep-ho	t								

			_
mechanical ventilation - balanced, extract or pos	itive input from outside	136.37	(230a)
central heating pump:		30	(230c)
Total electricity for the above, kWh/year	sum of (230a)(230g) =	166.37 (231)
Electricity for lighting			661.54 (232)
10a. Fuel costs - individual heating systems:			
	Fuel kWh/year	Fuel Price (Table 12)	Fuel Cost £/year
Space heating - main system 1	(211) x	3.48 × 0.01 =	396.47 (240)
Space heating - main system 2	(213) x	0 x 0.01 =	0 (241)
Space heating - secondary	(215) x	13.19 × 0.01 =	0 (242)
Water heating cost (other fuel)	(219)	3.48 x 0.01 =	116.63 (247)
Pumps, fans and electric keep-hot	(231)	13.19 x 0.01 =	21.94 (249)
(if off-peak tariff, list each of (230a) to (230g) sepa Energy for lighting	arately as applicable and app	ly fuel price according to $13.19 x 0.01 =$	Table 12a 87.26 (250)
Additional standing charges (Table 12)			120 (251)
11a. SAP rating - individual heating systems Energy cost deflator (Table 12) Energy cost factor (ECF) [(255) × (25)	s needed 7) + (250)(254) = [56)] ÷ [(4) + 45.0] =		742.3 (255) 0.42 (256) 1.88 (257)
SAP rating (Section 12)	o including mioro CUD		73.8 (258)
12a. CO2 emissions – Individual heating system	<u> </u>		
	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating (main system 1)	(211) x	0.216 =	2460.86 (261)
Space heating (secondary)	(215) x	0.519 =	0 (263)
Water heating	(219) x	0.216 =	723.89 (264)
Space and water heating	(261) + (262) + (263) + (264) =		3184.76 (265)
Electricity for pumps, fans and electric keep-hot	(231) x	0.519 =	86.35 (267)
Electricity for lighting	(232) x	0.519 =	343.34 (268)
Total CO2, kg/year	sum	of (265)(271) =	3614.44 (272)
CO2 emissions per m ²	(272) ÷ (4) =	29.87 (273)
El rating (section 14)			71 (274)
13a. Primary Energy			
	Energy kWh/year	Primary factor	P. Energy kWh/year
Space heating (main system 1)	(211) x	1.22	13899.33 (261)

Primary energy kWh/m²/year	(272)	÷ (4) =		169.67	(273)
'Total Primary Energy	sum o	of (265)(271) =		20529.67	(272)
Electricity for lighting	(232) x	0	=	2030.92	(268)
Electricity for pumps, fans and electric keep-hot	(231) x	3.07	=	510.76	(267)
Space and water heating	(261) + (262) + (263) + (264) =			17987.98	(265)
Energy for water heating	(219) x	1.22	=	4088.66	(264)
Space heating (secondary)	(215) x	3.07	=	0	(263)

			User I	Details:						
Assessor Name: Software Name:	Stroma FSA			Strom Softwa Address	are Ve			Versio	on: 1.0.4.18	
Address :	39, Fitzjohns	Avenue, LON	·		1101					
1. Overall dwelling dime	ensions:									
Ground floor			Are	a(m²)	(4-)		ight(m)	7(0-)	Volume(m ³	<u>-</u>
	a) . (4 b) . (4 a) . (4	۵ (((((((((((((((((((<u>ا</u>		(1a) x		3.2	(2a) =	230.4	(3a)
Total floor area TFA = (1a	a)+(1b)+(1c)+(1	(a)+(1e)+(1	n)	72	(4)	\	n (O)	(0.)		_
Dwelling volume					(3a)+(3b)+(3c)+(3c	d)+(3e)+	.(3n) =	230.4	(5)
2. Ventilation rate:	main	seconda	rv	other		total			m³ per hou	r
Number of objection	heating	heating	, □ + □		7 <u>-</u> F			40 =	-	_
Number of chimneys	0		ᆜ =	0	╛╘	0		20 =	0	(6a)
Number of open flues	0	+ 0	+	0] = [0			0	(6b)
Number of intermittent fa					Ļ	0		10 =	0	(7a)
Number of passive vents					Ļ	0		10 =	0	(7b)
Number of flueless gas fi	res					0	X 4	40 =	0	(7c)
								Air ch	nanges per ho	our
Infiltration due to chimne	ys, flues and far	ns = (6a) + (6b) +	(7a)+(7b)+	(7c) =	Г	0		÷ (5) =	0	(8)
If a pressurisation test has b			ed to (17),	otherwise of	continue fr	rom (9) to				_ _``
Number of storeys in the	ne dw <mark>elling</mark> (ns)								1	(9)
Additional infiltration Structural infiltration: 0	25 for steel or t	timber frame o	or 0.35 fo	ır masonı	v constr	ruction	[(9)	-1]x0.1 =	0.35	(10)
if both types of wall are pi					•	dollori			0.55	(` ' ' /
deducting areas of openir If suspended wooden f	• / .		1 (spal	مرا) مادم	antar ∩				0	7(12)
If no draught lobby, en	,	,	J. I (Scall	eu), eise	enter o				0.05	(12)
Percentage of windows	•								100	(14)
Window infiltration				0.25 - [0.2	x (14) ÷ 1	00] =			0.05	(15)
Infiltration rate				(8) + (10)					0.45	(16)
Air permeability value, If based on air permeabil			•	•	•	etre of e	envelope	area	0	$=$ $\begin{pmatrix} (17) \\ (49) \end{pmatrix}$
Air permeability value applie						is being u	sed		0.45	(18)
Number of sides sheltere	ed								2	(19)
Shelter factor				(20) = 1 -		19)] =			0.85	(20)
Infiltration rate incorporat	_			(21) = (18) x (20) =				0.38	(21)
Infiltration rate modified for	Mar Apr	May Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind sp			1 oui	1 //ug	ОСР	1 000	1 1404	<u> </u>	l	
(22)m= 5.1 5	4.9 4.4	4.3 3.8	3.8	3.7	4	4.3	4.5	4.7		
	-)	I	1	1		1	1	•	ı	
Wind Factor (22a)m = $(22a)$ m =		100 005	T 0.05	T 0.02	4	1.00	1 1 10	1 10	1	
(22a)m= 1.27 1.25	1.23 1.1	1.08 0.95	0.95	0.92	1	1.08	1.12	1.18		

djusted infiltra. 0.49	0.48	0.47	0.42	0.41	0.36	0.36	0.35	0.38	0.41	0.43	0.45	1	
Calculate effec		· ·	· ·	-			0.00	0.00	•···	00	1 00	ı	
If mechanica	I ventila	ition:										0.5	(2
If exhaust air he	at pump	using Appe	endix N, (2	3b) = (23a	a) × Fmv (e	equation (I	N5)) , othe	rwise (23b) = (23a)			0.5	(2
If balanced with	heat reco	overy: effic	iency in %	allowing f	or in-use f	actor (fron	n Table 4h) =				0	(2
a) If balance	d mech	anical ve	entilation	with he	at recove	ery (MVI	HR) (24a	a)m = (22)	2b)m + (23b) × [1 – (23c)	÷ 100]	
24a)m= 0	0	0	0	0	0	0	0	0	0	0	0		(2
b) If balance	d mech	anical ve	entilation	without	heat red	overy (N	ЛV) (24b	m = (22)	2b)m + (23b)			
24b)m= 0	0	0	0	0	0	0	0	0	0	0	0]	(2
c) If whole he if (22b)m				•	•				5 × (23b	o)			
24c)m= 0.74	0.73	0.72	0.67	0.66	0.61	0.61	0.6	0.63	0.66	0.68	0.7		(2
d) If natural v									0.5]				
24d)m= 0	0	0	0	0	0	0	0	0	0	0	0		(2
Effective air	change	rate - er	nter (24a) or (24b	o) or (24	c) or (24	d) in box	x (25)				_	
5)m= 0.74	0.73	0.72	0.67	0.66	0.61	0.61	0.6	0.63	0.66	0.68	0.7		(2
B. Heat losses	and he	eat loss i	paramete	er:									
LEMENT	Gros area	ss	Openin m	gs	Net Ar A ,r		U-valı W/m2		A X U (W/I	K)	k-value kJ/m²-		A X k kJ/K
in <mark>dows</mark> Type	1				1.44	x1.	/[1/(2.8)+	0.04] =	3.63				(2
in <mark>dows</mark> Type	2				5.4	x1	/[1/(2.8)+	0.04] =	13.6	Ħ			(2
indows Type	3				1.8		/[1/(2.8)+	0.04] =	4.53	Ħ			(2
alls Type1	36	,	5.76		30.24	x	1.7	=	51.41	٦,		\neg	
alls Type2	30		12.6		17.4	x	1.7	-	29.58	≓ i		= =	(2
otal area of e	ements	 , m²			66								^`` (;
or windows and			effective wi	ndow U-va		ated using	formula 1	/[(1/U-valu	ie)+0.04] a	as given in	paragraph	1 3.2	`
include the area						_				-			
abric heat los	s, W/K	= S (A x	U)				(26)(30)) + (32) =				127.2	2 (
eat capacity (Cm = S((Axk)						((28)	.(30) + (32	2) + (32a).	(32e) =	7842	2 (3
nermal mass	parame	ter (TMF	P = Cm ÷	- TFA) ir	n kJ/m²K			Indica	tive Value	: Low		100	(3
r design assess n be used instea				construct	ion are no	t known pr	ecisely the	e indicative	values of	TMP in Ta	able 1f		
nermal bridge				ısina Ar	nendix k	<						9.9	(;
details of therma	•	,			•	•						3.3	
otal fabric hea			()	`	,			(33) +	(36) =			137.1	2 (
entilation hea	t loss ca	alculated	d monthly	/				(38)m	= 0.33 × ((25)m x (5))		
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
3)m= 56.09	55.36	54.63	51	50.27	46.64	46.64	45.91	48.09	50.27	51.73	53.18		(3
eat transfer c	oefficie	nt, W/K						(39)m	= (37) + (37)	38)m		•	
Jat transition of												•	
9)m= 193.21	192.48	191.75	188.12	187.39	183.75	183.75	183.03	185.21	187.39	188.84	190.3		

eat loss para	meter (H	HLP), W/	′m²K					(40)m	= (39)m ÷	- (4)			
0)m= 2.68	2.67	2.66	2.61	2.6	2.55	2.55	2.54	2.57	2.6	2.62	2.64		
umber of day	s in mor	oth (Tabl	le 1a)		•				Average =	Sum(40) ₁ .	12 /12=	2.61	(40
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1)m= 31	28	31	30	31	30	31	31	30	31	30	31		(41
-													
4. Water heat	ing enei	gy requi	rement:								kWh/ye	ar:	
ssumed occu if TFA > 13.9 if TFA £ 13.9	N = 1		[1 - exp	(-0.0003	349 x (TF	FA -13.9)2)] + 0.0	0013 x (⁻	TFA -13		29		(42
nnual averag educe the annua ot more that 125	l average	hot water	usage by	5% if the c	lwelling is	designed t			se target o		.34		(43
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
ot water usage ir	litres per	day for ea	ach month	Vd,m = fa	ctor from	Table 1c x	(43)	•		,			
4)m= 102.68	98.94	95.21	91.48	87.74	84.01	84.01	87.74	91.48	95.21	98.94	102.68	1100.11	
nergy content of	hot water	used - cal	culated mo	onthly $= 4$.	190 x Vd,r	n x nm x E	Tm / 3600			m(44) ₁₁₂ = ables 1b, 1		1120.11	(44
5)m= 152.27	133.17	137.42	119.81	114.96	99.2	91.92	105.48	106.74	124.4	135.79	147.46		
					7 .				Total = Su	m(45) ₁₁₂ =		1468.63	(45
instantaneous w													(40
6)m= 22.84 /ater storage	19.98 loss:	20.61	17.97	17.24	14.88	13.79	15.82	16.01	18.66	20.37	22.12		(46
torage volum		includin	ig any so	olar or W	/WHRS	storage	within sa	ame ves	sel		300		(47
community h	eating a	nd no ta	nk in dw	elling, e	nter 110	litres in	(47)						
therwise if no		hot wate	er (this in	cludes i	nstantar	neous co	mbi boil	ers) ente	er '0' in ((47)			
/ater storage i) If manufact		eclared lo	oss facto	or is kno	wn (kWł	n/dav):				1	69		(4
emperature fa					•	, , ,					54		(4
nergy lost fro				ear			(48) x (49)) =			91		` (50
) If manufact			-										
ot water stora community h	•			e 2 (kW	h/litre/da	ıy)					0		(5
olume factor	_		JII 4.5								0		(52
emperature fa	actor fro	m Table	2b								0		(53
nergy lost fro	m water	storage	, kWh/ye	ear			(47) x (51)) x (52) x (53) =		0		(54
Enter (50) or (54) in (5	55)								0.	91		(5
/ater storage	loss cal	culated f	or each	month			((56)m = (55) × (41)	m		_		
6)m= 28.29	25.55	28.29	27.38	28.29	27.38	28.29	28.29	27.38	28.29	27.38	28.29		(5
cylinder contains	dedicate	d solar sto	rage, (57)ı	n = (56)m	x [(50) – (H11)] ÷ (5	0), else (5	7)m = (56)	m where (H11) is fro	m Appendi	хH	
7)m= 28.29	25.55	28.29	27.38	28.29	27.38	28.29	28.29	27.38	28.29	27.38	28.29		(5
rimary circuit	loss (an	nual) fro	m Table	3							0		(58
rimary circuit	•	•			59)m = ((58) ÷ 36	65 × (41)	m					
(modified by	factor fi	om Tabl	le H5 if t	here is s	solar wat	er heatii	ng and a	cylinde	r thermo	stat)			

Combiles o	الم مغمل بمام	for ooole		(C1)	(00) . 0	CF (44)	\						
Combi loss c	alculated 0	or each	0	0	(6U) ÷ 30	05 × (41))m 0	0	0	0	Ιο	1	(61)
			<u> </u>	<u> </u>			ļ				ļ	(E0)m + (61)m	(01)
(62)m= 203.82	`	188.98	169.7	166.51	149.09	143.48	157.04		175.95	185.68	199.01	· (59)m + (61)m]	(62)
Solar DHW inpu				<u> </u>		<u> </u>						1	(02)
(add addition									i ooniinba	iion to wat	or ricating)		
(63)m= 0	0	0	0	0	0	0	0	0	0	0	0	1	(63)
Output from v	vater hea	ter		ļ.		!	<u>. </u>			ļ		J	
(64)m= 203.82		188.98	169.7	166.51	149.09	143.48	157.04	4 156.63	175.95	185.68	199.01]	
							Oı	utput from w	ater heate	er (annual)	112	2075.63	(64)
Heat gains from	om water	heating,	kWh/m	onth 0.2	5 ´ [0.85	× (45)m	ı + (61)	m] + 0.8	k [(46)m	+ (57)m	+ (59)m	 n]	_
(65)m= 91.87		86.94	79.75	79.47	72.9	71.81	76.32		82.61	85.06	90.27]	(65)
include (57	')m in cald	culation	of (65)m	only if c	ylinder i	s in the	dwellin	g or hot w	ater is f	rom com	munity h	neating	
5. Internal of	gains (see	e Table 5	and 5a):								-	
Metabolic gai	ins (Table	5). Wat	ts										
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec]	
(66)m= 137.62	137.62	137.62	137.62	137.62	137.62	137.62	137.62	2 137.62	137.62	137.62	137.62		(66)
Ligh <mark>ting g</mark> ains	s (calcula	ted in Ap	pendix	L, equat	on L9 o	r L9a), a	lso see	Table 5					
(67)m= 65.7	58.36	47.46	35.93	26.86	22.67	24.5	31.85	42.75	54.28	63.35	67.53		(67)
App <mark>liance</mark> s g	ains (ca <mark>lc</mark>	ulated ir	Append	dix L, eq	uation L	13 or L1	3a), al	so see Ta	ble 5				
(68)m= 301.37	304.5	296.62	279.84	258.66	238.76	225.46	222.33	3 230.22	246.99	268.17	288.07		(68)
Cooking gain	s (calcula	ited in A	ppendix	L, equat	ion L15	or L15a), also	see Table	5		-		
(69)m= 51.06	51.06	51.06	51.06	51.06	51.06	51.06	51.06	51.06	51.06	51.06	51.06		(69)
Pumps and fa	ans gains	(Table 5	5a)										
(70)m= 3	3	3	3	3	3	3	3	3	3	3	3]	(70)
Losses e.g. e	vaporatio	n (nega	tive valu	es) (Tab	le 5)							_	
(71)m= -91.75	-91.75	-91.75	-91.75	-91.75	-91.75	-91.75	-91.75	-91.75	-91.75	-91.75	-91.75]	(71)
Water heating	g gains (T	able 5)										_	
(72)m= 123.48	121.33	116.85	110.76	106.81	101.24	96.51	102.58	3 104.73	111.03	118.14	121.34		(72)
Total interna	_ -	: 			(66))m + (67)m	n + (68)n	n + (69)m +	(70)m + (7	71)m + (72))m	_	
(73)m= 590.49		560.86	526.46	492.26	462.61	446.41	456.69	9 477.62	512.23	549.59	576.87		(73)
6. Solar gair													
Solar gains are		•				•	itions to		ne applical		tion.		
Orientation:	Access F Table 6d		Area m²		Flu Tal	ıx ble 6a		g_ Table 6b	Т	FF able 6c		Gains (W)	
North 0.9x							1				_		7,74
		X	1.4	_		10.63]	0.76	×	0.7	=	29.33	(74)
		×	1.4			20.32]	0.76		0.7	=	56.04	∫(74) ¬(74)
		×	1.4			34.53]	0.76		0.7	=	95.23	∫(74) ¬(74)
		×	1.4	==	-	55.46]	0.76		0.7		152.96	(74)
North 0.9x	1	X	1.4	14	× 7	74.72	X	0.76	Х	0.7	=	206.06	(74)

North	Г					7			1 1		_				7
North	0.9x	1		X	1.44	X		9.99	X	0.76	×	0.7	_ =	220.59	(74)
North	0.9x	1		X	1.44	X	7	4.68	X	0.76	×	0.7	_ =	205.95	<u> </u> (74)
North	0.9x	1		X	1.44	X	5	9.25	X	0.76	X	0.7	=	163.39	(74)
North	0.9x	1		X	1.44	X	4	1.52	X	0.76	×	0.7	=	114.5	1 (74)
North	0.9x	1		X	1.44	X	2	4.19	X	0.76	X	0.7	=	66.71	(74)
North	0.9x	1		X	1.44	X	1	3.12	X	0.76	X	0.7	=	36.18	(74)
North	0.9x	1		X	1.44	X	8	3.86	X	0.76	X	0.7	=	24.45	(74)
West	0.9x	1		X	5.4	X	1	9.64	X	0.76	X	0.7	=	101.56	(80)
West	0.9x	1		X	1.8	X	1	9.64	X	0.76	X	0.7	=	16.93	(80)
West	0.9x	1		x	5.4	X	3	8.42	X	0.76	X	0.7	=	198.67	(80)
West	0.9x	1		x	1.8	X	3	8.42	X	0.76	X	0.7	=	33.11	(80)
West	0.9x	1		x	5.4	X	6	3.27	X	0.76	X	0.7	=	327.19	(80)
West	0.9x	1		x	1.8	X	6	3.27	x	0.76	X	0.7	=	54.53	(80)
West	0.9x	1		x	5.4	X	9	2.28	X	0.76	x	0.7	=	477.18	(80)
West	0.9x	1		x	1.8	X	9	2.28	X	0.76	x	0.7	=	79.53	(80)
West	0.9x	1		x	5.4	x	11	13.09	x	0.76	x	0.7	=	584.81	(80)
West	0.9x	1		x	1.8	x	1	13.09	x	0.76	×	0.7	=	97.47	(80)
West	0.9x	1		x	5.4	X	11	15.77	Х	0.76	X	0.7	=	598.65	(80)
West	0.9x	1		x	1.8	x	1	15.77	x	0.76	x	0.7	=	99.78	(80)
West	0.9x	1		x	5.4	х	11	10.22	x	0.76	x	0.7	_ =	569.94	(80)
West	0.9x	1		x	1.8	X	1	10.22	x	0.76	x	0.7	=	94.99	(80)
West	0.9x	1		x	5.4	x	9	4.68	Х	0.76	x	0.7		489.57	(80)
West	0.9x	1	7	x	1.8	j x	9	4.68	Х	0.76	х	0.7	=	81.6	(80)
West	0.9x	1		x	5.4	x	7	3.59	x	0.76	х	0.7	=	380.53	(80)
West	0.9x	1		x	1.8	x	7	3.59	x	0.76	x	0.7	=	63.42	(80)
West	0.9x	1		x	5.4	x	4	5.59	X	0.76	x	0.7	=	235.74	(80)
West	0.9x	1		x	1.8	x	4	5.59	x	0.76	x	0.7	=	39.29	(80)
West	0.9x	1		x	5.4	x	2	4.49	x	0.76	×	0.7	=	126.63	(80)
West	0.9x	1		x	1.8	x	2	4.49	X	0.76	x	0.7	=	21.11	(80)
West	0.9x	1		x	5.4	j×	1	6.15	x	0.76	×	0.7		83.52	(80)
West	0.9x	1		x	1.8	j×	1	6.15	x	0.76	×	0.7	_ =	13.92	(80)
	_			,		_									_
Solar g	ains in	watts, ca	alcula	ted	for each mon	th			(83)m	= Sum(74)m .	(82)m			_	
(83)m=	147.81	287.83	476.	95	709.68 888.3	3 9	19.02	870.88	734.	.56 558.45	341.7	5 183.92	121.89		(83)
Total g	ains – ir	nternal a	nd so	olar	(84)m = (73) r	n + (83)m	watts						•	
(84)m=	738.3	871.94	1037	.81	1236.14 1380.	59 1:	381.63	1317.29	1191	.25 1036.07	853.9	7 733.51	698.76		(84)
7. Mea	an inter	nal temp	eratu	ıre (heating seas	on)									
Temp	erature	during h	eatin	g pe	eriods in the I	iving	area f	rom Tab	ole 9,	Th1 (°C)				21	(85)
Utilisa	ition fac	tor for g	ains f	or li	ving area, h1	,m (s	ee Ta	ble 9a)							_
	Jan	Feb	Ма	ar	Apr Ma	у	Jun	Jul	Aı	ug Sep	Oct	: Nov	Dec		
(86)m=	0.93	0.91	0.87	7	0.8 0.7		0.58	0.47	0.5	2 0.7	0.85	0.92	0.94		(86)
Mean	internal	l temper	ature	in li	ving area T1	(follo	w ste	os 3 to 7	in T	able 9c)					
(87)m=	16.98	17.34	18.0	_	18.92 19.7		20.39	20.7	20.0	- 1	19.01	17.85	16.93]	(87)
L					,	•			•	•			•	•	

Usefu	ıl gains,	hmGm	W = (9	4)m x (84	4)m				l					
		_	<u> </u>	<u> </u>		656.1	161 97	169.79	605.71	647.96	624.29	621.22		(95)
(95)m=	650.54	740.98	827.28	880.83	835.64	656.1	461.87	468.78	605.71	647.86	624.38	621.32		(95)
Month (96)m=	hly avera	age exte	ernal tem	perature 8.9	from Ta	able 8 14.6	16.6	16.4	14.1	10.6	7.1	4.2		(96)
	loss rate										7.1	4.2		(90)
(97)m=	2086.86	_	_	_		847.73	535.39	561.65	892.87	1322.14	1720.55	2063.59		(97)
	e heating							L				2000.00		()
(98)m=	1068.62	879.88	795.55	532.19	325.11	0	0	0	0	501.66	789.24	1073.05		
()								<u> </u>		<u> </u>) = Sum(9	<u> </u>	5965.31	(98)
Space	e heating	n require	ement in	kW/h/m²	:/vear				, , , , , , ,	()	, (-		82.85	(99)
		•			•		1 12		VID)			L	62.65	(99)
	ergy req		nts – Indi	ividual h	eating sy	ystems i	ncluding	micro-C	CHP)					
•	e heatin ion of sp	_	at from so	econdari	u/sunnla	mentary	evetem					Г	0	(201)
	•					mentary	•		(204)			ļ		= 1
	ion of sp			•	` ,			(202) = 1 -	, ,			ļ	1	(202)
Fracti	ion of tot	al heati	ng from	main sys	stem 1			(204) = (20	02) × [1 –	(203)] =			1	(204)
г сс	ency of n	nain spa	ace heat	in a overte	. m. 1							Γ	71	(206)
ETTICIE			200 110at	ing syste	#III I							L		
	ency of s	econda				g system	n, %						0	(208)
	ency of s	econda Feb				g system Jun	n, % Jul	Aug	Sep	Oct	Nov	Dec	0 kWh/ye	`
Efficie		Feb	ry/supplo	ementar Apr	y heating May	Jun		Aug	Sep	Oct	Nov	Dec		`
Efficie	Jan	Feb g require	ry/supplo	ementar Apr	y heating May	Jun		Aug 0	Sep 0	Oct 501.66	Nov 789.24	Dec 1073.05		`
Efficie Space	Jan e heating	Feb g require 879.88	Mar ement (c	Apr alculated	May d above)	Jun	Jul							`
Efficie Space	Jan e heating	Feb g require 879.88	Mar ement (c	Apr alculated	May d above)	Jun	Jul							in and a second
Efficie Space	Jan e heating 1068.62 n = {[(98)	Feb g require 879.88 Im x (20	ry/supple Mar ement (c 795.55	Apr alculated 532.19 00 ÷ (20	May dabove; 325.11	Jun) 0	Jul 0	0	0	501.66 706.57	789.24	1073.05		ear (211)
Efficie Space (211)m	Jan e heating 1068.62 n = {[(98) 1505.1	Feb g require 879.88 Im x (20 1239.27	ry/supple Mar ement (c 795.55 (4)] } x 1	Apr	May d above; 325.11 66) 457.9	Jun) 0	Jul 0	0	0	501.66 706.57	789.24 1111.61	1073.05	kWh/ye	in and a second
Space (211)m	Jan e heating 1068.62 n = {[(98) 1505.1	Feb g require 879.88 Im x (20 1239.27	mar ement (c 795.55 (4)] } x 1 1120.5	Apr alculated 532.19 00 ÷ (20 749.56	May d above; 325.11 66) 457.9	Jun) 0	Jul 0	0	0	501.66 706.57	789.24 1111.61	1073.05	kWh/ye	ear (211)
Space (211)m	Jan e heating 1068.62 n = {[(98) 1505.1 e heating)m x (20	Feb g require 879.88 Im x (20 1239.27	mar ement (c 795.55 (4)] } x 1 1120.5	Apr alculated 532.19 00 ÷ (20 749.56	May d above; 325.11 66) 457.9	Jun) 0	Jul 0	0	0	501.66 706.57	789.24 1111.61	1073.05	kWh/ye	ear (211)

Water heating										
Output from water heater (calculate	1 1	440.00	4.40.40	457.04	450.00	475.05	405.00	400.04	1	
203.82 179.74 188.98 16 Efficiency of water heater	9.7 166.51	149.09	143.48	157.04	156.63	175.95	185.68	199.01	60.3	(216)
	.08 66.97	60.3	60.3	60.3	60.3	67.87	68.68	69.08	00.5	(217)
Fuel for water heating, kWh/month									I	
(219) m = (64) m x $100 \div (217)$ m (219)m = 295.23 260.77 275.23 249	9.27 248.62	247.25	237.94	260.43	259.76	259.24	270.36	288.08	1	
(219)m= 295.23 260.77 275.23 249	9.27 248.62	247.25	237.94		I = Sum(2:		270.36	288.08	3152.17	(219)
Annual totals							Wh/year		kWh/year	
Space heating fuel used, main sys	tem 1						,		8401.84	
Water heating fuel used									3152.17	Ī
Electricity for pumps, fans and elec	ctric keep-hot									_
mechanical ventilation - balanced	, extract or po	ositive ir	put fron	n outside	Э			81.15		(230a)
central heating pump:								30		(230c)
Total electricity for the above, kWh	/year			sum	of (230a).	(230g) =			111.15	(231)
Electricity for lighting									464.15	(232)
10a. Fuel costs - individual heatin	g systems:									
		Fue kW	el h/year			Fuel P (Table			Fuel Cost £/year	
Space heating - main system 1		(211				3.4		x 0.01 =	292.38	(240)
				/						(240)
Space heating - main system 2		(213				0		x 0.01 =	0	
		(213								(241)
Space heating - main system 2		(213	s) x			13.	19	x 0.01 =	0	
Space heating - main system 2 Space heating - secondary		(213 (215	3) x 3) x			13.	19 8	x 0.01 = x 0.01 =	0	(241)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel)		(213 (215 (219 (231	s) x	icable a	nd apply	13. ⁻ 3.4	8 19	x 0.01 = x 0.01 = x 0.01 = x 0.01 =	0 0 109.7 14.66	(241) (242) (247)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel) Pumps, fans and electric keep-hot		(213 (215 (219 (231	x x x x y x y as appl	icable a	nd apply	13. ⁻ 3.4	19 8 19 ce accor	x 0.01 = x 0.01 = x 0.01 = x 0.01 =	0 0 109.7 14.66	(241) (242) (247)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel) Pumps, fans and electric keep-hot (if off-peak tariff, list each of (230a)) to (230g) se	(213 (215 (219 (231 parately	x x x x y x y as appl	icable a	nd apply	13. 3.4 13.	19 8 19 ce accor	x = 0.01 = 0.0	0 0 109.7 14.66 Table 12a	(241) (242) (247) (249)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel) Pumps, fans and electric keep-hot (if off-peak tariff, list each of (230a) Energy for lighting) to (230g) se	(213 (215 (219 (231 parately (232	x as appl	icable a	nd apply	13. 3.4 13.	19 8 19 ce accor	x = 0.01 = 0.0	0 109.7 14.66 Table 12a 61.22	(241) (242) (247) (249) (250)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel) Pumps, fans and electric keep-hot (if off-peak tariff, list each of (230a) Energy for lighting Additional standing charges (Table) to (230g) se e 12) i3) and (254)	(213 (215 (219 (231 parately (232	x as appl		nd apply	13. 3.4 13.	19 8 19 ce accor	x = 0.01 = 0.0	0 109.7 14.66 Table 12a 61.22	(241) (242) (247) (249) (250)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel) Pumps, fans and electric keep-hot (if off-peak tariff, list each of (230a) Energy for lighting Additional standing charges (Table Appendix Q items: repeat lines (25) to (230g) se e 12) (3) and (254) (245)(2	(213 (215 (219 (231 parately (232	x x y) x y) x y as appl		nd apply	13. 3.4 13.	19 8 19 ce accor	x = 0.01 = 0.0	0 109.7 14.66 Table 12a 61.22	(241) (242) (247) (249) (250) (251)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel) Pumps, fans and electric keep-hot (if off-peak tariff, list each of (230a) Energy for lighting Additional standing charges (Table Appendix Q items: repeat lines (25) Total energy cost) to (230g) se e 12) (3) and (254) (245)(2	(213 (215 (219 (231 parately (232	x x y) x y) x y as appl		nd apply	13. 3.4 13.	19 8 19 ce accor	x = 0.01 = 0.0	0 109.7 14.66 Table 12a 61.22	(241) (242) (247) (249) (250) (251)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel) Pumps, fans and electric keep-hot (if off-peak tariff, list each of (230a) Energy for lighting Additional standing charges (Table Appendix Q items: repeat lines (25 Total energy cost 11a. SAP rating - individual heating	12) 3) and (254) (245)(2	(213 (215 (219 (231 eparately (232 as need 247) + (25	x x y) x y) x y as appl	=	nd apply	13. 3.4 13.	19 8 19 ce accor	x = 0.01 = 0.0	0 109.7 14.66 Table 12a 61.22 120	(241) (242) (247) (249) (250) (251) (255)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel) Pumps, fans and electric keep-hot (if off-peak tariff, list each of (230a) Energy for lighting Additional standing charges (Table Appendix Q items: repeat lines (25 Total energy cost 11a. SAP rating - individual heatin Energy cost deflator (Table 12)	12) 3) and (254) (245)(2	(213 (215 (219 (231 eparately (232 as need 247) + (25	(a) x (b) x (c) x (d) (d) (d) (d) (d) (d) (d) (d) (d) (d)	=	nd apply	13. 3.4 13.	19 8 19 ce accor	x = 0.01 = 0.0	0 109.7 14.66 Table 12a 61.22 120 597.96	(241) (242) (247) (249) (250) (251) (255)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel) Pumps, fans and electric keep-hot (if off-peak tariff, list each of (230a) Energy for lighting Additional standing charges (Table Appendix Q items: repeat lines (25 Total energy cost 11a. SAP rating - individual heatin Energy cost deflator (Table 12) Energy cost factor (ECF)) to (230g) se e 12) (3) and (254) (245)(2 ng systems	(213 (215 (219 (231 eparately (232 as need (247) + (25	s) x s) x o) x o) x as appl ed o)(254)	=		13. 3.4 13.	19 8 19 ce accor	x = 0.01 = 0.0	0 109.7 14.66 Table 12a 61.22 120 597.96	(241) (242) (247) (249) (250) (251) (255) (256) (257)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel) Pumps, fans and electric keep-hot (if off-peak tariff, list each of (230a) Energy for lighting Additional standing charges (Table Appendix Q items: repeat lines (25 Total energy cost 11a. SAP rating - individual heatin Energy cost deflator (Table 12) Energy cost factor (ECF) SAP rating (Section 12)) to (230g) se e 12) (3) and (254) (245)(2 ng systems	(213 (215 (215 (231 (232 as need (247) + (25 (256)] ÷ [(4	s) x s) x o) x o) x as appl ed o)(254)	=		13.4 3.4 13.7 fuel pric 13.7	19 8 19 ce accor 19	x 0.01 = x 0.01 = x 0.01 = x 0.01 = ding to x 0.01 =	0 109.7 14.66 Table 12a 61.22 120 597.96	(241) (242) (247) (249) (250) (251) (255) (256) (257) (258)

Space heating (secondary)	(215) x	0.519	=	0	(263)
Water heating	(219) x	0.216	=	680.87	(264)
Space and water heating	(261) + (262) + (263) + (264) =			2495.67	(265)
Electricity for pumps, fans and electric keep-hot	(231) x	0.519	=	57.69	(267)
Electricity for lighting	(232) x	0.519	=	240.89	(268)
Total CO2, kg/year	sum	of (265)(271) =		2794.24	(272)
CO2 emissions per m ²	(272	(a) ÷ (4) =		38.81	(273)
El rating (section 14)				68	(274)

13a. Primary Energy

	Energy kWh/year	Primary factor	P. Energy kWh/year
Space heating (main system 1)	(211) x	1.22 =	10250.25 (261)
Space heating (secondary)	(215) x	3.07	0 (263)
Energy for water heating	(219) x	1.22	3845.65 (264)
Space and water heating	(261) + (262) + (263) + (264) =		14095.9 (265)
Electricity for pumps, fans and electric keep-hot	(231) x	3.07 =	341.22 (267)
Electricity for lighting	(232) x	0 =	1424.93 (268)
'Total Primary Energy	sum	of (265)(271) =	15862.04 (272)
Primary energy kWh/m²/year	(272) ÷ (4) =	220.31 (273)

Assessor Name: Stroma FSAP 2012 Software Version: Version: 1.0.4.18 Property Address: SF03 Address: 39, Fitzjohns Avenue, LONDON, NW3 5JY 1. Overall dwelling dimensions: Area(m²) Av. Height(m) Volume(m³) Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)+(1n) 156 (1a) x 3.2 (2a) = 499.2 (3a) Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)+(1n) 156 (4) Dwelling volume (3a)+(3b)+(3c)+(3d)+(3e)+(3n) = 499.2 (5) 2. Ventilation rate: main secondary other total m³ per hour heating hour of intermittent flans 0 x10 = 0 (7a) Number of passive vents 0 x10 = 0 (7a) Number of flueless gas fires 0 x40 = 0 (8a) Number of flueless gas fires 0 x10 = 0 (7b) Number of flueless gas fires 0 x40 = 0 (8) Air changes per hour linititation due to chimneys, flues and fans = (8a)+(8b)+(7a)+(7b)+(7b) = 0 (7c) Air changes per hour (9) to (16) Number of storeys in the dwelling (ns) Additional infiltration: 0.25 for steel or timber frame or 0.35 for masonry construction if both types of wall are present, use the value corresponding to the greater wall area (after deducting areas of openings); if equal user 0.35 If suspended wooden floor, enter 0.2 (unsealed) or 0.1 (sealed), else enter 0 0 0 (12)
Address: 39, Fitzjohns Avenue, LONDON, NW3 5JY 1. Overall dwelling dimensions: Area(m²)
Area(m²)
Ground floor Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)+(1n) Dwelling volume (3a)+(3b)+(3c)+(3d)+(3e)+(3n) = 499.2 (5) 2. Ventilation rate: Main
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)+(1n)
Dwelling volume (3a)+(3b)+(3c)+(3d)+(3e)+(3n) = 499.2 (5) 2. Ventilation rate: main heating h
2. Ventilation rate: main heating heating heating heating heating heating heating heating heating heating heating heating heating heating heating heating heating heating heating
Number of chimneys Number of chimneys
Number of chimneys \[\begin{array}{cccccccccccccccccccccccccccccccccccc
Number of chimneys Number of open flues O
Number of intermittent fans \[0
Number of passive vents 0
Number of flueless gas fires O
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) = 0 (8) If a pressurisation test has been carried out or is intended, proceed to (17), otherwise continue from (9) to (16) Number of storeys in the dwelling (ns) Additional infiltration Structural infiltration: 0.25 for steel or timber frame or 0.35 for masonry construction if both types of wall are present, use the value corresponding to the greater wall area (after deducting areas of openings); if equal user 0.35
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) = 0
If a pressurisation test has been carried out or is intended, proceed to (17), otherwise continue from (9) to (16) Number of storeys in the dwelling (ns) Additional infiltration Structural infiltration: 0.25 for steel or timber frame or 0.35 for masonry construction if both types of wall are present, use the value corresponding to the greater wall area (after deducting areas of openings); if equal user 0.35
Additional infiltration Structural infiltration: 0.25 for steel or timber frame or 0.35 for masonry construction if both types of wall are present, use the value corresponding to the greater wall area (after deducting areas of openings); if equal user 0.35 [(9)-1]x0.1 = 0 (10) 0.35
Structural infiltration: 0.25 for steel or timber frame or 0.35 for masonry construction if both types of wall are present, use the value corresponding to the greater wall area (after deducting areas of openings); if equal user 0.35 (11)
if both types of wall are present, use the value corresponding to the greater wall area (after deducting areas of openings); if equal user 0.35
deducting areas of openings); if equal user 0.35
If suspended wooden floor, enter 0.2 (unsealed) or 0.1 (sealed), else enter 0
If we describe labely contain 0.05, also contain 0.
If no draught lobby, enter 0.05, else enter 0 0.05 (13) Percentage of windows and doors draught stripped 100 (14)
Percentage of windows and doors draught stripped $0.25 - [0.2 \times (14) \div 100] = 0.05 $ (15)
Infiltration rate $ (8) + (10) + (11) + (12) + (13) + (15) = $
Air permeability value, q50, expressed in cubic metres per hour per square metre of envelope area 0 (17)
If based on air permeability value, then $(18) = [(17) \div 20] + (8)$, otherwise $(18) = (16)$ 0.45
Air permeability value applies if a pressurisation test has been done or a degree air permeability is being used Number of sides sheltered 2 (19)
Number of sides sheltered 2 (19) Shelter factor $(20) = 1 - [0.075 \times (19)] = 0.85$ (20)
Infiltration rate incorporating shelter factor $(21) = (18) \times (20) =$ $0.38 \times (21)$
Infiltration rate modified for monthly wind speed
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Monthly average wind speed from Table 7
(22)m= 5.1 5 4.9 4.4 4.3 3.8 3.8 3.7 4 4.3 4.5 4.7
Wind Factor (22a)m = (22)m ÷ 4
(22a)m= 1.27 1.25 1.23 1.1 1.08 0.95 0.95 0.92 1 1.08 1.12 1.18

0.49	0.48	0.47	0.42	0.41	d wind s	0.36	0.35	0.38	0.41	0.43	0.45	1	
alculate effec	' '		-	_		l	0.00	0.00	• • • •	1 00	1 0]	
If mechanica	al ventila	tion:										0.5	(23
If exhaust air he) = (23a)			0.5	(23
If balanced with		-	-	_								0	(23
a) If balance						- ` ` 	- ` ` - 	ŕ	 	` 	- ` ` `) ÷ 100]	
4a)m= 0	0	0	0	0	0	0	0	0	0	0	0]	(24
b) If balance	l 1				1		- ^ ` ` - 	i `	r ´ `	- 		1	(0.
4b)m= 0	0	0	0	0	0	0	0	0	0	0	0]	(24
c) If whole h if (22b)n				-	-				5 × (23h	n)			
4c)m = 0.74	0.73	0.72	0.67	0.66	0.61	0.61	0.6	0.63	0.66	0.68	0.7	1	(24
d) If natural						<u> </u>						J	•
if (22b)n									0.5]				
4d)m= 0	0	0	0	0	0	0	0	0	0	0	0]	(24
Effective air	change	rate - er	ter (24a	or (24b	o) or (24	c) or (24	d) in box	x (25)	-			_	
5)m= 0.74	0.73	0.72	0.67	0.66	0.61	0.61	0.6	0.63	0.66	0.68	0.7		(2
3. Heat losse	s and he	eat loss r	paramet	er:								_	
LEMENT	Gros area	SS	Openin	gs	Net Ar A ,r		U-valı W/m2		A X U (W/	K)	k-value kJ/m²-		A X k kJ/K
/in <mark>dows</mark> Type	e 1				3.04	x1,	/[1/(2.8)+	0.04] =	7.65				(2
/in <mark>dows</mark> Type	2				3.23	x1,	/[1/(2.8)+	0.04] =	8.13	Ħ			(2
indows Type	3				3.52	x1,	/[1/(2.8)+	0.04] =	8.86	Ħ			(2
/indows Type	4				3.36	x1,	/[1/(2.8)+	0.04] =	8.46	5			(2
					3.52	x1,	/[1/(2.8)+	0.04] =	8.86	=			(2
indows Type	e 5												
/indows Type /alls Type1	5 15		3.04		11.96	x	1.7		20.33	\neg [(2
• •		=	3.04	=	11.96	=	1.7	= [20.33				
/alls Type1	15					×		=					(2
alls Type1	15	5	3.23		17.77	x x	1.7	=	30.21				(2
alls Type1 alls Type2 alls Type3 alls Type4	21 27.5 22.5	5	3.23 6.88		17.77	x x	1.7	= [30.21 35.05				(2
alls Type1 alls Type2 alls Type3 alls Type4 otal area of e	21 27.5 22.5 22.5 27.6 27.6	5 , m²	3.23 6.88 3.52	ndow U-va	17.77 20.62 18.98 86 alue calcul	x x x x x x	1.7	= [30.21 35.05 32.27		paragraph	h 3.2	(2
alls Type1 alls Type2 alls Type3 alls Type4 otal area of e or windows and include the area	27.5 22.5 22.6 20 vindo	5 , m ² ows, use e sides of in	3.23 6.88 3.52 Iffective with ternal wall	ndow U-va	17.77 20.62 18.98 86 alue calcul	x x x x x x x x x x x x x x x x x x x	1.7	= [= [= [/[(1/U-valu	30.21 35.05 32.27		paragraph	h 3.2	(2) (2) (3)
'alls Type1 'alls Type2 'alls Type3	27.5 27.5 22.5 22.5 20 elements 2 roof windows on both 2 ss, W/K =	5 5 , m ² ows, use e sides of in = S (A x	3.23 6.88 3.52 Iffective with ternal wall	ndow U-va	17.77 20.62 18.98 86 alue calcul	x x x x x x x x x x x x x x x x x x x	1.7 1.7 1.7	= [= [- [(1/U-value)]) + (32) =	30.21 35.05 32.27 (e)+0.04] &				(2 (2 (3 (3 (3 (3 (3 (4 (4 (4 (4 (4 (4 (4 (4 (4 (4 (4 (4 (4
falls Type1 falls Type2 falls Type3 falls Type4 otal area of e or windows and include the area abric heat los eat capacity	21.5 27.5 22.5 22.5 22.5 22.5 27.6 27.6 27.6 27.6 27.6 27.6 27.6 27.6	5 5, m ² cows, use e sides of in = S (A x (A x k)	3.23 6.88 3.52 Iffective winternal wall U)	ndow U-va	17.77 20.62 18.98 86 alue calcultitions	x x x x x x x x x x x x x x x x x x x	1.7 1.7 1.7	= [= [] = [] = [] (1/U-value) + (32) = ((28)	30.21 35.05 32.27 (e)+0.04] &	as given in 2) + (32a).		159.84	(2 (2 (3 (3 (3 (3 (3 (4 (4 (4 (4 (4 (4 (4 (4 (4 (4 (4 (4 (4
alls Type1 alls Type2 alls Type3 alls Type4 otal area of e or windows and include the area abric heat los eat capacity hermal mass or design assess	27.5 27.5 22.5 22.5 22.6 25.6 27.6 27.6 29.6 29.6 29.6 29.6 29.6 29.6 29.6 29	5 5, m ² cows, use e sides of in = S (A x (A x k) ter (TMF ere the dec	3.23 6.88 3.52 Iffective winternal wall U) P = Cm tails of the	ndow U-va ds and pan	17.77 20.62 18.98 86 86 alue calcul titions	x x x x x x x ated using	1.7 1.7 1.7 1 formula 1 (26)(30)	= [= [] = [] = [] (1/U-valu) + (32) = ((28)	30.21 35.05 32.27 (e)+0.04] a	as given in 2) + (32a).	(32e) =	159.84	(2 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3
alls Type1 alls Type2 alls Type3 alls Type4 talls Type4 or alls area of e for windows and include the area abric heat los	27.5 27.5 22.5 22.5 22.5 22.5 22.5 22.5	5, m² cows, use e sides of in = S (A x k) tter (TMF) ere the detailed calculations.	3.23 6.88 3.52 Iffective winternal wall U) P = Cm - tails of the culation.	ndow U-vals and pand	17.77 20.62 18.98 86 alue calcul titions kJ/m²K	x x x x x x x x x x x x x x x x x x x	1.7 1.7 1.7 1 formula 1 (26)(30)	= [= [] = [] = [] (1/U-valu) + (32) = ((28)	30.21 35.05 32.27 (e)+0.04] a	as given in 2) + (32a).	(32e) =	159.84	(2 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3
alls Type1 alls Type2 alls Type3 alls Type4 alls Type4 otal area of e or windows and include the area abric heat los eat capacity nermal mass or design assess on be used instea	27.5 22.5 lements roof winders on both ss, W/K = Cm = S(parame sments whe ad of a det es : S (L al bridging	5 , m ² cows, use e sides of in = S (A x k) ter (TMF) ere the detailed calculus (X Y) calculus (X Y) calculus (X Y) calculus (X Y)	3.23 6.88 3.52 Iffective winternal wall U) P = Cm + tails of the ulation. culated to	ndow U-vals and part	17.77 20.62 18.98 86 alue calcultitions n kJ/m²K ion are not	x x x x x x x x x x x x x x x x x x x	1.7 1.7 1.7 1 formula 1 (26)(30)	= [= [] = [] = [] (1/U-value) + (32) = ((28) Indicative	30.21 35.05 32.27 (e)+0.04] a	as given in 2) + (32a).	(32e) =	159.84 13172.7 100	(2 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3 (3

(38)m= 121.52	119.95	118.37	110.5	108.92	101.04	101.04	99.47	104.2	108.92	112.07	115.22		(38)
Heat transfer	coefficie	nt, W/K						(39)m	= (37) + (37)	38)m			
(39)m= 294.26	292.68	291.11	283.23	281.66	273.78	273.78	272.21	276.93	281.66	284.81	287.96		
Heat loss para	ameter (H	HLP), W/	/m²K						Average = = (39)m ÷		12 /12=	282.84	(39)
(40)m= 1.89	1.88	1.87	1.82	1.81	1.76	1.76	1.74	1.78	1.81	1.83	1.85]	
						l .			Average =	Sum(40) ₁	12 /12=	1.81	(40)
Number of da	<u>, </u>	nth (Tab	le 1a)	1	1	1	1	1	1	1	1	1	
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(41)m= 31	28	31	30	31	30	31	31	30	31	30	31]	(41)
4. Water hea	ting ene	rgy requi	irement:								kWh/y	ear:	
Assumed occ	upancy,	N								2	.94]	(42)
if TFA > 13.		+ 1.76 x	[1 - exp	(-0.0003	349 x (TF	FA -13.9)2)] + 0.0	0013 x (TFA -13.	.9)		ı	, ,
if TFA £ 13. Annual average	•	ater usac	ne in litre	s ner da	av Vd av	erane –	(25 v NI)	± 36		10	9.58	1	(43)
Reduce the annu									se target o		9.58	l	(43)
not more that 125	5 litres per	person per	day (all w	ater use, i	hot and co	ld)							
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Hot water usage	in litres per	day for ea	ach month	Vd,m = fa	ctor from 7	Table 1c x	(43)				-		
(44)m= 120.54	116.15	1111.77	107.39	103.01	98.62	98.62	103.01	107.39	111.77	116.15	120.54		
Energy content o	f bot water	used sol	outotod m	anthly 1	100 v Vd v	n v nm v 5	Tm / 260/		Total = Su			1314.96	(44)
Energy content o												1	
(45)m= 178.75	156.34	161.33	140.65	134.96	116.46	107.92	123.83	125.31	146.04	159.41	173.11	4704.40	(45)
If instantaneous v	water heati	ng at point	of use (no	hot wate	r storage),	enter 0 in	boxes (46		Total = Su	M(45) ₁₁₂ :	=	1724.12	(45)
(46)m= 26.81	23.45	24.2	21.1	20.24	17.47	16.19	18.58	18.8	21.91	23.91	25.97]	(46)
Water storage	1											l	, ,
Storage volun	ne (litres)	includin	ng any so	olar or W	WHRS	storage	within sa	ame ves	sel		300		(47)
If community I	_			_			, ,						
Otherwise if n		hot wate	er (this in	ıcludes i	nstantar	neous co	mbi boil	ers) ente	er '0' in (47)			
Water storage a) If manufac		aclared l	nee facti	nr is kno	wn (k\//h	J/day).					60	1	(48)
Temperature 1				JI 10 KI10	wii (itwi	ı, aay).					.69]]	(49)
Energy lost from				aar			(48) x (49) <u> </u>			.54]]	, ,
b) If manufac		_	-		or is not		(40) X (40)	, –		0	.91	l	(50)
Hot water stor			•								0]	(51)
If community I	_		on 4.3									•	
Volume factor			Ol-							—	0		(52)
Temperature											0]	(53)
Energy lost from Enter (50) or		-	, KVVh/ye	ear			(47) x (51) x (52) x (53) =	-	0		(54)
Water storage	. , .	•	for each	month			((56)m - ((55) × (41)	m		.91	I	(55)
					07.55					07.55	00.00	1	(EC)
(56)m= 28.29 If cylinder contain	25.55	28.29	27.38	28.29 m = (56)m	27.38 x [(50) = (28.29 H11)1 ÷ (5	28.29 0) else (5	27.38 7)m = (56)	28.29 m where (27.38 H11) is fro	28.29	J lix H	(56)
	1	ı		· ·	· · · · ·	1	· · ·			· ·		1	(F →)
(57)m= 28.29	25.55	28.29	27.38	28.29	27.38	28.29	28.29	27.38	28.29	27.38	28.29]	(57)

Primary circuit loss (annual) from Table 3	i8)
Primary circuit loss calculated for each month (59) m = $(58) \div 365 \times (41)$ m	
(modified by factor from Table H5 if there is solar water heating and a cylinder thermostat)	
(59)m= 23.26 21.01 23.26 22.51 23.26 22.51 23.26 22.51 23.26 (5)	i9)
Combi loss calculated for each month $(61)m = (60) \div 365 \times (41)m$	
(61)m= 0 0 0 0 0 0 0 0 0 0 0 0 0 (6	51)
Total heat required for water heating calculated for each month $(62)m = 0.85 \times (45)m + (46)m + (57)m + (59)m + (61)m$	
(62)m= 230.31 202.9 212.88 190.54 186.51 166.35 159.47 175.39 175.2 197.59 209.3 224.67 (62)m=	32)
Solar DHW input calculated using Appendix G or Appendix H (negative quantity) (enter '0' if no solar contribution to water heating)	
(add additional lines if FGHRS and/or WWHRS applies, see Appendix G)	
(63)m= 0 0 0 0 0 0 0 0 0 0 0 0 0 (6.5)	33)
Output from water heater	
(64)m= 230.31 202.9 212.88 190.54 186.51 166.35 159.47 175.39 175.2 197.59 209.3 224.67	
Output from water heater (annual) ₁₁₂ 2331.11 (6-	64)
Heat gains from water heating, kWh/month 0.25 ´ [0.85 × (45)m + (61)m] + 0.8 x [(46)m + (57)m + (59)m]	
(65)m= 100.68 89.23 94.88 86.68 86.12 78.63 77.12 82.42 81.58 89.8 92.92 98.8 (65)m=	i5)
include (57)m in calculation of (65)m only if cylinder is in the dwelling or hot water is from community heating	
5. Internal gains (see Table 5 and 5a):	
Metabolic gains (Table 5), Watts	
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	
(66)m= 176.59 176.59 176.59 176.59 176.59 176.59 176.59 176.59 176.59 176.59 176.59 (66)m= 176.59 176.59 176.59 176.59 176.59	36)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	
(67)m= 116.27 103.27 83.98 63.58 47.53 40.13 43.36 56.36 75.64 96.04 112.1 119.5 (6	57)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	
(68)m= 488.02 493.09 480.33 453.16 418.86 386.63 365.1 360.04 372.8 399.96 434.26 466.49 (66)	38)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	
(69)m= 55.6 55.6 55.6 55.6 55.6 55.6 55.6 55.	39)
Pumps and fans gains (Table 5a)	
(70)m= 3 3 3 3 3 3 3 3 3 3 3 (71)	7 0)
Losses e.g. evaporation (negative values) (Table 5)	
(71)m= -117.73	7 1)
Water heating gains (Table 5)	
(72)m= 135.32 132.79 127.53 120.39 115.75 109.21 103.66 110.78 113.3 120.7 129.05 132.8 (73.25)	7 2)
Total internal gains = $(66)m + (67)m + (68)m + (69)m + (70)m + (71)m + (72)m$	
(73)m= 857.08 846.61 809.31 754.59 699.61 653.44 629.58 644.63 679.21 734.18 792.88 836.26 (73)m=	7 3)
6. Solar gains:	
Solar gains are calculated using solar flux from Table 6a and associated equations to convert to the applicable orientation.	
Orientation: Access Factor Area Flux g_ FF Gains	
Table 6d m² Table 6a Table 6b Table 6c (W)	
East 0.9x 1 x 3.04 x 19.64 x 0.76 x 0.7 = 28.59 (7)	7 6)
East 0.9x 1 x 3.23 x 19.64 x 0.76 x 0.7 = 30.37 (7)	7 6)

East	0.9x	1	X	3.04	x	38.42	x	0.76	x	0.7] =	55.92	(76)
East	0.9x	1	x	3.23	x	38.42	x	0.76	x	0.7	=	59.42	(76)
East	0.9x	1	x	3.04	x	63.27	x	0.76	x	0.7	=	92.1	(76)
East	0.9x	1	x	3.23	x	63.27	x	0.76	x	0.7	=	97.85	(76)
East	0.9x	1	x	3.04	x	92.28	x	0.76	x	0.7	=	134.32	(76)
East	0.9x	1	x	3.23	x	92.28	X	0.76	x	0.7	=	142.71	(76)
East	0.9x	1	x	3.04	x	113.09	x	0.76	x	0.7	=	164.61	(76)
East	0.9x	1	x	3.23	x	113.09	x	0.76	x	0.7	=	174.9	(76)
East	0.9x	1	X	3.04	X	115.77	x	0.76	x	0.7	=	168.51	(76)
East	0.9x	1	X	3.23	X	115.77	X	0.76	x	0.7	=	179.04	(76)
East	0.9x	1	X	3.04	X	110.22	X	0.76	x	0.7	=	160.43	(76)
East	0.9x	1	X	3.23	X	110.22	X	0.76	X	0.7	=	170.46	(76)
East	0.9x	1	x	3.04	x	94.68	X	0.76	x	0.7] =	137.81	(76)
East	0.9x	1	X	3.23	X	94.68	X	0.76	x	0.7	=	146.42	(76)
East	0.9x	1	X	3.04	x	73.59	X	0.76	x	0.7	=	107.11	(76)
East	0.9x	1	x	3.23	x	73.59	X	0.76	x	0.7] =	113.81	(76)
East	0.9x	1	x	3.04	x	45.59	X	0.76	x	0.7	=	66.36	(76)
East	0.9x	1	x	3.23	X	45.59	Х	0.76	X	0.7	=	70.5	(76)
East	0.9x	1	x	3.04	х	24.49	x	0.76	x	0.7	=	35.65	(76)
East	0.9x	1	x	3.23	x	24.49	×	0.76	x	0.7	=	37.87	(76)
East	0.9x	1	X	3.04	X	16.15	X	0.76	x	0.7	=	23.51	(76)
East	0.9x	1	x	3.23	x	16.15	Х	0.76	x	0.7	=	24.98	(76)
South	0.9x	1	x	3.52	x	46.75	X	0.76	x	0.7	=	78.79	(78)
South	0.9x	1	х	3.36	х	46.75	X	0.76	X	0.7	=	75.21	(78)
South	0.9x	1	х	3.52	X	46.75	X	0.76	X	0.7	=	78.79	(78)
South	0.9x	1	х	3.52	X	76.57	X	0.76	X	0.7	=	129.05	(78)
South	0.9x	1	х	3.36	X	76.57	X	0.76	X	0.7	=	123.18	(78)
South	0.9x	1	х	3.52	X	76.57	X	0.76	X	0.7	=	129.05	(78)
South	0.9x	1	х	3.52	X	97.53	X	0.76	X	0.7	=	164.38	(78)
South	0.9x	1	X	3.36	X	97.53	X	0.76	X	0.7	=	156.91	(78)
South	0.9x	1	X	3.52	X	97.53	X	0.76	X	0.7	=	164.38	(78)
South	0.9x	1	х	3.52	X	110.23	X	0.76	X	0.7	=	185.79	(78)
South	0.9x	1	х	3.36	X	110.23	X	0.76	X	0.7	=	177.34	(78)
South	0.9x	1	X	3.52	X	110.23	X	0.76	X	0.7	=	185.79	(78)
South	0.9x	1	X	3.52	X	114.87	X	0.76	X	0.7	=	193.6	(78)
South	0.9x	1	x	3.36	X	114.87	x	0.76	x	0.7	=	184.8	(78)
South	0.9x	1	x	3.52	x	114.87	X	0.76	x	0.7	=	193.6	(78)
South	0.9x	1	x	3.52	x	110.55	x	0.76	x	0.7	=	186.31	(78)
South	0.9x	1	х	3.36	x	110.55	X	0.76	X	0.7	=	177.85	(78)
South	0.9x	1	x	3.52	X	110.55	X	0.76	x	0.7	=	186.31	(78)
South	0.9x	1	X	3.52	X	108.01	X	0.76	X	0.7	=	182.04	(78)

South 0.9x 1 x 3.36 x 100.601 x 0.76 x 0.7 = 173.77 (78) South 0.9x 1 x 3.52 x 100.601 x 0.76 x 0.77 = 1767.04 (78) South 0.9x 1 x 3.52 x 100.801 x 0.76 x 0.77 = 1767.09 (78) South 0.9x 1 x 3.52 x 100.800 x 0.76 x 0.77 = 1767.09 (78) South 0.9x 1 x 3.36 x 40.4 x 0.76 x 0.77 = 1767.09 (78) South 0.9x 1 x 3.36 x 40.4 x 0.76 x 0.77 = 1767.09 (78) South 0.9x 1 x 3.36 x 40.4 x 0.76 x 0.77 = 1767.09 (78) South 0.9x 1 x 3.36 x 40.4 x 0.76 x 0.77 = 1767.09 (78) South 0.9x 1 x 3.36 x 40.4 x 0.76 x 0.77 = 1767.09 (78) South 0.9x 1 x 3.36 x 0.79	O 41														
South 0.9s 1 x 3.32 x 104.89 x 0.76 x 0.7 = 176.79 [78] South 0.9s 1 x 3.32 x 104.89 x 0.76 x 0.7 = 176.79 [78] South 0.9s 1 x 3.32 x 104.89 x 0.76 x 0.7 = 176.79 [78] South 0.9s 1 x 3.32 x 104.89 x 0.76 x 0.7 = 176.79 [78] South 0.9s 1 x 3.32 x 104.89 x 0.76 x 0.7 = 176.79 [78] South 0.9s 1 x 3.32 x 104.89 x 0.76 x 0.7 = 176.79 [78] South 0.9s 1 x 3.32 x 104.89 x 0.76 x 0.7 = 176.79 [78] South 0.9s 1 x 3.32 x 104.89 x 0.76 x 0.7 = 174.72 [78] South 0.9s 1 x 3.32 x 104.89 x 0.76 x 0.7 = 174.72 [78] South 0.9s 1 x 3.32 x 104.89 x 0.76 x 0.7 = 174.72 [78] South 0.9s 1 x 3.32 x 104.89 x 0.76 x 0.7 = 174.72 [78] South 0.9s 1 x 3.32 x 104.89 x 0.76 x 0.7 = 132.89 [78] South 0.9s 1 x 3.32 x 104.89 x 0.76 x 0.7 = 132.89 [78] South 0.9s 1 x 3.32 x 104.89 x 0.76 x 0.7 = 132.89 [78] South 0.9s 1 x 3.32 x 104.89 x 0.76 x 0.7 = 132.89 [78] South 0.9s 1 x 3.32 x 104.89 x 0.76 x 0.7 = 132.89 [78] South 0.9s 1 x 3.32 x 104.89 x 0.76 x 0.7 = 132.89 [78] South 0.9s 1 x 3.32 x 104.89 x 0.76 x 0.7 = 132.89 [78] South 0.9s 1 x 3.32 x 104.4 x 0.76 x 0.7 = 132.89 [78] South 0.9s 1 x 3.32 x 104.4 x 0.76 x 0.7 = 132.89 [78] South 0.9s 1 x 3.32 x 104.4 x 0.76 x 0.7 = 104.89 [78] South 0.9s 1 x 3.32 x 104.4 x 0.76 x 0.7 = 104.89 [78] South 0.9s 1 x 3.32 x 104.4 x 0.76 x 0.7 = 104.89 [78] South 0.9s 1 x 3.32 x 104.4 x 0.76 x 0.7 = 104.89 [78] South 0.9s 1 x 3.32 x 104.4 x 0.76 x 0.7 = 104.89 [78] South 0.9s 1 x 3.32 x 104.4 x 0.76 x 0.7 = 104.89 [78] South 0.9s 1 x 3.32 x 104.4 x 0.76 x 0.7 = 104.89 [78] South 0.9s 1 x 3.32 x 104.4 x 0.76 x 0.7 = 104.89 [78] South 0.9s 1 x 3.32 x 104.4 x 0.76 x 0.7 = 104.89 [78] South 0.9s 1 x 3.32 x 104.89 [78] South 0.9s 1 x 3.89 [78] South 0.9s 1 x 3.89 [78] South 0.9	South	0.9x	1	X	3.3	6	X	108.01	X	0.76	x	0.7	=	173.77	(78)
South 0.9s	South	0.9x	1	X	3.5	2	X	108.01	x	0.76	x [0.7	=	182.04	(78)
South 0.9s 1 x 3.32 x 101.83 x 0.76 x 0.7 = 176.79 (78) South 0.9s 1 x 3.35 x 101.83 x 0.76 x 0.7 = 171.72 (78) South 0.9s 1 x 3.35 x 101.83 x 0.76 x 0.7 = 171.72 (78) South 0.9s 1 x 3.35 x 101.83 x 0.76 x 0.7 = 171.72 (78) South 0.9s 1 x 3.35 x 101.83 x 0.76 x 0.7 = 171.72 (78) South 0.9s 1 x 3.35 x 101.83 x 0.76 x 0.7 = 171.72 (78) South 0.9s 1 x 3.35 x 101.83 x 0.76 x 0.7 = 133.19 (78) South 0.9s 1 x 3.35 x 102.83 x 0.76 x 0.7 = 133.19 (78) South 0.9s 1 x 3.35 x 102.83 x 0.76 x 0.7 = 133.19 (78) South 0.9s 1 x 3.35 x 102.83 x 0.76 x 0.7 = 133.19 (78) South 0.9s 1 x 3.35 x 102.83 x 0.76 x 0.7 = 133.19 (78) South 0.9s 1 x 3.35 x 102.83 x 0.76 x 0.7 = 133.19 (78) South 0.9s 1 x 3.35 x 102.83 x 0.76 x 0.7 = 133.19 (78) South 0.9s 1 x 3.35 x 102.83 x 0.76 x 0.7 = 133.19 (78) South 0.9s 1 x 3.35 x 102.83 x 0.76 x 0.7 = 133.19 (78) South 0.9s 1 x 3.35 x 102.83 x 102.83 x 0.76 x 0.7 = 133.19 (78) South 0.9s 1 x 3.35 x 102.83 x 102	South	0.9x	1	x	3.5	2	X	104.89	x	0.76	x [0.7	=	176.79	(78)
South 0.9% 1 x 3.552 x 101.88 x 0.76 x 0.7 = 171.72 (78) South 0.9% 1 x 3.552 x 101.88 x 0.76 x 0.7 = 171.72 (78) South 0.9% 1 x 3.552 x 101.88 x 0.76 x 0.7 = 171.72 (78) South 0.9% 1 x 3.552 x 101.88 x 0.76 x 0.7 = 171.72 (78) South 0.9% 1 x 3.552 x 101.88 x 0.76 x 0.7 = 171.72 (78) South 0.9% 1 x 3.552 x 101.88 x 0.76 x 0.76 x 0.7 = 138.91 (78) South 0.9% 1 x 3.552 x 101.88 x 0.76 x 0.76 x 0.7 = 138.91 (78) South 0.9% 1 x 3.552 x 101.88 x 0.76 x 0.76 x 0.7 = 138.91 (78) South 0.9% 1 x 3.552 x 101.88 x 0.76 x 0.76 x 0.7 = 138.91 (78) South 0.9% 1 x 3.552 x 101.88 x 0.76 x 0.76 x 0.7 = 138.91 (78) South 0.9% 1 x 3.552 x 101.88 x 10.76 x 0.76 x 0.7 = 138.91 (78) South 0.9% 1 x 3.552 x 101.88 x 10.76 x 0.76 x 0.7 = 138.91 (78) South 0.9% 1 x 3.552 x 101.88 x 10.76 x 0.76 x 0.7 = 138.91 (78) South 0.9% 1 x 3.552 x 101.88 x 10.76 x 0.76 x 0.7 = 138.91 (78) South 0.9% 1 x 3.552 x 101.88 x 10.76 x 0.76 x 0.7 = 101.88 (78) South 0.9% 1 x 3.552 x 101.88 x 10.76 x 0.76 x 0.7 = 101.88 (78) South 0.9% 1 x 3.552 x 101.88 x 10.76 x 0.76 x 0.7 = 101.88 (78) South 0.9% 1 x 3.552 x 101.88 x 10.76 x 0.76 x 0.7 = 101.88 (78) South 0.9% 1 x 3.552 x 101.88 x 10.76 x 0.76 x 0.7 = 101.88 (78) South 0.9% 1 x 3.552 x 101.88 x 10.76 x 0.76 x 0.7 = 101.88 (78) South 0.9% 1 x 3.552 x 101.88 x 10.76 x 0.76 x 0.7 = 101.88 (78) South 0.9% 1 x 3.552 x 101.88 x 10.78 (18) South 0.9% 1 x 3.552 x 101.88 x 10.78 (18) South 0.9% 1 x 3.552 x 101.88 x 10.78 (18) South 0.9% 1 x 3.552 x 101.88 x 10.78 (18) South 0.9% 1 x 3.552 x 101.88 x 10.78 (18) South 0.9% 1 x 3.552 x 101.88 x 10.78 (18) South 0.9% 1 x 3.552 x 101.88 x 10.78 (18) South 0.9% 1 x 3.552 x 101.88 x 10.78 (18) South 0.9% 1 x 3.552 x 101.88 x 10.78 (18) South 0.9% 1 x 3.552 x 101.88 x 10.78 (18) South 0.9% 1 x 3.552 x 101.88 x 10.78 (18) South 0.9% 1 x 3.552 x 101.88 x 10.78 (18) South 0.9% 1 x 3.552 x 101.88 x 10.78 (18) South 0.9% 1 x 3.552 x 101.88 x 10.78 (18) South 0.9% 1 x 3.552 x 101.88 x 10.78 (18) South 0.9% 1 x 3.552 x 10.78 (18) South 0.9% 1 x 3.552 x 10.78 (18) South 0.9% 1	South	0.9x	1	x	3.3	6	X	104.89	x	0.76	x	0.7	=	168.75	(78)
South 0.9x 1 x 3.52 x 101.83 x 0.76 x 0.7 = 163.91 (78) South 0.9x 1 x 3.52 x 101.83 x 0.76 x 0.7 = 171.72 (78) South 0.9x 1 x 3.52 x 82.59 x 0.76 x 0.7 = 133.19 (78) South 0.9x 1 x 3.52 x 82.59 x 0.76 x 0.7 = 133.19 (78) South 0.9x 1 x 3.52 x 82.59 x 0.76 x 0.7 = 133.19 (78) South 0.9x 1 x 3.52 x 82.59 x 0.76 x 0.7 = 133.19 (78) South 0.9x 1 x 3.52 x 82.59 x 0.76 x 0.7 = 133.19 (78) South 0.9x 1 x 3.52 x 82.59 x 0.76 x 0.7 = 133.19 (78) South 0.9x 1 x 3.52 x 82.59 x 0.76 x 0.7 = 133.19 (78) South 0.9x 1 x 3.52 x 62.54 x 0.76 x 0.7 = 133.19 (78) South 0.9x 1 x 3.52 x 62.54 x 0.76 x 0.7 = 133.19 (78) South 0.9x 1 x 3.52 x 65.42 x 0.76 x 0.7 = 93.4 (78) South 0.9x 1 x 3.52 x 65.42 x 0.76 x 0.7 = 93.4 (78) South 0.9x 1 x 3.52 x 60.44 x 0.76 x 0.7 = 93.4 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 93.4 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 0.7 x 0	South	0.9x	1	x	3.5	2	X	104.89	X	0.76	x	0.7	=	176.79	(78)
South 0.9x 1 x 3.52 x 51.18 x 0.76 x 0.7 = 171.72 (78) South 0.9x 1 x 3.52 x 82.59 x 0.76 x 0.7 = 139.19 (78) South 0.9x 1 x 3.52 x 82.59 x 0.76 x 0.7 = 139.19 (78) South 0.9x 1 x 3.52 x 82.59 x 0.76 x 0.7 = 139.19 (78) South 0.9x 1 x 3.52 x 82.59 x 0.76 x 0.7 = 334.4 (78) South 0.9x 1 x 3.52 x 55.42 x 0.76 x 0.7 = 334.4 (78) South 0.9x 1 x 3.52 x 55.42 x 0.76 x 0.7 = 334.4 (78) South 0.9x 1 x 3.52 x 55.42 x 0.76 x 0.7 = 334.4 (78) South 0.9x 1 x 3.52 x 55.42 x 0.76 x 0.7 = 334.4 (78) South 0.9x 1 x 3.52 x 55.42 x 0.76 x 0.7 = 334.4 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 0.7 = 68.09 (78) South 0.9x 1 x 0.7 = 68.09 (78) South 0	South	0.9x	1	x	3.5	2	X	101.89	x	0.76	x	0.7	=	171.72	(78)
South 0.9x 1 x 3.52 x 82.99 x 0.76 x 0.7 = 139.19 (78) South 0.9x 1 x 3.52 x 82.99 x 0.76 x 0.7 = 139.19 (78) South 0.9x 1 x 3.52 x 82.99 x 0.76 x 0.7 = 139.19 (78) South 0.9x 1 x 3.52 x 82.99 x 0.76 x 0.7 = 139.19 (78) South 0.9x 1 x 3.52 x 56.42 x 0.76 x 0.7 = 33.4 (78) South 0.9x 1 x 3.52 x 56.42 x 0.76 x 0.7 = 33.4 (78) South 0.9x 1 x 3.52 x 56.42 x 0.76 x 0.7 = 33.4 (78) South 0.9x 1 x 3.52 x 56.42 x 0.76 x 0.7 = 33.4 (78) South 0.9x 1 x 3.52 x 56.42 x 0.76 x 0.7 = 33.4 (78) South 0.9x 1 x 3.52 x 56.42 x 0.76 x 0.7 = 33.4 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 34.4 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 0.7 x 0.	South	0.9x	1	x	3.3	6	X	101.89	×	0.76	_ x	0.7	=	163.91	(78)
South 0.9x 1 x 3.36 x 82.59 x 0.76 x 0.7 = 132.86 (78) South 0.9x 1 x 3.52 x 82.59 x 0.76 x 0.7 = 133.19 (78) South 0.9x 1 x 3.52 x 55.42 x 0.76 x 0.7 = 33.4 (78) South 0.9x 1 x 3.52 x 55.42 x 0.76 x 0.7 = 33.4 (78) South 0.9x 1 x 3.52 x 55.42 x 0.76 x 0.7 = 89.15 (78) South 0.9x 1 x 3.52 x 55.42 x 0.76 x 0.7 = 89.15 (78) South 0.9x 1 x 3.52 x 55.42 x 0.76 x 0.7 = 89.15 (78) South 0.9x 1 x 3.52 x 56.42 x 0.76 x 0.7 = 89.15 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 66.09 (78) South 0.9x 1 x 0.7x 1	South	0.9x	1	x	3.5	2	X	101.89	x	0.76	x	0.7	=	171.72	(78)
South 0.9x 1 x 3.52 x 88.29 x 0.76 x 0.7 = 133.19 (78) South 0.9x 1 x 3.52 x 56.42 x 0.76 x 0.7 = 33.4 (78) South 0.9x 1 x 3.52 x 56.42 x 0.76 x 0.7 = 33.4 (78) South 0.9x 1 x 3.52 x 56.42 x 0.76 x 0.7 = 33.4 (78) South 0.9x 1 x 3.52 x 56.42 x 0.76 x 0.7 = 33.4 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 33.4 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) Solar gains in watts, calculated for each morth (83)n= 291.72 4.72 8.72 8.72 8.72 8.72 8.72 8.72 8.72 8	South	0.9x	1	x	3.5	2	X	82.59	x	0.76	x	0.7	=	139.19	(78)
South 0.9x 1	South	0.9x	1	x	3.3	6	X	82.59	T x	0.76	x	0.7	=	132.86	(78)
South 0.9x 1	South	0.9x	1	x	3.5	2	X	82.59	x	0.76	x	0.7	=	139.19	(78)
South 0.9x 1 x 3.52 x 55.42 x 0.76 x 0.7 = 93.4 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) Solar gains in watts, calculated for each month (83)m = \$\frac{291.76}{291.76}\$ 496.61 \$\frac{76.62}{66.2}\$ 825.95 \$\frac{91.52}{91.12}\$ 898.03 \$88.73 \$806.95 \$\frac{72.26}{22.6}\$ 548.1 \$49.47 \$\frac{72.49.65}{242.65}\$ (83) Total gains - internal and solar (84)m = (73)m + (83)m, watts (84)m = \frac{1148.84}{1343.23}\$ \frac{144.93}{144.93}\$ \frac{1551.47}{144.93}\$ \frac{1498.32}{1451.18}\$ \frac{1457.47}{1282.27}\$ \frac{1282.27}{1142.34}\$ \frac{108.91}{108.91}\$ (84) 7. Mean internal temporature (prods in the living area from Table 9, Th1 (°C) Utilisation factor for gains for living area, h1,m (see Table 9a) Utilisation factor for gains for living area T1 (follow steps 3 to 7 in Table 9c) (86)m = 0.96 0.94 0.92 0.88 0.81 0.71 0.6 0.62 0.77 0.89 0.94 0.96 (86) Mean internal temperature in living area T1 (follow steps 3 to 7 in Table 9c) (89)m = \frac{19.41}{19.42}\$ \frac{19.46}{19.47}\$ \frac{19.47}{19.5}\$ \frac{19.5}{19.5}\$ \frac{19.49}{19.47}\$ \frac{19.47}{19.45}\$ \frac{19.44}{19.44}\$ (88) Utilisation factor for gains for rest of dwelling from Table 9, Th2 (°C) (89)m = \frac{19.41}{19.42}\$ \frac{19.46}{19.47}\$ \frac{19.47}{19.5}\$ \frac{19.5}{19.5}\$ \frac{19.5}{19.5}\$ \frac{19.49}{19.49}\$ \frac{19.47}{19.45}\$ \frac{19.44}{19.49}\$ \frac{19.47}{19.49}\$ \frac{19.47}{19.49	South	0.9x	1	x	3.5	2	X	55.42	×	0.76	×	0.7	=	93.4	(78)
South 0.9s 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) South 0.9s 1 x 3.52 x 0.7 = 68.09 (78) South 0.9s 1 x 3.52 x 0.7 = 68.09 (78) South 0.9s 1 x 3.52 x 0.7 = 68.09 (78) South 0.9s 1 x 3.52 x 0.7 = 68.09 (78) South 0.9s 1 x 3.52 x 0.7 = 68.09 (78) South 0.9s 1 x 3.52 x 0.7 = 68.09 (78) South 0.9s 1 x 3.52 x 0.7 = 68.09 (78) South 0.9s 1 x 3.52 x 0.7 = 68.09 (78) South 0.9s 1 x 3.52 x 0.7 = 68.09 (78) South 0.9s 1 x 3.52 x 0.7 = 68.09 (78) South 0.9s 1 x 3.52 x 0.7 = 68.09 (78) South 0.9s 1 x 3.52 x 0.7 = 68.09 (78) South 0.9s 1 x 3.52 x 0.7 = 68.09 (78) South 0.9s 1 x 3.52 x 0.7 = 68.09 (78) South 0.9s 1 x 0.7 = 68.09 (78) South 0.9s 1 x 0.7 = 68.09 (78) South 0.9s 1 x 0	South	0.9x	1	x	3.3	6	X	55.42	×	0.76	_ x [0.7	=	89.15	(78)
South 0.9x 1 x 3.36 x 40.4 x 0.76 x 0.7 = 64.99 (78) Solar gains in watts, calculated for each month (83)m = \$\frac{2}{9}1.76 \frac{1}{9}\$ x 0.7 = 64.99 (78) Solar gains in watts, calculated for each month (83)m = \$\frac{2}{9}1.76 \frac{1}{9}\$ x 0.7 = 68.09 (78) Solar gains in watts, calculated for each month (83)m = \$\frac{2}{9}1.76 \frac{1}{9}\$ x 0.7 = 68.09 (78) Solar gains in watts, calculated for each month (83)m = \$\frac{1}{9}1.76 \frac{1}{9}\$ x 0.7 = 68.09 (78) Solar gains in watts, calculated for each month (83)m = \$\frac{1}{9}1.76 \frac{1}{9}\$ x 0.7 = 68.09 (78) Solar gains in watts, calculated for each month (83)m = \$\frac{1}{9}1.76 \frac{1}{9}\$ x 0.7 = 68.09 (78) Solar gains in watts, calculated for each month (83)m = \$\frac{1}{9}1.76 \frac{1}{9}\$ x 0.7 = 68.09 (78) Solar gains in watts, calculated for each month (83)m = \$\frac{1}{9}1.76 \frac{1}{9}\$ x 0.7 = 68.09 (78) Solar gains in watts, calculated for each month (83)m = \$\frac{1}{9}1.76 \frac{1}{9}\$ x 0.7 = 68.09 (78) Solar gains in watts, calculated for each month (83)m = \$\frac{1}{9}1.76 \frac{1}{9}\$ x 0.7 = 68.09 (78) Solar gains in watts, calculated for each month (83)m = \$\frac{1}{9}1.76 \frac{1}{9}\$ x 0.5 = 6.54.1 349.47 249.65 (83) Total gains - internal and solar (84)m = (73)m + (83)m, watts (84)m = \frac{1}{148.84} \frac{1}{1342.32} \frac{1}{148.49} \frac{1}{1580.50} \frac{1}{1551.47} \frac{1}{1498.32} \frac{1}{1451.18} \frac{1}{1407.47} \frac{1}{1282.27} \frac{1}{142.34} \frac{1}{1085.91} (86) Wean internal temperature in living area T1 (follow steps 3 to 7 in Table 9c) (86)m = \frac{1}{17.52} \frac{1}{17.55} \frac{1}{18.38} \frac{1}{19.47} \frac{1}{19.45} \frac{1}{19.47} \frac{1}{19.45} \frac{1}{19.44} \frac{1}{19.45} \frac{1}{19.44} \frac{1}{19.45} \frac{1}{19.44} \frac{1}{19.45} \frac{1}{19.44} \frac{1}{19.45} \frac{1}{	South	0.9x	1	x	3.5	2	X	55.42	X	0.76	_ x [0.7	-	93.4	(78)
South 0.9x 1 x 3.52 x 40.4 x 0.76 x 0.7 = 68.09 (78) Solar gains in watts, calculated for each month (83)m = Sum(74)m(82)m	South	0.9x	1	x	3.5	2	X	40.4	×	0.76	×	0.7	=	68.09	(78)
Solar gains in watts, calculated for each month (83)m = \$um(74)m(82)m	South	0.9x	1	x	3.3	6	X	40.4	X	0.76	_ x [0.7	-	64.99	(78)
(83) (83) (83) (83) (83) (83) (83) (83) (83) (83) (83) (83) (83) (83) (83) (84) (8	South	0.9x	1	x	3.5	2	X	40.4	×	0.76	×	0.7	=	68.09	(78)
(83) (83) (83) (83) (83) (83) (83) (83) (83) (83) (83) (83) (83) (83) (83) (84) (8				•											
Total gains — internal and sola (84)m = (73)m + (83)m , watts (84)m = 1148.84 1343.23 1484.93 1580.54 1611.12 1551.47 1498.32 1451.18 1407.47 1282.27 1142.34 1085.91 (84) 7. Mean internal temperature (heating season) Temperature during heating periods in the living area from Table 9, Th1 (°C)	Solar g	ains in wa	atts, calcul	ated	for each	n month	1		(83)m	= Sum(74)m .	(82)m				
(84) 148.84 1343.23 1484.93 1589.54 1611.12 1551.47 1498.32 1451.18 1407.47 1282.27 1142.34 1085.91 (84) 7. Mean internal temperature (heating season) (85) 1. Mean internal temperature (heating season) (85) 1. Mean internal temperature (heating periods in the living area from Table 9, Th1 (°C) 21 (85) (85) 1. Mean internal temperature in living area, h1,m (see Table 9a) 21 32 33 34 39 34 39 30 34 39 30 34 39 30 34 39 30 34 39 30 34 39 30 34 39 30 34 39 30 34 39 30 34 39 30 34 39 30 34 39 30 34 39 30 34 39 30 34 39 34 34	(83)m=	291.76 4	96.61 675	.62	825.95	911.52	8	8.03 868.73	806	55 728.26	548.1	349.47	249.65		(83)
7. Mean internal temperature (heating season) Temperature during heating periods in the living area from Table 9, Th1 (°C) Utilisation factor for gains for living area, h1,m (see Table 9a) Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec (86)m= 0.96 0.94 0.92 0.88 0.81 0.71 0.6 0.62 0.77 0.89 0.94 0.96 0.94 0.96 (86) Mean internal temperature in living area T1 (follow steps 3 to 7 in Table 9c) (87)m= 17.52 17.85 18.38 19.1 19.78 20.39 20.71 20.67 20.22 19.33 18.32 17.5 (87) Temperature during heating periods in rest of dwelling from Table 9, Th2 (°C) (88)m= 19.41 19.42 19.42 19.46 19.47 19.5 19.5 19.5 19.51 19.49 19.47 19.45 19.44 (88) Utilisation factor for gains for rest of dwelling, h2,m (see Table 9a) (89)m= 0.95 0.93 0.9 0.85 0.77 0.62 0.45 0.48 0.69 0.85 0.93 0.95 (89) Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c) (90)m= 14.98 15.44 16.2 17.23 18.17 18.98 19.34 19.31 18.78 17.57 16.14 14.96 (90) #LA = Living area ÷ (4) = 0.25 (91) Mean internal temperature (for the whole dwelling) = fLA × T1 + (1 - fLA) × T2 (92)m= 15.62 16.04 16.74 17.7 18.57 19.34 19.68 19.65 19.14 18.01 16.69 15.59 (92) Apply adjustment to the mean internal temperature from Table 4e, where appropriate (93)m= 15.62 16.04 16.74 17.7 18.57 19.34 19.68 19.65 19.14 18.01 16.69 15.59 (93) 8. Space heating requirement Set Ti to the mean internal temperature obtained at step 11 of Table 9b, so that Ti,m=(76)m and re-calculate	Total g	ains – inte	ernal and s	olar	(84)m =	(73)m	+ (8	33)m , watts							
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Temperature during heating periods in the living area from Table 9, Th1 (°C) Utilisation factor for gains for living area, h1,m (see Table 9a) Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec (86) Mean internal temperature in living area T1 (follow steps 3 to 7 in Table 9c) (87)m= 17.52 17.85 18.38 19.1 19.78 20.39 20.71 20.67 20.22 19.33 18.32 17.5 (87) Temperature during heating periods in rest of dwelling from Table 9, Th2 (°C) (88)m= 19.41 19.42 19.42 19.46 19.47 19.5 19.5 19.5 19.51 19.49 19.47 19.45 19.44 (88) Utilisation factor for gains for rest of dwelling, h2,m (see Table 9a) (89)m= 0.95 0.93 0.9 0.85 0.77 0.62 0.45 0.48 0.69 0.85 0.93 0.95 (89) Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c) (90)m= 14.98 15.44 16.2 17.23 18.17 18.98 19.34 19.31 18.78 17.57 16.14 14.96 (90) FLA = Living area ÷ (4) = 0.25 (92) Apply adjustment to the mean internal temperature from Table 4e, where appropriate (93)m= 15.62 16.04 16.74 17.7 18.57 19.34 19.68 19.65 19.14 18.01 16.69 15.59 (93) 8. Space heating requirement Set Ti to the mean internal temperature obtained at step 11 of Table 9b, so that Ti,m=(76)m and re-calculate	7. Mea	an interna	l temperat	ure (heating	seasor	1)				_				
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(86)m=				T			T		A	ug Sep	Oct	Nov	Dec		
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(87)m= 17.52 17.85 18.38 19.1 19.78 20.39 20.71 20.67 20.22 19.33 18.32 17.5 Temperature during heating periods in rest of dwelling from Table 9, Th2 (°C) (88)m= 19.41 19.42 19.42 19.46 19.47 19.5 19.5 19.5 19.51 19.49 19.47 19.45 19.44 (88) Utilisation factor for gains for rest of dwelling, h2,m (see Table 9a) (89)m= 0.95 0.93 0.9 0.85 0.77 0.62 0.45 0.48 0.69 0.85 0.93 0.95 (89) Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c) (90)m= 14.98 15.44 16.2 17.23 18.17 18.98 19.34 19.31 18.78 17.57 16.14 14.96 (90) ### Mean internal temperature (for the whole dwelling) = fLA × T1 + (1 - fLA) × T2 (92)m= 15.62 16.04 16.74 17.7 18.57 19.34 19.68 19.65 19.14 18.01 16.69 15.59 (92) Apply adjustment to the mean internal temperature from Table 4e, where appropriate (93)m= 15.62 16.04 16.74 17.7 18.57 19.34 19.68 19.65 19.14 18.01 16.69 15.59 (93) 8. Space heating requirement Set Ti to the mean internal temperature obtained at step 11 of Table 9b, so that Ti,m=(76)m and re-calculate	Mean	internal te		in I	iving are	a T1 (f	ماام	w stens 3 to				•			
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(88)m=	` '		17.85 18.	38 I	19.1	19.78	_	i	_		19.33	18.32	17.5		(87)
Utilisation factor for gains for rest of dwelling, h2,m (see Table 9a) (89)m= 0.95 0.93 0.9 0.85 0.77 0.62 0.45 0.48 0.69 0.85 0.93 0.95 (89) Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c) (90)m= 14.98 15.44 16.2 17.23 18.17 18.98 19.34 19.31 18.78 17.57 16.14 14.96 (90) Mean internal temperature (for the whole dwelling) = fLA × T1 + (1 - fLA) × T2 (92)m= 15.62 16.04 16.74 17.7 18.57 19.34 19.68 19.65 19.14 18.01 16.69 15.59 (92) Apply adjustment to the mean internal temperature from Table 4e, where appropriate (93)m= 15.62 16.04 16.74 17.7 18.57 19.34 19.68 19.65 19.14 18.01 16.69 15.59 (93) 8. Space heating requirement Set Ti to the mean internal temperature obtained at step 11 of Table 9b, so that Ti,m=(76)m and re-calculate	T	ļ			!		2	0.39 20.71	20.0	67 20.22	19.33	18.32	17.5		(87)
(89)m=	· r	erature du	uring heati	ng pe	eriods in	rest of	dw	0.39 20.71 elling from T	20.0 able 9	20.22), Th2 (°C)		1		 	. ,
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(90)m= 14.98 15.44 16.2 17.23 18.17 18.98 19.34 19.31 18.78 17.57 16.14 14.96 (90) Mean internal temperature (for the whole dwelling) = fLA × T1 + (1 - fLA) × T2	(88)m= [Utilisa	erature du	uring heating 19.42 19.	ng pe	eriods in 19.46 est of dy	rest of 19.47 velling,	dw h2,	0.39 20.71 elling from T 19.5 19.5 m (see Table	20.0 able 9 19.0 9a)	20.22), Th2 (°C) 51 19.49	19.47	19.45	19.44		(88)
Mean internal temperature (for the whole dwelling) = $fLA \times T1 + (1 - fLA) \times T2$ (92)m= 15.62 16.04 16.74 17.7 18.57 19.34 19.68 19.65 19.14 18.01 16.69 15.59 (92) Apply adjustment to the mean internal temperature from Table 4e, where appropriate (93)m= 15.62 16.04 16.74 17.7 18.57 19.34 19.68 19.65 19.14 18.01 16.69 15.59 (93) 8. Space heating requirement Set Ti to the mean internal temperature obtained at step 11 of Table 9b, so that Ti,m=(76)m and re-calculate	(88)m= [Utilisa	erature du	uring heating 19.42 19.	ng pe	eriods in 19.46 est of dy	rest of 19.47 velling,	dw h2,	0.39 20.71 elling from T 19.5 19.5 m (see Table	20.0 able 9 19.0 9a)	20.22), Th2 (°C) 51 19.49	19.47	19.45	19.44		(88)
Mean internal temperature (for the whole dwelling) = $fLA \times T1 + (1 - fLA) \times T2$ (92)m= 15.62 16.04 16.74 17.7 18.57 19.34 19.68 19.65 19.14 18.01 16.69 15.59 (92) Apply adjustment to the mean internal temperature from Table 4e, where appropriate (93)m= 15.62 16.04 16.74 17.7 18.57 19.34 19.68 19.65 19.14 18.01 16.69 15.59 (93) 8. Space heating requirement Set Ti to the mean internal temperature obtained at step 11 of Table 9b, so that Ti,m=(76)m and re-calculate	(88)m= [Utilisa (89)m= [erature du 19.41 1 ation factor 0.95	r for gains 0.93 0.00	ng pe	eriods in 19.46 est of dv	rest of 19.47 velling, 0.77	dw h2,	0.39 20.71 elling from T 19.5 19.5 m (see Table 0.62 0.45	20.0 able 9 19.9 9a)	20.22 0, Th2 (°C) 51 19.49 8 0.69	19.47	19.45	19.44		(88)
(92)m= 15.62 16.04 16.74 17.7 18.57 19.34 19.68 19.65 19.14 18.01 16.69 15.59 Apply adjustment to the mean internal temperature from Table 4e, where appropriate (93)m= 15.62 16.04 16.74 17.7 18.57 19.34 19.68 19.65 19.14 18.01 16.69 15.59 (93) 8. Space heating requirement Set Ti to the mean internal temperature obtained at step 11 of Table 9b, so that Ti,m=(76)m and re-calculate	(88)m= [Utilisa (89)m= [Mean	erature du 19.41 2 ation factor 0.95 internal te	uring heating 19.42 19. r for gains 0.93 0. emperature	ng po 42 for r	eriods in 19.46 est of dv 0.85 he rest of	rest of 19.47 welling, 0.77	h2,	0.39 20.71 elling from T 19.5 19.5 m (see Table 0.62 0.45 T2 (follow st	20.0 able 9 19.9 9a) 0.4 eps 3	20.22 0, Th2 (°C) 51 19.49 8 0.69 to 7 in Tabl	19.47 0.85 e 9c)	19.45	19.44		(88)
(92)m= 15.62 16.04 16.74 17.7 18.57 19.34 19.68 19.65 19.14 18.01 16.69 15.59 Apply adjustment to the mean internal temperature from Table 4e, where appropriate (93)m= 15.62 16.04 16.74 17.7 18.57 19.34 19.68 19.65 19.14 18.01 16.69 15.59 (93) 8. Space heating requirement Set Ti to the mean internal temperature obtained at step 11 of Table 9b, so that Ti,m=(76)m and re-calculate	(88)m= [Utilisa (89)m= [Mean	erature du 19.41 2 ation factor 0.95 internal te	uring heating 19.42 19. r for gains 0.93 0. emperature	ng po 42 for r	eriods in 19.46 est of dv 0.85 he rest of	rest of 19.47 welling, 0.77	h2,	0.39 20.71 elling from T 19.5 19.5 m (see Table 0.62 0.45 T2 (follow st	20.0 able 9 19.9 9a) 0.4 eps 3	20.22 0, Th2 (°C) 51 19.49 8 0.69 to 7 in Tabl 31 18.78	19.47 0.85 e 9c) 17.57	0.93	0.95	0.25	(88) (89) (90)
(93)m= 15.62 16.04 16.74 17.7 18.57 19.34 19.68 19.65 19.14 18.01 16.69 15.59 (93) 8. Space heating requirement Set Ti to the mean internal temperature obtained at step 11 of Table 9b, so that Ti,m=(76)m and re-calculate	(88)m= [Utilisa (89)m= [Mean (90)m= [erature du 19.41 / ation factor 0.95 / internal te	uring heating 19.42 19. r for gains 0.93 0. emperature 15.44 16	for r	eriods in 19.46 est of dv 0.85 he rest of	velling, 0.77 of dwel	h2,	0.39 20.71 elling from T 19.5 19.5 m (see Table 0.62 0.45 T2 (follow st 8.98 19.34	20.0 able \$ 19.3 e 9a) 0.4 eps 3	20.22 0, Th2 (°C) 51 19.49 8 0.69 to 7 in Tabl 31 18.78	19.47 0.85 e 9c) 17.57	0.93	0.95	0.25	(88) (89) (90)
8. Space heating requirement Set Ti to the mean internal temperature obtained at step 11 of Table 9b, so that Ti,m=(76)m and re-calculate	(88)m= [Utilisa (89)m= [Mean (90)m= [erature du 19.41 1 ation factor 0.95 1 internal te 14.98 1	uring heating 19.42 19.42 19.42 19.43 19.43 19.44 16.4	ng pe 42 for r 9 e in t	eriods in 19.46 est of dv 0.85 he rest of 17.23	rest of 19.47 welling, 0.77 of dwel 18.17	dw h2,	0.39 20.71 elling from T 19.5 19.5 m (see Table 0.62 0.45 T2 (follow st 8.98 19.34 g) = fLA × T1	20.0 able \$ 19.0 eps 3 19.0 + (1.0 cm)	67 20.22 9, Th2 (°C) 51 19.49 8 0.69 to 7 in Tabl 31 18.78 f - fLA) × T2	19.47 0.85 e 9c) 17.57 LA = Liv	19.45 0.93 16.14 ing area ÷ (4)	19.44 0.95 14.96	0.25	(88) (89) (90) (91)
Set Ti to the mean internal temperature obtained at step 11 of Table 9b, so that Ti,m=(76)m and re-calculate	(88)m= [Utilisa (89)m= [Mean (90)m= [Mean (92)m= [erature du 19.41 2 ation factor 0.95 2 internal te 14.98 2 internal te	uring heating 19.42	for r. 9 e in t	eriods in 19.46 est of dv 0.85 he rest of 17.23	velling, 0.77 of dwel 18.17 ole dwe 18.57	dw h2,	0.39 20.71 elling from T 19.5 19.5 m (see Table 0.62 0.45 T2 (follow st 8.98 19.34 g) = fLA × T1 9.34 19.68	20.0 able \$ 19.0 able \$ 9a) 0.4 eps 3 19.0 + (1 19.0 able \$ 19.0 a	67 20.22 0, Th2 (°C) 51 19.49 8 0.69 to 7 in Tabl 31 18.78 f fLA) × T2 65 19.14	19.47 0.85 e 9c) 17.57 LA = Liv	19.45 0.93 16.14 ing area ÷ (4)	19.44 0.95 14.96	0.25	(88) (89) (90) (91)
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Apr

May

Jul

Jun

Aug

Mar

the utilisation factor for gains using Table 9a

Feb

Jan

Oct

Nov

Dec

Sep

Utilisation factor for gains, h	m:									
(94)m= 0.92 0.89 0.86	0.8 0.73	0.61	0.47	0.5	0.67	0.81	0.89	0.92		(94)
Useful gains, hmGm , W = (94)m x (84)m				•					
(95)m= 1053.53 1197.38 1272.7	6 1272.1 1174.	13 947.54	706.63	725.1	940.72	1043.09	1018.59	1003.62		(95)
Monthly average external te	mperature from	Table 8		•	•	•	•			
(96)m= 4.3 4.9 6.5	8.9 11.7	7 14.6	16.6	16.4	14.1	10.6	7.1	4.2		(96)
Heat loss rate for mean inte			1 '	1	<u> </u>		1	1		
(97)m= 3329.92 3261.65 2982.1				884.7	1394.9	2086.44	2731.14	3280.61		(97)
Space heating requirement		1			` ` ` 	í · · ·		l		
(98)m= 1693.64 1387.19 1271.7	7 878.22 567.0	0 0	0	0	0	776.25	1233.04	L		٦,,,,,,
				Tota	al per year	(kWh/yea	r) = Sum(9	8) _{15,912} =	9501.2	(98)
Space heating requirement	in kWh/m²/year								60.91	(99)
9a. Energy requirements – In	dividual heating	gsystems	including	g micro-C	CHP)					
Space heating:										_
Fraction of space heat from	secondary/sup	plementary	y system	l					0	(201)
Fraction of space heat from	main system(s))		(202) = 1	- (201) =				1	(202)
Fraction of total heating from	n main system	1		(204) = (2	(02) × [1 –	(203)] =			1	(204)
Efficiency of main space he	ating system 1								71	(206)
Efficiency of secondary/sup	ol <mark>eme</mark> ntary hea	t <mark>ing s</mark> yster	n, %						0	(208)
Jan Feb Mai	Apr Ma	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/ye	⊐ ar
Space heating requirement	<u> </u>									
1693.64 1387. <mark>19 12</mark> 71.7	7 878.22 567.0	03 0	0	0	0	776.25	1233.04	1694.08		
$(211)m = \{[(98)m \times (204)]\} x$	100 ÷ (206)									(211)
2385.4 1953.78 1791.2		63 0	0	0	0	1093.31	1736.68	2386.02		
	•	•		Tota	al (kWh/yea	ar) =Sum(2	211),15,1012	=	13381.98	(211)
Space heating fuel (seconda	ary), kWh/mont	า						'		_
$= \{[(98)m \times (201)]\} \times 100 \div (201)$	208)									
(215)m = 0 0 0	0 0	0	0	0	0	0	0	0		_
				Tota	al (kWh/yea	ar) =Sum(2	215) _{15,1012}	=	0	(215)
Water heating										
Output from water heater (ca			159.47	175.20	175.2	197.59	200.2	224.67		
230.31 202.9 212.88 Efficiency of water heater	5 190.54 166.5	166.35	159.47	175.39	175.2	197.59	209.3	224.07	CO 0	(216)
<u> </u>	68.82 68.0	1 60.3	60.3	60.3	60.3	68.53	69.22	69.55	60.3	(217)
` '		1 60.3	00.3	00.3	60.3	00.55	09.22	69.55		(217)
Fuel for water heating, kWh/r (219) m = (64) m x $100 \div (21)$										
(219)m= 331.27 292.25 307.46		23 275.87	264.46	290.86	290.55	288.32	302.39	323.01		
<u> </u>	•	•	-	Tota	al = Sum(2	19a) ₁₁₂ =		-	3517.51	(219)
Annual totals						k	Wh/year	•	kWh/year	
Space heating fuel used, ma	n system 1								13381.98	
Water heating fuel used									3517.51	7
Electricity for pumps, fans an	d electric keep-	hot						'		_

	_		
mechanical ventilation - balanced, extract or pos	itive input from outside	175.82	(230a)
central heating pump:		30	(230c)
Total electricity for the above, kWh/year	sum of (230a	a)(230g) =	205.82 (231)
Electricity for lighting			821.35 (232)
10a. Fuel costs - individual heating systems:			
	Fuel kWh/year	Fuel Price (Table 12)	Fuel Cost £/year
Space heating - main system 1	(211) x	3.48 x 0.01 =	465.69 (240)
Space heating - main system 2	(213) x	0 x 0.01 =	0 (241)
Space heating - secondary	(215) x	13.19 × 0.01 =	0 (242)
Water heating cost (other fuel)	(219)	3.48 × 0.01 =	122.41 (247)
Pumps, fans and electric keep-hot	(231)	13.19 × 0.01 =	27.15 (249)
(if off-peak tariff, list each of (230a) to (230g) sepa Energy for lighting	arately as applicable and app (232)	oly fuel price according to 13.19 x 0.01 =	
Additional standing charges (Table 12)			120 (251)
11a. SAP rating - individual heating systems Energy cost deflator (Table 12)	s needed 7) + (250)(254) = [56)] ÷ [(4) + 45.0] =	+	0.42 (255) 0.42 (256) 1.76 (257)
SAP rating (Section 12)	30)] : [(1) : 10.0] =		75.41 (258)
12a. CO2 emissions – Individual heating system	s including micro-CHP		70.41
· · · · · · · · · · · · · · · · · · ·	Energy	Emission factor	Emissions
	kWh/year	kg CO2/kWh	kg CO2/year
Space heating (main system 1)	(211) x	0.216 =	2890.51 (261)
Space heating (secondary)	(215) x	0.519 =	0 (263)
Water heating	(219) x	0.216	759.78 (264)
Space and water heating	(261) + (262) + (263) + (264) =		3650.29 (265)
Electricity for pumps, fans and electric keep-hot	(231) x	0.519 =	106.82 (267)
Electricity for lighting	(232) x	0.519	426.28 (268)
Total CO2, kg/year	sum	of (265)(271) =	4183.39 (272)
CO2 emissions per m ²	(272	2) ÷ (4) =	26.82 (273)
El rating (section 14)			72 (274)
13a. Primary Energy			
	Energy kWh/year	Primary factor	P. Energy kWh/year
Space heating (main system 1)	(211) x	1.22	16326.01 (261)

Primary energy kWh/m²/year	(272) -	÷ (4) =		152.38	(273)
'Total Primary Energy	sum o	f (265)(271) =		23770.77	(272)
Electricity for lighting	(232) x	0	=	2521.53	(268)
Electricity for pumps, fans and electric keep-hot	(231) x	3.07	=	631.86	(267)
Space and water heating	(261) + (262) + (263) + (264) =			20617.38	(265)
Energy for water heating	(219) x	1.22	=	4291.37	(264)
Space heating (secondary)	(215) x	3.07	=	0	(263)



9.2. Appendix 2 – SAP Worksheets 'Be Lean'

				User D	etails:						
Assessor Name: Software Name:	Stroma FS	AP 2012			Softwa	a Num are Ver			Versio	n: 1.0.4.18	
	00 57 1	•			Address	: LG01					
Address:	39, Fitzjohn	s Avenue	e, LONL	ON, NV	V3 5JY						
Overall dwelling dime	ensions:			A #04	n/m 2\		Av. Hai	iaht/m\		\/aluma/m3\	
Basement					a(m²) 132	(1a) x		ight(m) 3.2	(2a) =	Volume(m³) 422.4	(3a)
					132]]
Ground floor					132	(1b) x	3	3.2	(2b) =	422.4	(3b)
Total floor area TFA = (1	la)+(1b)+(1c)+	(1d)+(1e))+(1r	1)	264	(4)					
Dwelling volume						(3a)+(3b))+(3c)+(3d	l)+(3e)+	.(3n) =	844.8	(5)
2. Ventilation rate:											
	main heating		condar	у	other		total			m³ per hour	
Number of chimneys	0	7 +	0	+ [0] = [0	X 4	40 =	0	(6a)
Number of open flues	0	T + F	0	Ī + Ē	0	ī - F	0	x2	20 =	0	(6b)
Number of intermittent fa	ans						0	x ′	10 =	0	(7a)
Number of passive vents	S					Ē	0	x ′	10 =	0	(7b)
Number of flueless gas f	fires					\	0	X 4	40 =	0	(7c)
									Air ch	anges <mark>per</mark> hou	ır
Infiltration due to chimne	eys, flu <mark>es an</mark> d f	ans = (68	a)+(6b)+(7	(a)+(7b)+(7c) =		0	Π.	÷ (5) =	0	(8)
If a pressurisation test has			d, proceed	d to (17), d	otherwise (continue fr	om (9) to ((16)	,		-
Number of storeys in t	the dw <mark>elling</mark> (no	s) <u> </u>								2	(9)
Additional infiltration) OF fam ata al a	. 4: 4		0.05 ([(9)-	-1]x0.1 =	0.1	(10)
Structural infiltration: (if both types of wall are p						•	uction			0.35	(11)
deducting areas of open			oriding to	ine great	ci wan arc	a (anoi					
If suspended wooden	floor, enter 0.2	(unseale	ed) or 0.	1 (seale	ed), else	enter 0				0	(12)
If no draught lobby, er	nter 0.05, else	enter 0								0.05	(13)
Percentage of window	s and doors di	aught str	ripped							100	(14)
Window infiltration					•	? x (14) ÷ 1	- 1			0.05	(15)
Infiltration rate					. , . ,	+ (11) + (1	, , ,	, ,		0.55	(16)
Air permeability value				•		•	etre of e	nvelope	area	0	(17)
If based on air permeabi	-						is hoine	end		0.55	(18)
Number of sides shelter		on lest nas	been don	ie or a deg	gree air pe	ппеаышу	is being us	seu		2	(19)
Shelter factor	- -				(20) = 1 -	[0.075 x (1	9)] =			0.85	(20)
Infiltration rate incorpora	iting shelter fac	tor			(21) = (18) x (20) =				0.47	(21)
Infiltration rate modified	for monthly wir	nd speed									_
Jan Feb	Mar Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind sp	peed from Tab	e 7									
(22)m= 5.1 5	4.9 4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7		

Wind F	<u> </u>	22a)m =	`	4		T			1	1			1		
(22a)m=	1.27	1.25	1.23	1.1	1.08	0.95	0.95	0.92	1	1.08	1.12	1.18			
Adjuste	ed infiltra	ation rat	e (allowi	ng for sh	elter an	d wind s	speed) =	(21a) x	(22a)m						
	0.6	0.58	0.57	0.51	0.5	0.44	0.44	0.43	0.47	0.5	0.53	0.55]		
		<i>ctive air</i> al ventila	change i	rate for t	he appli	cable ca	se	-	-		-	-	- -	0.5	(23a
			using Appe	endix N. (2	3b) = (23a	a) × Fmv (e	eguation (N	N5)) . othe	rwise (23b) = (23a)				0.5	(23)
If bala	anced with	heat reco	overy: effici	iency in %	allowing f	or in-use f	actor (from	n Table 4h) =	, , ,				7.35	(230
a) If I	balance	d mech	anical ve	entilation	with he	at recov	erv (MVI	HR) (24a	a)m = (2)	2b)m + (23b) x [1 – (23c)			
(24a)m=		0.7	0.69	0.63	0.62	0.56	0.56	0.55	0.58	0.62	0.64	0.66]		(24
b) If I	balance	d mech	anical ve	ntilation	without	heat red	covery (N	лV) (24b	m = (22)	2b)m + (2	23b)	1	ı		
(24b)m=	0	0	0	0	0	0	0	0	0	0	0	0]		(24
c) If v	whole h	ouse ex	tract ven	tilation o	r positiv	e input	ventilatio	n from o	outside		•	•	•		
ii	f (22b)n	n < 0.5 ×	(23b), t	hen (24d	c) = (23b); other	wise (24	c) = (22l	o) m + 0.	5 × (23b)		,		
(24c)m=	0	0	0	0	0	0	0	0	0	0	0	0]		(240
,			on or when (24d)		•					O E 1					
ا =(24d) =		0	0	0	0	0	0	0.5 + [(2	0	0.5]	0	0			(24
` ' L			rate - er										J		(
(25)m=	ouve an	change	rate ci	itei (Z+a) 01 (24))	C) OI (2-	u) 111 002	(20)						
	0.71	0.7	0.69	0.63	0.62	0.56	0.56	0.55	0.58	0.62	0.64	0.66			(25)
						0.56	0.56	0.55	0.58	0.62	0.64	0.66]		(25)
3. Hea	at losse:	s and he	eat loss p	paramete	er:						0.64				
	at losse:		eat loss p		er:	0.56 Net Ar A ,r	ea	0.55 U-val W/m2	ue	0.62 A X U (W/I		0.66 k-value kJ/m²-l		A . kJ	X k
3. Hea	at losse:	s and he Gros	eat loss p	oaramete Openin	er:	Net Ar	ea m²	U-val	ue PK	AXU		k-value			X k
3. Hea	at losse:	s and he Gros area	eat loss p	oaramete Openin	er:	Net Ar A ,r	ea m² x1/	U-val W/m2	ue 2K 0.04] =	A X U (W/I		k-value			X k /K
3. Head	at losses	Gros area e 1	eat loss p	oaramete Openin	er:	Net Ar A ,r 4.75	ea m² x1/	U-val W/m2 /[1/(1.8)+	ue 2K 0.04] = 0.04] =	A X U (W/I		k-value			X k /K (27)
3. Head Section 1. Window Window Window Window	at losses IENT ws Type ws Type	Gros area e 1	eat loss p	oaramete Openin	er:	Net Ar A ,r 4.75	ea m² x1/ x1/ x1/	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+	0.04] = 0.04] = 0.04] = 0.04]	A X U (W/I 7.98 3.36		k-value			X k /K (27) (27)
3. Head Window Window Window Window Window	at losse: IENT ws Type ws Type ws Type	Gros area e 1	eat loss p	oaramete Openin	er:	Net Ar A ,r 4.75	x1/ x1/ x1/	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+	0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04]	A X U (W/I 7.98 3.36 7.98		k-value			X k /K (27) (27) (27)
3. Head Window Window Window Window Window Window	at losses IENT ws Type ws Type ws Type ws Type	Gros area e 1 e 2 e 3 e 4	eat loss p	oaramete Openin	er:	Net Ar A ,r 4.75 2 4.75	ea m² x1/ x1/ x1/ x1/ x1/	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+	ue 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] =	A X U (W/I 7.98 3.36 7.98 3.36		k-value			X k /K (27) (27) (27) (27)
3. Head Window W	at losses IENT ws Type ws Type ws Type ws Type ws Type	Gros area e 1 e 2 e 3 e 4	eat loss p	oaramete Openin	er:	Net Ar A ,r 4.75 2 4.75 2	ea m² x1/ x1/ x1/ x1/ x1/	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+	ue PK 0.04] = 0.04] = 0.04] = 0.04] = 0.04] =	A X U (W/I 7.98 3.36 7.98 3.36 3.36		k-value			X k /K (27) (27) (27) (27) (27)
3. Head Window Window Window Window Window Window	at losses IENT ws Type	Gros area e 1 e 2 e 3 e 4	eat loss participations of the control of the contr	oaramete Openin	gs 2	Net Ar A ,r 4.75 2 4.75 2 2 2	x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+	0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04]	A X U (W/I 7.98 3.36 7.98 3.36 3.36 3.36		k-value			X k /K (27) (27) (27) (27) (27) (27)
3. Head Window Window Window Window Window Window Window Window Floor	at losses IENT ws Type ws Type ws Type ws Type ws Type ws Type	Gros area 2 2 3 4 4 4 5 5 6 6	eat loss participations of the control of the contr	Openin m	gs 2	Net Ar A ,r 4.75 2 4.75 2 2 132	x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.2	0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = = 0.04] =	A X U (W/I 7.98 3.36 7.98 3.36 3.36 3.36 26.4		k-value			X k /K (27) (27) (27) (27) (27) (27)
3. Head Window W	at losses IENT ws Type ws Type ws Type ws Type ws Type fype1 Type2	Gros area 2 2 3 4 4 5 5 6 6 32	eat loss participations of the control of the contr	Openin m	gs 2	Net Ar A ,r 4.75 2 4.75 2 2 2 132 15.75	x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.2	0.04] = [0.04]	A X U (W/I 7.98 3.36 7.98 3.36 3.36 3.36 3.36 3.94		k-value			X k /K (27) (27) (27) (27) (27) (28) (29)
3. Head Window W	at losses IENT ws Type ws Type ws Type ws Type ws Type fype1 fype2 fype3	Gros area e 1 e 2 e 3 e 4 e 5 e 6 e 6	eat loss particular (m²)	Openin m	gs 2	Net Ar A ,r 4.75 2 4.75 2 2 2 132 15.75 36	x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.2 0.25	0.04] = [0.04]	A X U (W/I 7.98 3.36 7.98 3.36 3.36 3.36 3.94 9		k-value			X k /K (27) (27) (27) (27) (27) (27) (28) (29)
3. Head Window W	at losses IENT ws Type ws Type ws Type ws Type ws Type fype1 fype2 fype3 fype4	S and he Gros area at 1 at 2 at 2 at 3 at 4 at 5 at 6 at 2	eat loss participations (m²)	16.25 4 16.25	gs 2	Net Ar A ,r 4.75 2 4.75 2 132 15.75 36 15.75 22	x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.2 0.25 0.25 0.25	0.04] = [0.04]	A X U (W/I 7.98 3.36 7.98 3.36 3.36 3.36 3.94 9 3.94 5.5		k-value			X k /K (27) (27) (27) (27) (27) (27) (28) (29) (29) (29)
3. Head Window W	at losses IENT ws Type ws Type ws Type ws Type ws Type fype1 fype2 fype3 fype4 fype5	S and he Gros area a 1 2 2 3 3 4 4 4 5 5 6 6 32 40 32	eat loss participation (m²)	16.25 4	gs 2	Net Ar A ,r 4.75 2 4.75 2 2 2 132 15.75 36	x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.2 0.25 0.25	0.04] = [0.04]	A X U (W/I 7.98 3.36 7.98 3.36 3.36 3.36 3.94 9 3.94		k-value			X k /K (27) (27) (27) (27) (27) (28) (29) (29) (29)
3. Head Selection Window Windo	at losses IENT ws Type ws Type ws Type ws Type ws Type fype1 fype2 fype3 fype4 fype5 rea of e	S and he Gros area at 1 at 2 at 2 at 3 at 4 at 5 at 6 at 1 at 2 at 1 at 1 at 1 at 1 at 1 at 1	eat loss participation (m²)	16.28 4 16.28 0	gs 2	Net Ar A ,r 4.75 2 4.75 2 2 132 15.75 36 15.75 22 14 276	x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.2 0.25 0.25 0.25	0.04] = [0.04]	A X U (W/I 7.98 3.36 7.98 3.36 3.36 3.36 3.94 9 3.94 5.5 3.5	()	k-value kJ/m²-	k		X k /K (27) (27) (27) (27) (28) (29) (29) (29)
3. Head Selection of the control of	at losses IENT ws Type ws Type ws Type ws Type ws Type fype1 fype2 fype3 fype4 fype5 rea of e dows and e the area	s and he Gros area at 1 at 2 at 3 at 4 at 5 at 6 at 6 at 1 at 2 at 1 at 1 at 1 at 1 at 1 at 1	eat loss part (m²), m²	Openin m 16.25 4 16.25 0 4 ffective winternal wall	gs 2	Net Ar A ,r 4.75 2 4.75 2 15.75 36 15.75 22 14 276 alue calculus	ea m² x1/	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.2 0.25 0.25 0.25	0.04] = [0.04]	A X U (W/I 7.98 3.36 7.98 3.36 3.36 3.36 3.94 9 3.94 5.5 3.5	()	k-value kJ/m²-	k		X k /K (27) (27) (27) (27) (27) (28) (29) (29) (29) (29) (31)
3. Head Selection of the selection of th	at losses IENT ws Type ws Type ws Type ws Type ws Type fype1 fype2 fype3 fype4 fype5 rea of e dows and e the area heat los	s and he Gros area at 1 at 2 at 2 at 3 at 4 at 5 at 6 at 6 at 1 at 2 at 1 at 1 at 1 at 1 at 1 at 1	eat loss particles (m²) maximum m² maxim	Openin m 16.25 4 16.25 0 4 ffective winternal wall	gs 2	Net Ar A ,r 4.75 2 4.75 2 15.75 36 15.75 22 14 276 alue calculus	ea m² x1/	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.2 0.25 0.25 0.25	Ue K	A X U (W/I) 7.98 3.36 7.98 3.36 3.36 3.36 26.4 3.94 9 3.94 5.5 3.5	<)	k-value kJ/m²-	K 3.2		X k /K (27) (27) (27) (27) (27) (28) (29) (29) (29) (31)
3. Head Selection of the selection of th	at losses IENT ws Type ws Type ws Type ws Type ws Type fype1 fype2 fype3 fype4 fype5 rea of e dows and e the area heat los apacity	s and he Gros area e 1 e 2 e 3 e 4 e 5 e 6 32 40 32 22 18 ellements eroof winder es on both es, W/K =	eat loss particles (m²) maximum m² maxim	Openin m 16.25 4 16.25 0 4 Iffective winternal wall U)	gs 2 5 mdow U-vals and pand	Net Ar A ,r 4.75 2 4.75 2 132 15.75 36 15.75 22 14 276 alue calculatitions	rea m² x1/	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.2 0.25 0.25 0.25	Ue	A X U (W/I 7.98 3.36 7.98 3.36 3.36 3.36 3.94 9 3.94 5.5 3.5	(s) (32a).	k-value kJ/m²-	n 3.2	kJ	X k /K (27 (27 (27 (27 (27 (27 (29 (29 (29 (31

For design assessments where the details of the construction are not known precisely the indicative values of TMP in Table 1f

can be used instead of a detailed calculation Thermal bridges: S (L x Y) calculated using Appendix K (36)41.4 if details of thermal bridging are not known (36) = $0.05 \times (31)$ Total fabric heat loss (33) + (36) =(37)161.68 Ventilation heat loss calculated monthly (38)m = $0.33 \times (25)$ m x (5)Feb Mar Jul Aug Sep Dec .lan Apr May Jun Oct Nov (38)m =197.74 194.49 191.23 174.94 171.68 155.39 155.39 152.13 161.9 171.68 178.2 184.71 (38)Heat transfer coefficient, W/K (39)m = (37) + (38)m (39)m =359.42 356.17 352.91 336.62 333.36 317.07 317.07 313.81 323.58 333.36 339.87 346.39 Average = Sum(39)_{1...12} /12= (39)335.8 Heat loss parameter (HLP), W/m²K (40)m = (39)m \div (4)1.36 1.35 1.34 1.28 1.26 1.2 1.2 1.19 1.23 1.26 1.29 1.31 (40)m =(40)Average = $Sum(40)_{1...12}/12=$ 1.27 Number of days in month (Table 1a) Jan Feb Mar Jun May Jul Aug Sep Oct Nov Apr Dec (41)31 28 31 30 31 30 31 31 30 31 30 31 (41)m =4. Water heating energy requirement: Assumed occupancy, N (42)3.09 if TFA > 13.9, $N = 1 + 1.76 \times [1 - \exp(-0.000349 \times (TFA - 13.9)2)] + 0.0013 \times (TFA - 13.9)$ if TFA £ 13.9, N = 1Annual average hot water usage in litres per day Vd, average = (25 x N) + 36 (43)107.47 Reduce the annual average hot water usage by 5% if the dwelling is designed to achieve a water use target of not more that 125 litres per person per day (all water use, hot and cold) Jan Feb Mar Apr May Jun Aug Sep Oct Nov Dec Hot water usage in litres per day for each month Vd,m = factor from Table 1c x (43) 118.22 113.92 109.62 105.32 101.02 101.02 105.32 113.92 118.22 (44)m =96.72 96.72 109.62 (44)Total = $Sum(44)_{1...12}$ = 1289.66 Energy content of hot water used - calculated monthly = 4.190 x Vd,m x nm x DTm / 3600 kWh/month (see Tables 1b, 1c, 1d) 169.78 (45)m =175.32 153.33 158.22 137.94 132.36 114.22 105.84 121.45 122.9 143.23 156.35 (45)Total = $Sum(45)_{1...12}$ = 1690.95 If instantaneous water heating at point of use (no hot water storage), enter 0 in boxes (46) to (61) 26.3 23.73 20.69 17.13 15.88 18.22 18.44 21.48 23.45 25.47 (46)19.85 Water storage loss: Storage volume (litres) including any solar or WWHRS storage within same vessel 300 (47)If community heating and no tank in dwelling, enter 110 litres in (47) Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47) Water storage loss: a) If manufacturer's declared loss factor is known (kWh/day): 1.69 (48)Temperature factor from Table 2b (49)0.54 Energy lost from water storage, kWh/year $(48) \times (49) =$ 0.91 (50)b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) 0 (51)If community heating see section 4.3 Volume factor from Table 2a (52)0 Temperature factor from Table 2b 0 (53)

Energy lost from water storage, kWh/year	(47) x (51) x (52) x (53) =	0	(54)
Enter (50) or (54) in (55) Water storage loss calculated for each month	$((56)m = (55) \times (41)m$	0.91	(55)
	· · · · · · · ·	07.00	(56)
(56)m= 28.29 25.55 28.29 27.38 28.29 27.38 28.29 27.38 28.29 If cylinder contains dedicated solar storage, (57)m = (56)m x [(50) – (H11)] ÷		27.38 28.29 (H11) is from Append	(56) ix H
(57)m= 28.29 25.55 28.29 27.38 28.29 27.38 28.29		27.38 28.29	(57)
Primary circuit loss (annual) from Table 3		0	(58)
Primary circuit loss calculated for each month (59) m = $(58) \div$	365 × (41)m		l
(modified by factor from Table H5 if there is solar water hea	iting and a cylinder thermo	ostat)	
(59)m= 23.26 21.01 23.26 22.51 23.26 22.51 23.26	23.26 22.51 23.26	22.51 23.26	(59)
Combi loss calculated for each month (61)m = (60) \div 365 × (4	1)m		
(61)m= 0 0 0 0 0 0	0 0 0	0 0	(61)
Total heat required for water heating calculated for each mon	th (62) m = $0.85 \times (45)$ m +	(46)m + (57)m +	(59)m + (61)m
(62)m= 226.87 199.9 209.78 187.83 183.91 164.11 157.3	9 173 172.79 194.78	206.24 221.34	(62)
Solar DHW input calculated using Appendix G or Appendix H (negative quant	tity) (enter '0' if no solar contribu	tion to water heating)	
(add additional lines if FGHRS and/or WWHRS applies, see A	Appendix G)	,	
(63)m= 0 0 0 0 0 0	0 0 0	0 0	(63)
Output from water heater			
(64)m= 226.87 199.9 209.78 187.83 183.91 164.11 157.3	9 173 172.79 194.78	206.24 221.34	
	Output from water heate	r (annual) ₁₁₂	2297.95 (64)
Heat gains from water heating, kWh/month 0.25 / [0.85 x (45)	$m + (61)ml + 0.8 \times [(46)m]$	+ (57)m + (59)m	1
	(8 l/m] . die x [(le/m	1 (67)111 1 (66)111	, 1
(65)m= 99.53 88.23 93.85 85.78 85.25 77.89 76.43		91.9 97.7	(65)
	81.63 80.78 88.87	91.9 97.7	(65)
(65)m= 99.53 88.23 93.85 85.78 85.25 77.89 76.43	81.63 80.78 88.87	91.9 97.7	(65)
(65)m= 99.53 88.23 93.85 85.78 85.25 77.89 76.43 include (57)m in calculation of (65)m only if cylinder is in the	81.63 80.78 88.87	91.9 97.7	(65)
(65)m= 99.53 88.23 93.85 85.78 85.25 77.89 76.43 include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a):	81.63 80.78 88.87	91.9 97.7	(65)
(65)m= 99.53 88.23 93.85 85.78 85.25 77.89 76.43 include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts	81.63 80.78 88.87 dwelling or hot water is f Aug Sep Oct	91.9 97.7 rom community h	(65)
include (57)m in calculation of (65)m only if cylinder is in the first term of (57)m in calculation of (65)m only if cylinder is in the first term of (57)m in calculation of (65)m only if cylinder is in the first term of (57)m in calculation of (65)m only if cylinder is in the first term of (57)m in calculation of (65)m only if cylinder is in the first term of (57)m in calculation of (65)m only if cylinder is in the first term of (57)m in calculation of (65)m only if cylinder is in the first term of (57)m in calculation of (65)m only if cylinder is in the first term of (57)m in calculation of (65)m only if cylinder is in the first term of (57)m in calculation of (65)m only if cylinder is in the first term of (57)m in calculation of (65)m only if cylinder is in the first term of (57)m in calculation of (65)m only if cylinder is in the first term of (57)m in calculation of (65)m only if cylinder is in the first term of (57)m in calculation of (65)m only if cylinder is in the first term of (57)m in calculation of (65)m only if cylinder is in the first term of (57)m in calculation of (65)m only if cylinder is in the first term of (57)m in calculation of (65)m only if cylinder is in the first term of (57)m in calculation of (65)m only if cylinder is in the first term of (57)m in calculation of (65)m only if cylinder is in the first term of (57)m in calculation of (65)m only if cylinder is in the first term of (57)m in calculation of (65)m only if cylinder is in the first term of (57)m in calculation of (57)m in calculatio	81.63 80.78 88.87 e dwelling or hot water is f Aug Sep Oct 1 185.11 185.11 185.11	91.9 97.7 rom community h	(65) leating
(65)m= 99.53 88.23 93.85 85.78 85.25 77.89 76.43 include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 185.11 185.11 185.11 185.11 185.11 185.11	81.63 80.78 88.87 e dwelling or hot water is f Aug Sep Oct 1 185.11 185.11 185.11 also see Table 5	91.9 97.7 rom community h	(65) leating
(65)m= 99.53 88.23 93.85 85.78 85.25 77.89 76.43 include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 18	Aug Sep Oct 1 185.11 185.11 185.11 also see Table 5 46.28 62.12 78.87	91.9 97.7 rom community h Nov Dec 185.11 185.11	(65) leating (66)
(65)m= 99.53 88.23 93.85 85.78 85.25 77.89 76.43 include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 185.11 185.11 185.11 185.11 185.11 185.11 Lighting gains (calculated in Appendix L, equation L9 or L9a), (67)m= 95.48 84.81 68.97 52.21 39.03 32.95 35.61	Aug Sep Oct 1 185.11 185.11 185.11 also see Table 5 46.28 62.12 78.87	91.9 97.7 rom community h Nov Dec 185.11 185.11	(65) leating (66)
(65)m= 99.53 88.23 93.85 85.78 85.25 77.89 76.43 include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 18	Aug Sep Oct 1 185.11 185.11 185.11 also see Table 5 46.28 62.12 78.87 1.13a), also see Table 5 6 471.73 488.45 524.05	91.9 97.7 rom community h Nov Dec 185.11 185.11 92.06 98.14	(65) leating (66) (67)
(65)m= 99.53 88.23 93.85 85.78 85.25 77.89 76.43 include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 185.1	Aug Sep Oct 1 185.11 185.11 185.11 also see Table 5 46.28 62.12 78.87 1.13a), also see Table 5 6 471.73 488.45 524.05	91.9 97.7 rom community h Nov Dec 185.11 185.11 92.06 98.14	(65) leating (66) (67)
(65)m= 99.53 88.23 93.85 85.78 85.25 77.89 76.43 include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 185.1	Aug Sep Oct 1 185.11 185.11 185.11 also see Table 5 46.28 62.12 78.87 .13a), also see Table 5 6 471.73 488.45 524.05 a), also see Table 5	91.9 97.7 rom community h Nov Dec 185.11 185.11 92.06 98.14 568.98 611.21	(65) leating (66) (67) (68)
(65)m= 99.53 88.23 93.85 85.78 85.25 77.89 76.43 include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 185.1	Aug Sep Oct 1 185.11 185.11 185.11 also see Table 5 46.28 62.12 78.87 .13a), also see Table 5 6 471.73 488.45 524.05 a), also see Table 5	91.9 97.7 rom community h Nov Dec 185.11 185.11 92.06 98.14 568.98 611.21	(65) leating (66) (67) (68)
include (57)m in calculation of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (66)m only if cylinder is in the final state o	Aug Sep Oct 1 185.11 185.11 185.11 also see Table 5 46.28 62.12 78.87 13a), also see Table 5 6 471.73 488.45 524.05 1a), also see Table 5 56.6 56.6 56.6	91.9 97.7 rom community h Nov Dec 185.11 185.11 92.06 98.14 568.98 611.21 56.6 56.6	(65) leating (66) (67) (68) (69)
include (57)m in calculation of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (66)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (66)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (66)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (66)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (65)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (65)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (65)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (65)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (65)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (65)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (65)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (65)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (65)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (65)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (65)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (65)m. Herefore, and the fi	Aug Sep Oct 1 185.11 185.11 185.11 also see Table 5 46.28 62.12 78.87 .13a), also see Table 5 6 471.73 488.45 524.05 a), also see Table 5 56.6 56.6 56.6	91.9 97.7 rom community h Nov Dec 185.11 185.11 92.06 98.14 568.98 611.21 56.6 56.6	(65) leating (66) (67) (68) (69)
include (57)m in calculation of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (66)m. Herefore, Table 5), Watts Metabolic gains (Table 5), Watts Jan	Aug Sep Oct 1 185.11 185.11 185.11 also see Table 5 46.28 62.12 78.87 .13a), also see Table 5 6 471.73 488.45 524.05 a), also see Table 5 56.6 56.6 56.6	91.9 97.7 rom community h Nov Dec 185.11 185.11 92.06 98.14 568.98 611.21 56.6 56.6 3 3	(65) leating (66) (67) (68) (69) (70)
include (57)m in calculation of (65)m only if cylinder is in the final state of (57)m in calculation of (65)m only if cylinder is in the final state of (57)m in calculation of (65)m only if cylinder is in the final state of (57)m in calculation of (65)m only if cylinder is in the final state of (57)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m. Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m Jul	Aug Sep Oct 1 185.11 185.11 185.11 also see Table 5 46.28 62.12 78.87 .13a), also see Table 5 6 471.73 488.45 524.05 a), also see Table 5 56.6 56.6 56.6 3 3 3 3 1 -123.41 -123.41 -123.41	91.9 97.7 rom community h Nov Dec 185.11 185.11 92.06 98.14 568.98 611.21 56.6 56.6 3 3	(65) leating (66) (67) (68) (69) (70)
include (57)m in calculation of (65)m only if cylinder is in the final pains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 1	Aug Sep Oct 1 185.11 185.11 185.11 also see Table 5 46.28 62.12 78.87 .13a), also see Table 5 6 471.73 488.45 524.05 a), also see Table 5 56.6 56.6 56.6 3 3 3 3 1 -123.41 -123.41 -123.41	91.9 97.7 rom community h Nov Dec 185.11 185.11 92.06 98.14 568.98 611.21 56.6 56.6 3 3 -123.41 -123.41 127.64 131.31	(65) leating (66) (67) (68) (69) (70) (71)
include (57)m in calculation of (65)m only if cylinder is in the final pains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 1	Aug Sep Oct 1 185.11 185.11 185.11 also see Table 5 46.28 62.12 78.87 .13a), also see Table 5 6 471.73 488.45 524.05 a), also see Table 5 56.6 56.6 56.6 3 3 3 3 3 1 -123.41 -123.41 -123.41 3 109.71 112.19 119.44	91.9 97.7 rom community h Nov Dec 185.11 185.11 92.06 98.14 568.98 611.21 56.6 56.6 3 3 -123.41 -123.41 127.64 131.31	(65) leating (66) (67) (68) (69) (70) (71)

Solar gains are calculated using solar flux from Table 6a and associated equations to convert to the applicable orientation.

Orientati	on:	Access Factor Table 6d	·	Area m²		Flux Table 6a		g_ Table 6b		FF Table 6c		Gains (W)	
North	0.9x	1	X	2	x	10.63	x	0.5	x	0.9	=	17.23	(74)
North	0.9x	1	X	2	x	10.63	х	0.5	x	0.9] =	17.23	(74)
North	0.9x	1	X	2	х	20.32	х	0.5	x	0.9	<u> </u>	32.92	(74)
North	0.9x	1	X	2	x	20.32	х	0.5	x	0.9] =	32.92	(74)
North	0.9x	1	X	2	x	34.53	х	0.5	x	0.9] =	55.94	(74)
North	0.9x	1	X	2	x	34.53	х	0.5	x	0.9	=	55.94	(74)
North	0.9x	1	X	2	x	55.46	х	0.5	x	0.9	=	89.85	(74)
North	0.9x	1	X	2	x	55.46	x	0.5	x	0.9	=	89.85	(74)
North	0.9x	1	X	2	x	74.72	x	0.5	x	0.9	=	121.04	(74)
North	0.9x	1	x	2	x	74.72	x	0.5	x	0.9	=	121.04	(74)
North	0.9x	1	X	2	x	79.99	x	0.5	x	0.9	=	129.58	(74)
North	0.9x	1	X	2	x	79.99	x	0.5	x	0.9	=	129.58	(74)
North	0.9x	1	X	2	x	74.68	x	0.5	x	0.9	=	120.98	(74)
North	0.9x	1	X	2	x	74.68	x	0.5	x	0.9	=	120.98	(74)
North	0.9x	1	X	2	x	59.25	x	0.5	x	0.9	=	95.98	(74)
North	0.9x	1	X	2	X	59.25	X	0.5	X	0.9] =	95.98	(74)
North	0.9x	1	X	2	x	41.52	х	0.5	x	0.9		67.26	(74)
North	0.9x	1	X	2	х	41.52	×	0.5	x	0.9	=	67.26	(74)
North	0.9x	1	X	2	x	24.19	x	0.5	x	0.9	=	39.19	(74)
North	0.9x	1	X	2	x	24.19	х	0.5	x	0.9	=	39.19	(74)
North	0.9x	1	X	2	x	13.12	X	0.5	x	0.9	=	21.25	(74)
North	0.9x	1	X	2	х	13.12	x	0.5	x	0.9	=	21.25	(74)
North	0.9x	1	x	2	x	8.86	x	0.5	x	0.9	=	14.36	(74)
North	0.9x	1	X	2	x	8.86	x	0.5	x	0.9	=	14.36	(74)
West	0.9x	1	X	4.75	X	19.64	X	0.5	X	0.9	=	113.35	(80)
West	0.9x	1	X	2	x	19.64	X	0.5	x	0.9	=	15.91	(80)
West	0.9x	1	X	4.75	X	19.64	X	0.5	X	0.9	=	113.35	(80)
West	0.9x	1	X	2	x	19.64	x	0.5	X	0.9	=	15.91	(80)
West	0.9x	1	X	4.75	x	38.42	x	0.5	X	0.9	=	221.73	(80)
West	0.9x	1	X	2	X	38.42	X	0.5	X	0.9	=	31.12	(80)
West	0.9x	1	X	4.75	x	38.42	X	0.5	X	0.9	=	221.73	(80)
West	0.9x	1	X	2	x	38.42	x	0.5	x	0.9	=	31.12	(80)
West	0.9x	1	X	4.75	X	63.27	X	0.5	X	0.9	=	365.17	(80)
West	0.9x	1	X	2	X	63.27	X	0.5	X	0.9	=	51.25	(80)
West	0.9x	1	X	4.75	x	63.27	x	0.5	x	0.9	=	365.17	(80)
West	0.9x	1	X	2	x	63.27	x	0.5	x	0.9	=	51.25	(80)
West	0.9x	1	X	4.75	x	92.28	x	0.5	x	0.9	=	532.57	(80)
West	0.9x	1	X	2	x	92.28	x	0.5	x	0.9	=	74.75	(80)
West	0.9x	1	X	4.75	X	92.28	X	0.5	X	0.9	=	532.57	(80)

West	0.9x	1		、 [2	X	92	2.28	X	0.5	X	0.9	=	74.75	(80)
West	0.9x	1		· [4.75	x	11	3.09	X	0.5	X	0.9	=	652.69	(80)
West	0.9x	1		· [2	x	11	3.09	X	0.5	X	0.9	=	91.61	(80)
West	0.9x	1		· [4.75	x	11	3.09	X	0.5	X	0.9	=	652.69	(80)
West	0.9x	1		〈 [2	x	11	3.09	x	0.5	X	0.9	=	91.61	(80)
West	0.9x	1		ζĒ	4.75	x	11	5.77	X	0.5	X	0.9	=	668.14	(80)
West	0.9x	1		ΥĒ	2	x	11	5.77	X	0.5	X	0.9	=	93.77	(80)
West	0.9x	1		٠ [4.75	x	11	5.77	x	0.5	X	0.9	=	668.14	(80)
West	0.9x	1		- <u> </u>	2	x	11	5.77	x	0.5	X	0.9		93.77	(80)
West	0.9x	1		ΥĒ	4.75	x	11	0.22	X	0.5	X	0.9	=	636.1	(80)
West	0.9x	1		٠ [2	x	11	0.22	x	0.5	X	0.9	=	89.28	(80)
West	0.9x	1		- <u> </u>	4.75	x	11	0.22	x	0.5	X	0.9		636.1	(80)
West	0.9x	1	:	· [2	x	11	0.22	x	0.5	x	0.9	_ =	89.28	(80)
West	0.9x	1		⟨┌	4.75	x	94	1.68	x	0.5	X	0.9	_ =	546.4	(80)
West	0.9x	1	=	⟨┌	2	x	94	1.68	x	0.5	X	0.9	=	76.69	(80)
West	0.9x	1		· [4.75	x	94	1.68	x	0.5	x	0.9	_ =	546.4	(80)
West	0.9x	1		⟨┌	2	x	94	1.68	x	0.5	x	0.9	=	76.69	(80)
West	0.9x	1	=	(<u> </u>	4.75	X	73	3.59	Х	0.5	Х	0.9		424.7	(80)
West	0.9x	1		ΥĒ	2	x	73	3.59	х	0.5	х	0.9		59.61	(80)
West	0.9x	1	T	⟨┌	4.75	х	73	3.59	x	0.5	Х	0.9	=	424.7	(80)
West	0.9x	1	-	ΥĒ	2	x	73	3.59	x	0.5	Х	0.9	=	59.61	(80)
West	0.9x	1	7	ΥĒ	4.75	x	45	5.59	Х	0.5	х	0.9	_ =	263.11	(80)
West	0.9x	1	7	([2	x	45	5.59	Х	0.5	Х	0.9		36.93	(80)
West	0.9x	1			4.75	х	45	5.59	X	0.5	Х	0.9	=	263.11	(80)
West	0.9x	1		< [2	x	45	5.59	X	0.5	X	0.9	=	36.93	(80)
West	0.9x	1		ζĒ	4.75	x	24	1.49	X	0.5	X	0.9	=	141.33	(80)
West	0.9x	1		ΥĒ	2	x	24	1.49	X	0.5	X	0.9	=	19.84	(80)
West	0.9x	1		٠ [4.75	x	24	1.49	X	0.5	X	0.9	=	141.33	(80)
West	0.9x	1		ζĒ	2	x	24	1.49	X	0.5	X	0.9	=	19.84	(80)
West	0.9x	1		ΥĒ	4.75	x	16	6.15	X	0.5	X	0.9	=	93.21	(80)
West	0.9x	1		٠ [2	x	16	6.15	x	0.5	X	0.9	=	13.08	(80)
West	0.9x	1		- <u> </u>	4.75	x	16	6.15	x	0.5	X	0.9		93.21	(80)
West	0.9x	1		ΥĒ	2	x	16	3.15	x	0.5	X	0.9	=	13.08	(80)
															_
Solar g	ains in	watts, ca	lculate	d fo	or each mont	th_			(83)m	ı = Sum(74)m	.(82)m	1		_	
(83)m=	292.97	571.55	944.71		394.34 1730.6		782.98	1692.7	1438	3.13 1103.13	678.4	364.84	241.31		(83)
Total g				Ť	34)m = (73)m	<u> </u>		-						7	
(84)m=	1282.96	1555.01	1890.4	3 2	280.73 2554.3	9 2	551.99	2430.7	2187	7.15 1887.19	1522	.1 1274.81	1203.27		(84)
7. Me	an interi	nal temp	erature	e (h	eating seasc	n)									
Temp	erature	during he	eating	per	iods in the li	ving	area fi	om Tab	ole 9,	Th1 (°C)				21	(85)
Utilisa	ation fac	tor for ga	ins fo	livi	ng area, h1,	Ť	ee Tal	ole 9a)						-	
	Jan	Feb	Mar		Apr May	/	Jun	Jul	Αι	ug Sep	Oc	t Nov	Dec		

(86)m=	0.98	0.97	0.94	0.88	0.78	0.63	0.5	0.56	0.77	0.92	0.97	0.98		(86)
Mean ii	nternal	tempera	ature in	living are	ea T1 (fo	ollow ste	ps 3 to 7	in Table	e 9c)					
	18.01	18.32	18.88	19.66	20.27	20.72	20.89	20.85	20.49	19.66	18.75	18.03		(87)
Tempe	rature d	durina h	eating p	eriods ir	rest of	dwellina	from Ta	ble 9. Ti	h2 (°C)			•		
· -	19.79	19.8	19.81	19.86	19.87	19.92	19.92	19.93	19.9	19.87	19.85	19.83		(88)
∟ Htilieati	ion fact	or for a	ains for	rest of d	welling	h2 m (se	a Tahla	0a)						
(89)m=	0.98	0.96	0.93	0.86	0.73	0.56	0.4	0.46	0.71	0.9	0.96	0.98		(89)
	ntornal	tompor	oturo in	the rest	of duralli	na T2 /f/	ollow oto	no 2 to -	Tin Tobl	o 0o)				
	15.81	16.27	17.07	18.21	19.06	19.67	19.85	19.83	7 in Tabl	18.23	16.91	15.86		(90)
(30)111=	10.01	10.27	17.07	10.21	13.00	10.07	13.00	10.00			g area ÷ (4		0.5	(91)
								, , ,			J (′		(0.7
			`	r the wh		, , , , , , , , , , , , , , , , , , ,	1	<u> </u>		10.04	47.00	40.04		(02)
` ′ _	16.91	17.29	17.97	18.93	19.67	20.19	20.37	20.34	19.94	18.94	17.83	16.94	ı	(92)
· · · · · -	16.91	17.29	17.97	18.93	19.67	20.19	20.37	20.34	re appro	18.94	17.83	16.94		(93)
` ′ _			uirement		19.07	20.19	20.37	20.54	19.94	10.94	17.00	10.94		(00)
					e obtain	ed at ste	ep 11 of	Table 9	o, so tha	t Ti.m=(76)m an	d re-calc	:ulate	
				using Ta		ou ut ou				,	r o)iii aii	a ro dale	uluto	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Utilisati	ion fact	or for g	ains, hm	:										
(94)m=	0.96	0.94	0.91	0.83	0.73	0.58	0.45	0.5	0.72	0.88	0.95	0.97		(94)
	_		•	4)m x (84	_								ı	(0-1)
(95)m= 1		1467.7	1713.22			1477.56	1085.84	1092.51	1350.32	1344.38	1209.13	1164.7	ı	(95)
	y avera	ge exte	rnal tem 6.5	perature 8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2		(96)
(96)m=									– (96)m		7.1	4.2		(30)
(97)m= 4		4414.34		3376.94	2655.77	1773.81			1889.04	2781.8	3646.8	4413.75		(97)
)m – (95					, ,
· -	ř	1980.14	1738.14		597.6	0	0	0	0	1069.44	1755.13	2417.29		
								Tota	l per year	(kWh/year) = Sum(9	8) _{15,912} =	13073.45	(98)
Space	heating	ı reauire	ement in	kWh/m²	/vear								49.52	(99)
9a. Ener		-			-	vetome i	neludina	micro-C	'UD/					
Space			its – Iriui	Muuai III	zauriy s	ysterris i	ricidaling	TIIIGIO-C)					
•		_	t from s	econdary	//supple	mentary	system						0	(201)
Fraction	n of spa	ace hea	t from m	nain syst	em(s)			(202) = 1 -	- (201) =				1	(202)
	•			, main sys	, ,			(204) = (2	02) × [1 – ((203)] =			1	(204)
			•	ing syste				, , ,	, .	`			90.5	(206)
	•	-		ementar		a cyctom	0/							(208)
Ellicien	.												0	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/y	/ear
· -	ř		1738.14	alculated	597.6	0	0	0	0	1069.44	1755 12	2417.29		
_						U U		_ ·	, v	1003.44	1700.13	2411.29		(04.1)
(211)m =	= {[(98) 2709.45	m x (20 2188	4)] } x 1 1920.6	00 ÷ (20 1175.29	660.33	0	0	0	0	1181.71	1020 27	2671.04		(211)
Ľ	109.45	Z100	1320.0	11/3.29	000.33	U	l ⁰		l (kWh/yea				11115	(211)
								· ota	(, 34.11(2	- · · /15,1012	2	14445.8	(211)

Space heating fuel (secondary), kW	n/month									
$= \{[(98)m \times (201)] \} \times 100 \div (208)$ $(215)m = 0 $	ΙοΙ	0	0	0	0	0	0	0]	
` '				Tota	I al (kWh/yea	ar) =Sum(2	L 215) _{15,101}		0	(215)
Water heating										
Output from water heater (calculated 226.87 199.9 209.78 187.83		40444	457.00	470	470.70	404.70	200.04	004.04	1	
226.87 199.9 209.78 187.83 Efficiency of water heater	183.91	164.11	157.39	173	172.79	194.78	206.24	221.34	79.8	(216)
(217)m= 89.48 89.4 89.21 88.71	87.73	79.8	79.8	79.8	79.8	88.67	89.24	89.49	79.0	(217)
Fuel for water heating, kWh/month	1		ļ		ļ				l	, ,
(219) m = (64) m × $100 \div (217)$ m	T T								1	
(219)m= 253.53 223.6 235.15 211.73	209.63	205.65	197.23	216.8	216.53 al = Sum(2	219.68	231.1	247.32	2667.04	(219)
Annual totals				1016	ii – Ouiii(2		Wh/yeaı	•	2667.94 kWh/yea i	
Space heating fuel used, main system	า 1					K	vii/yca		14445.8	
Water heating fuel used									2667.94	=
Electricity for pumps, fans and electric	c keep-hot									
mechanical ventilation - balanced, e	•		nput fron	n outsid	е			606.03		(230a)
central heating pump:								30		(230c)
Total electricity for the above, kWh/ye	ar			sum	of (230a).	(230g) =			636.03	(231)
Electricity for lighting									674.51	(232)
10a. Fuel costs - individual heating s	systems:									
		Fu	el			Fuel P (Table			Fuel Cost	
						lable	12)		£/vear	
Space heating - main system 1		kW	/h/year			`		x 0.01 =	£/year	7(240)
Space heating - main system 1 Space heating - main system 2		kW (21	<mark>/h/ye</mark> ar 1) x			3.4	.8		502.71	(240)
Space heating - main system 2		kW (21) (21)	/h/year 1) x 3) x			3.4	8	x 0.01 =	502.71	(241)
Space heating - main system 2 Space heating - secondary		(21) (21) (21)	/h/year 1) x 3) x 5) x			3.4	19	x 0.01 = x 0.01 =	0 0	(241)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel)		(21) (21) (21) (21)	/h/year 1) x 3) x 5) x			3.4 0 13.	19	x 0.01 = x 0.01 = x 0.01 =	502.71 0 0 92.84	(241) (242) (247)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel) Pumps, fans and electric keep-hot	(230a) se	(21) (21) (21) (21) (21) (23)	/h/year 1) x 3) x 5) x 9)	licable a	and apply	3.4 0 13. 3.4	8 19 8 19	x 0.01 = x 0.01 = x 0.01 = x 0.01 =	502.71 0 0 92.84 83.89	(241)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel)	(230g) se	(21) (21) (21) (21) (21) (23)	/h/year 1) x 3) x 5) x 9) 1) y as app	licable a	and apply	3.4 0 13. 3.4	8 19 19 ce accor	x 0.01 = x 0.01 = x 0.01 = x 0.01 =	502.71 0 0 92.84 83.89	(241) (242) (247)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel) Pumps, fans and electric keep-hot (if off-peak tariff, list each of (230a) to	, 0,	(213 (214 (215 (215 (237 (237)	/h/year 1) x 3) x 5) x 9) 1) y as app	licable a	nd apply	3.4 0 13. 3.4 13.	8 19 19 ce accor	x 0.01 = $x 0.01 =$ $x 0.01 =$ $x 0.01 =$ $x 0.01 =$	0 0 92.84 83.89 Table 12a	(241) (242) (247) (247) (249)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel) Pumps, fans and electric keep-hot (if off-peak tariff, list each of (230a) to Energy for lighting	2)	(215) (215) (215) (217) (237) (237)	/h/year 1) x 3) x 5) x 9) 1) y as app	licable a	nd apply	3.4 0 13. 3.4 13.	8 19 19 ce accor	x 0.01 = $x 0.01 =$ $x 0.01 =$ $x 0.01 =$ $x 0.01 =$	502.71 0 0 92.84 83.89 Table 12a 88.97	(241) (242) (247) (249) (250)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel) Pumps, fans and electric keep-hot (if off-peak tariff, list each of (230a) to Energy for lighting Additional standing charges (Table 12)	2) and (254)	(213 (214 (215 (215 (232 parately (232 as need	/h/year 1) x 3) x 5) x 9) 1) y as app		nd apply	3.4 0 13. 3.4 13.	8 19 19 ce accor	x 0.01 = $x 0.01 =$ $x 0.01 =$ $x 0.01 =$ $x 0.01 =$	502.71 0 0 92.84 83.89 Table 12a 88.97	(241) (242) (247) (249) (250)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel) Pumps, fans and electric keep-hot (if off-peak tariff, list each of (230a) to Energy for lighting Additional standing charges (Table 12 Appendix Q items: repeat lines (253)	2) and (254) (245)(2	(213 (214 (215 (215 (232 parately (232 as need	/h/year 1) x 3) x 5) x 9) 11) y as app 2) ded		nd apply	3.4 0 13. 3.4 13.	8 19 19 ce accor	x 0.01 = $x 0.01 =$ $x 0.01 =$ $x 0.01 =$ $x 0.01 =$	502.71 0 0 92.84 83.89 Table 12a 88.97 120	(241) (242) (247) (249) (250) (251)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel) Pumps, fans and electric keep-hot (if off-peak tariff, list each of (230a) to Energy for lighting Additional standing charges (Table 12 Appendix Q items: repeat lines (253) Total energy cost	2) and (254) (245)(2	(213 (214 (215 (215 (232 parately (232 as need	/h/year 1) x 3) x 5) x 9) 11) y as app 2) ded		and apply	3.4 0 13. 3.4 13.	8 19 19 ce accor	x 0.01 = $x 0.01 =$ $x 0.01 =$ $x 0.01 =$ $x 0.01 =$	502.71 0 0 92.84 83.89 Table 12a 88.97 120	(241) (242) (247) (249) (250) (251)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel) Pumps, fans and electric keep-hot (if off-peak tariff, list each of (230a) to Energy for lighting Additional standing charges (Table 12 Appendix Q items: repeat lines (253) Total energy cost 11a. SAP rating - individual heating	2) and (254) (245)(2 systems	(213 (215 (215 (237 (237 (237 (237) (237) (237)	/h/year 1) x 3) x 5) x 9) 1) y as app ded	=	and apply	3.4 0 13. 3.4 13.	8 19 19 ce accor	x 0.01 = $x 0.01 =$ $x 0.01 =$ $x 0.01 =$ $x 0.01 =$	502.71 0 0 92.84 83.89 Table 12a 88.97 120 888.42	(241) (242) (247) (249) (250) (251) (255)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel) Pumps, fans and electric keep-hot (if off-peak tariff, list each of (230a) to Energy for lighting Additional standing charges (Table 12 Appendix Q items: repeat lines (253) Total energy cost 11a. SAP rating - individual heating Energy cost deflator (Table 12)	2) and (254) (245)(2 systems	(213 (215 (215 (237 (237 (237 (237) (237) (237)	/h/year 1) x 3) x 5) x 9) 1) y as app 2) ded 50)(254)	=	and apply	3.4 0 13. 3.4 13.	8 19 19 ce accor	x 0.01 = $x 0.01 =$ $x 0.01 =$ $x 0.01 =$ $x 0.01 =$	502.71 0 0 92.84 83.89 Fable 12a 88.97 120 888.42	(241) (242) (247) (249) (250) (251) (255)

Electricity for lighting

'Total Primary Energy

Primary energy kWh/m²/year

SAP WorkSheet: Existing dwelling (SAP)

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating (main system 1)	(211) x	0.216 =	3120.29 (261)
Space heating (secondary)	(215) x	0.519 =	0 (263)
Water heating	(219) x	0.216 =	576.28 (264)
Space and water heating	(261) + (262) + (263) + (264) =		3696.57 (265)
Electricity for pumps, fans and electric keep-hot	(231) x	0.519 =	330.1 (267)
Electricity for lighting	(232) x	0.519 =	350.07 (268)
Total CO2, kg/year	sum	of (265)(271) =	4376.73 (272)
CO2 emissions per m ²	(272	2) ÷ (4) =	16.58 (273)
El rating (section 14)			81 (274)
13a. Primary Energy			
	Energy kWh/year	Primary factor	P. Energy kWh/year
Space heating (main system 1)	(211) x	1.22	17623.87 (261)
Space heating (secondary)	(215) x	3.07	0 (263)
Energy for water heating	(219) x	1.22 =	3254.89 (264)
Space and water heating	(261) + (262) + (263) + (264) =		20878.76 (265)
Electricity for pumps, fans and electric keep-hot	(231) x	3.07	1952.6 (267)

(232) x

sum of (265)...(271) =

 $(272) \div (4) =$

(268)

(272)

(273)

2070.74

24902.1

94.33

			User D	etails:						
Assessor Name: Software Name:	Stroma FS	-		Stroma Softwa	re Ver			Versic	on: 1.0.4.18	
Address :	39 Fitziohn	P s Avenue, LONE		Address: V3.5.IY	LG04					
Overall dwelling dime	-	o / (Veride, Eerve) (14)	VO 00 1						
			Area	a(m²)		Av. Hei	ight(m)		Volume(m	3)
Ground floor				``	(1a) x		3.2	(2a) =	246.4	(3a)
Total floor area TFA = (1	a)+(1b)+(1c)+	(1d)+(1e)+(1r	n)	77	(4)			_		_
Dwelling volume					(3a)+(3b)	+(3c)+(3d)+(3e)+	.(3n) =	246.4	(5)
2. Ventilation rate:										
	main heating	secondar heating	У	other		total			m³ per hou	ır
Number of chimneys	0	+ 0] + [0	= [0	X 4	40 =	0	(6a)
Number of open flues	0	+ 0] + [0] = [0	x	20 =	0	(6b)
Number of intermittent fa	ans					0	x -	10 =	0	(7a)
Number of passive vents	5					0	x '	10 =	0	(7b)
Number of flueless gas f	ires					0	X 4	40 =	0	(7c)
								Air ch	nanges per ho	nur
Infiltration due to chimne	we flues and f	ans = (6a)+(6b)+(7	(a)+(7h)+(7c) =		-				(8)
If a pressurisation test has b					ontinue fro	0 om (9) to (÷ (5) =	0	(0)
Number of storeys in t						, ,	ĺ		1	(9)
Additional infiltration							[(9)	-1]x0.1 =	0	(10)
Structural infiltration: 0					•	uction			0.35	(11)
if both types of wall are p deducting areas of openi	*	, ,	the great	er wall area	a (after					
If suspended wooden	• ,		.1 (seale	ed), else	enter 0				0	(12)
If no draught lobby, en	nter 0.05, else e	enter 0							0.05	(13)
Percentage of window	s and doors dr	aught stripped							100	(14)
Window infiltration				0.25 - [0.2	x (14) ÷ 1	00] =			0.05	(15)
Infiltration rate				(8) + (10)					0.45	(16)
Air permeability value,			-	•	•	etre of e	nvelope	area	0	(17)
If based on air permeabi	•					. , .	,		0.45	(18)
Air permeability value applie Number of sides sheltere	•	on test nas been dor	ie or a deg	gree air pei	теаріііту	is being us	sea			(19)
Shelter factor	5u			(20) = 1 - [0.075 x (1	9)] =			0.85	(20)
Infiltration rate incorpora	ting shelter fac	etor		(21) = (18)	x (20) =				0.38	(21)
Infiltration rate modified f	-								0.00	` ′
Jan Feb	Mar Apr	May Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind sp	peed from Tabl	e 7								
(22)m= 5.1 5	4.9 4.4	4.3 3.8	3.8	3.7	4	4.3	4.5	4.7		
Wind Factor (22a)m = (2										
(22a)m = 1.27 1.25	1.23 1.1	1.08 0.95	0.95	0.92	1	1.08	1.12	1.18		
<u> </u>		<u> </u>						!	1	

				1	i 	` 	(22a)m		1	т	1	
0.49 0.48	0.47	0.42	0.41	0.36	0.36	0.35	0.38	0.41	0.43	0.45		
<i>alculate effective aii</i> If mechanical ventil	_	rate ioi t	пе аррп	Cable Ca	100						0.5	(2
If exhaust air heat pump		endix N, (2	3b) = (23a	a) × Fmv (equation (I	N5)) , othe	rwise (23b) = (23a)			0.5	(2
If balanced with heat red	covery: effic	ciency in %	allowing f	for in-use f	factor (fron	n Table 4h) =				77.35	(2
a) If balanced mech	hanical ve	entilation	with he	at recov	ery (MV	HR) (24a	a)m = (2:	2b)m + (23b) × [1 – (23c)		`
4a)m= 0.6 0.59	0.58	0.53	0.52	0.48	0.48	0.47	0.5	0.52	0.54	0.56]	(2
b) If balanced mech	nanical ve	entilation	without	heat red	covery (l	MV) (24k	m = (22)	2b)m + (23b)		1	
4b)m= 0 0	0	0	0	0	0	0	0	0	0	0]	(2
c) If whole house e			•	•				- (00)	,	•	•	
if (22b)m < 0.5	- 	<u> </u>		i 	· `	r ` ` 	ŕ	<u> </u>	i 	Ι ,	1	(2
4c)m= 0 0	0	0	0	0	0	0	0	0	0	0	J	(2
d) If natural ventilat if (22b)m = 1, tl			•	•				0.51				
4d)m= 0 0	0	0	0	0	0	0	0	0	0	0]	(2
Effective air change	e rate - er	nter (24a) or (24l	o) or (24	c) or (24	ld) in bo	x (25)	!	!	ļ	J	
5)m= 0.6 0.59	0.58	0.53	0.52	0.48	0.48	0.47	0.5	0.52	0.54	0.56		(2
3. Heat losses and h							ı					
indows Type 1					m²	W/m2	-11	(W/	11)	kJ/m²-	1.	kJ/K
/alls Type2 1 /alls Type3 5 /alls Type4 1 otal area of element		7.1 4.85 1.3 2.25		1.3 1.3 1.3 2.25 2.25 2.25 2.25 2.25 2.25 2.25 2.	x1 x	/[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.25 0.25 0.25	0.04] = 0.04]	2.18 2.18 2.18 3.78 3.78 3.78 2.38 3.54 1.05 3.19				(2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (
indows Type 3 indows Type 4 indows Type 5 indows Type 6 alls Type1 16 alls Type2 1 alls Type3 5 alls Type4 1 otal area of element	9 .5 .5 .s, m² dows, use e	4.85 1.3 2.25	ndow U-va	1.3 1.3 2.25 2.25 2.25 2.25 9.54 14.11 4.2 12.75 56.14 alue calculations and a second a second and a second and a second and a second and a second a second and a	x1 x	/[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.25 0.25 0.25	0.04] = 0.04]	2.18 2.18 2.18 3.78 3.78 3.78 2.38 3.54 1.05 3.19				(2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (
findows Type 3 findows Type 4 findows Type 5 findows Type 6 falls Type1 falls Type2 falls Type3 falls Type4 fotal area of element for windows and roof wind finclude the areas on both	9 5 5 s, m² dows, use 6 th sides of in	4.85 1.3 2.25 effective winternal wall	ndow U-va	1.3 1.3 2.25 2.25 2.25 2.25 9.54 14.11 4.2 12.75 56.14 alue calculations and a second a second and a second and a second and a second and a second a second and a	x1 x	/[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.25 0.25 0.25	0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = = = =	2.18 2.18 2.18 3.78 3.78 3.78 2.38 3.54 1.05 3.19				(3)
findows Type 3 findows Type 4 findows Type 5 findows Type 6 falls Type1 falls Type2 falls Type3 falls Type4 for windows and roof windows and r	9 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5	4.85 1.3 2.25 effective winternal wall	ndow U-va	1.3 1.3 2.25 2.25 2.25 2.25 9.54 14.11 4.2 12.75 56.14 alue calculations and a second a second and a second and a second and a second and a second a second and a	x1 x	/[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.25 0.25 0.25	0.04] = 0.04]	2.18 2.18 2.18 3.78 3.78 3.78 2.38 3.54 1.05 3.19		n paragrapi	h 3.2	(3)
findows Type 3 findows Type 4 findows Type 5 findows Type 6 falls Type1 falls Type2 falls Type3 falls Type4 for tal area of element for windows and roof windows and roof windows the areas on both fabric heat loss, W/K teat capacity Cm = \$\frac{1}{2}\$	9 .5 s, m² dows, use eth sides of in $X = S (A \times B(A \times K))$	4.85 1.3 2.25 effective winternal walk	ndow U-va	1.3 1.3 2.25 2.25 2.25 2.25 9.54 14.19 4.2 12.79 56.14 alue calculatitions	x1 x	/[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.25 0.25 0.25	0.04] = 0.04]	2.18 2.18 2.18 3.78 3.78 3.78 2.38 3.54 1.05 3.19	as given in (2) + (32a).	n paragrapi	h 3.2	
findows Type 3 findows Type 4 findows Type 5 findows Type 6 falls Type1 falls Type2 falls Type3 for alls Type4 for windows and roof windows Type 3 findows Type 3 findows Type 4 findows Type 5 findows Type 5 findows Type 6 findows Type 7 findows Type 8 findows Type 8 findows Type 9 findow	9 .5 s, m² dows, use eth sides of in $X = S (A \times K)$ eter (TMR)	4.85 1.3 2.25 effective winternal walk U) P = Cm ÷	ndow U-vals and par	1.3 1.3 2.25 2.25 2.25 2.25 9.54 14.19 4.2 12.79 56.14 alue calculatitions	x1 x	/[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.25 0.25 0.25 0.25 (26)(30	0.04] = 0.04]	2.18 2.18 2.18 3.78 3.78 3.78 2.38 3.54 1.05 3.19 1e)+0.04] & & & & & & & & & & & & & & & & & & &	as given in (2) + (32a).	n paragrapi (32e) =	h 3.2 36.19 7721.6	
/indows Type 3 /indows Type 4 /indows Type 5 /indows Type 6 /alls Type1 16 /alls Type2 1 /alls Type3 5. /alls Type4 1	9 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5	4.85 1.3 2.25 effective winternal walk U) P = Cm - etails of the evaluation.	ndow U-va ls and par - TFA) ir construct	1.3 1.3 2.25 2.25 2.25 9.54 14.19 4.2 12.79 56.14 alue calculatitions	x1 x	/[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.25 0.25 0.25 0.25 (26)(30	0.04] = 0.04]	2.18 2.18 2.18 3.78 3.78 3.78 2.38 3.54 1.05 3.19 ie)+0.04] & & & & & & & & & & & & & & & & & & &	as given in (2) + (32a).	n paragrapi (32e) =	h 3.2 36.19 7721.6	(2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (

Ventilation heat loss calculated monthly $(38)m = 0.33 \times (25)m \times (5)$														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(38)m=	48.86	48.09	47.31	43.42	42.64	38.76	38.76	37.98	40.31	42.64	44.2	45.75		(38)
Heat tr	ansfer o	coefficier	nt, W/K					•	(39)m	= (37) + (37)	38)m			
(39)m=	93.47	92.69	91.92	88.03	87.25	83.36	83.36	82.58	84.92	87.25	88.81	90.36		
Heat Ic	ss para	meter (F	HLP), W/	′m²K						Average = = (39)m ÷	Sum(39) ₁ .	12 /12=	87.83	(39)
(40)m=	1.21	1.2	1.19	1.14	1.13	1.08	1.08	1.07	1.1	1.13	1.15	1.17		
Numbe	er of day	s in moi	nth (Tab	le 1a)					,	Average =	Sum(40) ₁	12 /12=	1.14	(40)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(41)m=	31	28	31	30	31	30	31	31	30	31	30	31		(41)
4. Wa	iter heat	ting ener	rgy requi	rement:								kWh/ye	ear:	
Assum	ed occu	ipancy, I	N								2	2.4		(42)
if TF		9, N = 1		[1 - exp	(-0.0003	349 x (TF	FA -13.9)2)] + 0.0	0013 x (ΓFA -13.		4		(42)
								(25 x N)				.28		(43)
			hot water person per				-	to achieve	a water us	se target o	†			
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Hot wate			day for ea						Seh	Oct	INOV			
(44)m=	100.41	96.76	93.11	89.46	85.81	82.15	82.15	85.81	89.46	93.11	96.76	100.41		
						100 - 1/1		T (000)			m(44) ₁₁₂ =		1095.39	(44)
	148.91	130.23	134.39	117.16	112.42	97.01	89.9	0Tm / 3600 103.16	104.39	121.65	132.8	144.21		
(45)m=	140.91	130.23	134.39	117.10	112.42	97.01	09.9	103.16			m(45) ₁₁₂ =	L	1436.23	(45)
If instant	taneous w	ater heatii	ng at point	of use (no	hot water	storage),	enter 0 in	boxes (46		rotal – ou	(10)112	Ĺ	1 100.20	()
(46)m=	22.34	19.54	20.16	17.57	16.86	14.55	13.48	15.47	15.66	18.25	19.92	21.63		(46)
	storage					/\/\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		20.25		!				\
•		` ,					•	within sa	ame ves	sei		300		(47)
Otherw	-	stored	nd no ta hot wate		_			mbi boil	ers) ente	er '0' in (47)			
	_		eclared l	oss facto	or is kno	wn (kWh	n/day):				1.	.69		(48)
,			m Table			`	• •					.54		(49)
Energy	lost fro	m water	storage	, kWh/ye	ear			(48) x (49)) =		0.	.91		(50)
			eclared o	-										
			factor fr ee section		e 2 (kW	h/litre/da	ıy)					0		(51)
	-	from Tal		JII 4.3								0		(52)
			m Table	2b								0		(53)
Energy	lost fro	m water	storage	, kWh/ye	ear			(47) x (51)) x (52) x (53) =		0		(54)
•		(54) in (5	-	,					•			.91		(55)
Water	storage	loss cal	culated f	or each	month			((56)m = (55) × (41)ı	m				
(56)m=	28.29	25.55	28.29	27.38	28.29	27.38	28.29	28.29	27.38	28.29	27.38	28.29		(56)

If cylinder contains dedicated so	olar storage, (57)	$m = (56)m \times [(56)m]$	50) – (H11)] ÷ (5	0), else (5	7)m = (56)	m where (H11) is fro	m Append	ix H	
(57)m= 28.29 25.55 28	8.29 27.38	28.29 2	7.38 28.29	28.29	27.38	28.29	27.38	28.29		(57)
Primary circuit loss (annua	al) from Table	3	•					0		(58)
Primary circuit loss calcula	,		m = (58) ÷ 36	65 × (41)	m				•	
(modified by factor from	Table H5 if t	here is sola	ar water heatii	ng and a	cylinde	r thermo	stat)			
(59)m= 23.26 21.01 23	3.26 22.51	23.26 22	2.51 23.26	23.26	22.51	23.26	22.51	23.26		(59)
Combi loss calculated for	each month ((61)m = (60) ÷ 365 × (41))m						
(61)m= 0 0	0 0	0	0 0	0	0	0	0	0		(61)
Total heat required for wa	iter heating ca	alculated for	r each month	(62)m =	0.85 × ((45)m +	(46)m +	(57)m +	(59)m + (61)m	1
(62)m= 200.46 176.8 18	35.94 167.05	163.98 14	46.9 141.45	154.71	154.28	173.21	182.69	195.76		(62)
Solar DHW input calculated usin	ng Appendix G o	Appendix H (negative quantity	/) (enter '0	' if no sola	r contribut	ion to wate	er heating)	•	
(add additional lines if FG	HRS and/or \	WWHRS ap	plies, see Ap	pendix (3)					
(63)m= 0 0	0 0	0	0 0	0	0	0	0	0		(63)
Output from water heater										
(64)m= 200.46 176.8 18	35.94 167.05	163.98 14	46.9 141.45	154.71	154.28	173.21	182.69	195.76		
		-	-	Outp	out from wa	ater heate	r (annual)	l12	2043.22	(64)
Heat gains from water hea	ating, kWh/m	onth 0.25 '	[0.85 × (45)m	+ (61)m	n] + 0.8 x	((46)m	+ (57)m	+ (59)m]	
(65)m= 90.75 80.55 85	5.93 78.87	78.62 7	2.17 71.13	75.54	74.62	81.69	84.07	89.19		(65)
include (57)m in calcula	tion of (65)m	only if cylin	nder is in the	dwelling	or hot w	ate <mark>r is f</mark> r	om com	munity h	eating	
5. Internal gains (see Ta	able 5 and 5a):								
Motabolic gains (Table 5)	,,,									
METADONIC MAINS (TABLE 3).	. Watts									
Metabolic gains (Table 5)	, Watts Mar Apr	May .	Jun Jul	Aug	Sep	Oct	Nov	Dec		
Jan Feb I			Jun Jul 14.21 144.21	Aug 144.21	Sep 144.21	Oct 144.21	Nov 144.21	Dec 144.21		(66)
Jan Feb I	Mar Apr 14.21 144.21	144.21 14	14.21 144.21	144.21	144.21		_	 		(66)
Jan Feb 144.21 144.21 14 Lighting gains (calculated	Mar Apr 14.21 144.21	144.21 14 L, equation	14.21 144.21	144.21	144.21		_	 		(66) (67)
Jan Feb 144.21 144.21 14 Lighting gains (calculated	Mar Apr 44.21 144.21 in Appendix 34.3 25.97	144.21 14 L, equation 19.41 10	144.21 144.21 L9 or L9a), a 6.39 17.71	144.21 Iso see	144.21 Table 5 30.89	39.23	144.21	144.21		, ,
Jan Feb 1	Mar Apr 44.21 144.21 in Appendix 34.3 25.97	144.21 14 L, equation 19.41 10 dix L, equati	144.21 L9 or L9a), a 6.39	144.21 Iso see	144.21 Table 5 30.89	39.23	144.21	144.21		, ,
Jan Feb 1	Mar Apr 14.21 144.21 in Appendix 34.3 25.97 ted in Appendix 12.98 295.28	144.21 14 L, equation 19.41 10 dix L, equati 272.93 25	144.21 144.21 L9 or L9a), a 6.39 17.71 ion L13 or L1 51.93 237.9	144.21 Iso see 23.02 3a), also	144.21 Table 5 30.89 see Ta 242.91	39.23 ble 5 260.62	144.21 45.78	144.21 48.81		(67)
Jan Feb 1 (66)m= 144.21 144.21 14 Lighting gains (calculated (67)m= 47.49 42.18 3 Appliances gains (calculated (68)m= 317.99 321.29 31 Cooking gains (calculated (calculat	Mar Apr 14.21 144.21 in Appendix 34.3 25.97 ted in Appendix 12.98 295.28	144.21 14 L, equation 19.41 10 dix L, equati 272.93 25 L, equation	144.21 144.21 L9 or L9a), a 6.39 17.71 ion L13 or L1 51.93 237.9	144.21 Iso see 23.02 3a), also	144.21 Table 5 30.89 see Ta 242.91	39.23 ble 5 260.62	144.21 45.78	144.21 48.81		(67)
Jan Feb 1	Mar Apr 14.21 144.21 in Appendix 34.3 25.97 ted in Appendix 12.98 295.28 d in Appendix 1.82 51.82	144.21 14 L, equation 19.41 10 dix L, equati 272.93 25 L, equation	14.21 144.21 L9 or L9a), a 6.39 17.71 ion L13 or L1 51.93 237.9 L15 or L15a)	144.21 lso see 23.02 3a), also 234.6	144.21 Table 5 30.89 see Ta 242.91 ee Table	39.23 ble 5 260.62	144.21 45.78 282.96	144.21 48.81 303.96		(67) (68)
Jan Feb 1 (66)m= 144.21 144.21 14 Lighting gains (calculated (67)m= 47.49 42.18 3 Appliances gains (calculated (68)m= 317.99 321.29 31 Cooking gains (calculated (calculat	Mar Apr 14.21 144.21 in Appendix 34.3 25.97 ted in Appendix 12.98 295.28 d in Appendix 1.82 51.82	144.21 14 L, equation 19.41 10 dix L, equati 272.93 25 L, equation	14.21 144.21 L9 or L9a), a 6.39 17.71 ion L13 or L1 51.93 237.9 L15 or L15a)	144.21 lso see 23.02 3a), also 234.6	144.21 Table 5 30.89 see Ta 242.91 ee Table	39.23 ble 5 260.62	144.21 45.78 282.96	144.21 48.81 303.96		(67) (68)
Jan Feb 144.21 14	Mar Apr 14.21 144.21 in Appendix 34.3 25.97 ted in Appendix 12.98 295.28 d in Appendix 1.82 51.82 able 5a) 3 3	144.21 14 L, equation 19.41 10 dix L, equation 272.93 25 L, equation 51.82 5	144.21	144.21 lso see 23.02 3a), also 234.6), also se 51.82	144.21 Table 5 30.89 o see Ta 242.91 ee Table 51.82	39.23 ble 5 260.62 5 51.82	144.21 45.78 282.96 51.82	144.21 48.81 303.96 51.82		(67) (68) (69)
Jan Feb 1	Mar Apr 14.21 144.21 in Appendix 34.3 25.97 ted in Appendix 12.98 295.28 d in Appendix 1.82 51.82 able 5a) 3 3	144.21 14 L, equation 19.41 10 dix L, equation 272.93 25 L, equation 51.82 5 3 es) (Table 5	144.21	144.21 lso see 23.02 3a), also 234.6), also se 51.82	144.21 Table 5 30.89 o see Ta 242.91 ee Table 51.82	39.23 ble 5 260.62 5 51.82	144.21 45.78 282.96 51.82	144.21 48.81 303.96 51.82		(67) (68) (69)
Jan Feb 144.21 14	Mar Apr 144.21 144.21 in Appendix 34.3 25.97 ted in Appendix 12.98 295.28 d in Appendix 1.82 51.82 able 5a) 3 3 negative valu 16.14 -96.14	144.21 14 L, equation 19.41 10 dix L, equation 272.93 25 L, equation 51.82 5 3 es) (Table 5	14.21 144.21 L9 or L9a), a 6.39 17.71 ion L13 or L1 51.93 237.9 1 L15 or L15a) 1.82 51.82 3 3 5)	144.21 lso see 23.02 3a), also 234.6 , also se 51.82	144.21 Table 5 30.89 See Ta 242.91 ee Table 51.82	39.23 ble 5 260.62 5 51.82	144.21 45.78 282.96 51.82	144.21 48.81 303.96 51.82		(67) (68) (69) (70)
Jan Feb 144.21 14	Mar Apr 144.21 144.21 in Appendix 34.3 25.97 ted in Appendix 12.98 295.28 d in Appendix 1.82 51.82 able 5a) 3 3 negative valu 16.14 -96.14	144.21 14 L, equation 19.41 10 dix L, equation 272.93 25 L, equation 51.82 5 3 es) (Table 5 -96.14 -9	14.21 144.21 L9 or L9a), a 6.39 17.71 ion L13 or L1 51.93 237.9 1 L15 or L15a) 1.82 51.82 3 3 5)	144.21 lso see 23.02 3a), also 234.6 , also se 51.82	144.21 Table 5 30.89 See Ta 242.91 ee Table 51.82	39.23 ble 5 260.62 5 51.82	144.21 45.78 282.96 51.82	144.21 48.81 303.96 51.82		(67) (68) (69) (70)
Jan Feb 1	Mar Apr 44.21 144.21 in Appendix 34.3 25.97 ted in Appendix 12.98 295.28 d in Appendix 1.82 51.82 able 5a) 3 3 negative valu 16.14 -96.14 le 5)	144.21 14 L, equation 19.41 10 dix L, equation 272.93 25 L, equation 51.82 5 3 es) (Table 5 -96.14 -9	144.21	144.21 lso see 23.02 3a), also 234.6), also se 51.82 3	144.21 Table 5 30.89 See Ta 242.91 See Table 51.82 3	39.23 ble 5 260.62 5 51.82 3 -96.14	144.21 45.78 282.96 51.82 3 -96.14	144.21 48.81 303.96 51.82 3 -96.14		(67) (68) (69) (70)
Jan Feb 144.21 14	Mar Apr 14.21 144.21 in Appendix 34.3 25.97 ted in Appendix 12.98 295.28 d in Appendix 1.82 51.82 able 5a) 3 3 negative valuu 16.14 -96.14	144.21 14 L, equation 19.41 10 dix L, equation 272.93 25 L, equation 51.82 5 3 es) (Table 6 -96.14 -9	144.21 144.21 L9 or L9a), a 6.39 17.71 ion L13 or L1 51.93 237.9 1 L15 or L15a) 1.82 51.82 3 3 5) 96.14 -96.14	144.21 lso see 23.02 3a), also 234.6), also se 51.82 3	144.21 Table 5 30.89 See Ta 242.91 See Table 51.82 3	39.23 ble 5 260.62 5 51.82 3	144.21 45.78 282.96 51.82 3 -96.14	144.21 48.81 303.96 51.82 3 -96.14		(67) (68) (69) (70)
Jan Feb 144.21 14	Mar Apr 44.21 144.21 in Appendix 34.3 25.97 ted in Appendix 12.98 295.28 d in Appendix 1.82 51.82 able 5a) 3 3 negative valu 96.14 -96.14 le 5) 15.49 109.54	144.21 14 L, equation 19.41 10 dix L, equation 272.93 25 L, equation 51.82 5 3 es) (Table 6 -96.14 -9	144.21	144.21 Iso see 23.02 3a), also 234.6), also se 51.82 3 -96.14 101.53 1 + (68)m +	144.21 Table 5 30.89 see Ta 242.91 ee Table 51.82 3 -96.14 103.64 + (69)m + (39.23 ble 5 260.62 5 51.82 3 -96.14 109.8 (70)m + (7	144.21 45.78 282.96 51.82 3 -96.14 116.76 1)m + (72	144.21 48.81 303.96 51.82 3 -96.14		(67) (68) (69) (70) (71) (72)
Jan Feb 144.21 14	Mar Apr 44.21 144.21 in Appendix 34.3 25.97 ted in Appendix 12.98 295.28 d in Appendix 1.82 51.82 able 5a) 3 3 negative valu 96.14 -96.14 le 5) 15.49 109.54	144.21 14 L, equation 19.41 10 dix L, equation 272.93 25 L, equation 51.82 5 3 es) (Table 6 -96.14 -9 105.68 10 500.91 47	144.21	144.21 lso see 23.02 3a), also 234.6), also se 51.82 3 -96.14 101.53 1+(68)m+462.04	144.21 Table 5 30.89 See Ta 242.91 See Table 51.82 3 -96.14 103.64 + (69)m + (480.34)	39.23 ble 5 260.62 5 51.82 3 -96.14 109.8 (70)m + (7 512.54	144.21 45.78 282.96 51.82 3 -96.14 116.76 1)m + (72) 548.4	144.21 48.81 303.96 51.82 3 -96.14 119.88 m 575.54		(67) (68) (69) (70) (71) (72)

m²

Table 6a

Table 6b

Table 6c

Table 6d

(W)

East	ا ۱۵۰۰		١		l .,	40.04	l	0.5	.,		1		(76)
East	0.9x	1	X	1.3	X	19.64	X	0.5	X	0.9] = 1	20.68	╡
East	0.9x	1	X	1.3	X	19.64	X	0.5	X	0.9] = 1	20.68	(76)
East	0.9x	1	X	2.25	X	19.64	X	0.5	X	0.9] = 1	35.79	(76)
	0.9x	1	X	2.25	X I	19.64	X	0.5	X	0.9] = 1	17.9	(76)
East	0.9x	1	X	1.3	X	38.42	X	0.5	X	0.9] = 1	40.46	(76)
East	0.9x	1	X	1.3	X	38.42	X	0.5	X	0.9] =	40.46	(76)
East	0.9x	1	X	2.25	X	38.42	Х	0.5	X	0.9	=	70.02	(76)
East	0.9x	1	X	2.25	Х	38.42	X	0.5	X	0.9	=	35.01	(76)
East	0.9x	1	X	1.3	X	63.27	Х	0.5	X	0.9] =	66.63	(76)
East	0.9x	1	X	1.3	X	63.27	X	0.5	X	0.9	=	66.63	(76)
East	0.9x	1	X	2.25	X	63.27	X	0.5	X	0.9	=	115.32	(76)
East	0.9x	1	X	2.25	x	63.27	X	0.5	X	0.9	=	57.66	(76)
East	0.9x	1	X	1.3	X	92.28	X	0.5	X	0.9	=	97.17	(76)
East	0.9x	1	X	1.3	X	92.28	X	0.5	X	0.9	=	97.17	(76)
East	0.9x	1	x	2.25	X	92.28	x	0.5	X	0.9	=	168.18	(76)
East	0.9x	1	X	2.25	x	92.28	X	0.5	X	0.9	=	84.09	(76)
East	0.9x	1	X	1.3	X	113.09	X	0.5	X	0.9	=	119.09	(76)
East	0.9x	1	x	1.3	X	113.09	Х	0.5	X	0.9	=	119.09	(76)
East	0.9x	1	x	2.25	x	113.09	×	0.5	x	0.9	=	206.11	(76)
East	0.9x	1	x	2.25	х	113.09	×	0.5	x	0.9	=	103.06	(76)
East	0.9x	1	x	1.3	x	115.77	x	0.5	x	0.9	=	121.91	(76)
East	0.9x	1	x	1.3	x	115.77	Х	0.5	x	0.9	=	121.91	(76)
East	0.9x	1	x	2.25	x	115.77	X	0.5	x	0.9	=	210.99	(76)
East	0.9x	1	x	2.25	х	115.77	x	0.5	x	0.9	=	105.5	(76)
East	0.9x	1	x	1.3	x	110.22	x	0.5	x	0.9	=	116.06	(76)
East	0.9x	1	x	1.3	x	110.22	x	0.5	x	0.9	=	116.06	(76)
East	0.9x	1	x	2.25	x	110.22	x	0.5	X	0.9	=	200.87	(76)
East	0.9x	1	x	2.25	x	110.22	x	0.5	x	0.9	=	100.44	(76)
East	0.9x	1	x	1.3	x	94.68	x	0.5	X	0.9	=	99.69	(76)
East	0.9x	1	x	1.3	x	94.68	x	0.5	X	0.9	=	99.69	(76)
East	0.9x	1	x	2.25	x	94.68	x	0.5	x	0.9	=	172.55	(76)
East	0.9x	1	x	2.25	x	94.68	X	0.5	x	0.9	=	86.27	(76)
East	0.9x	1	x	1.3	x	73.59	x	0.5	x	0.9	=	77.49	(76)
East	0.9x	1	х	1.3	x	73.59	х	0.5	x	0.9] =	77.49	(76)
East	0.9x	1	x	2.25	x	73.59	х	0.5	x	0.9] =	134.12	(76)
East	0.9x	1	x	2.25	x	73.59	x	0.5	x	0.9] =	67.06	(76)
East	0.9x	1	x	1.3	x	45.59	x	0.5	x	0.9] =	48.01	(76)
East	0.9x	1	x	1.3	x	45.59	x	0.5	x	0.9] =	48.01	(76)
East	0.9x	1	x	2.25	x	45.59	x	0.5	x	0.9] =	83.09	(76)
East	0.9x	1	x	2.25	x	45.59	x	0.5	x	0.9] =	41.54	(76)
East	0.9x	1	x	1.3	x	24.49	х	0.5	x	0.9	=	25.79	(76)

East	о о . Г					–			1						7(70)
	0.9x	1		X	1.3	_ X		4.49] X]	0.5	×	0.9	_ =	25.79	(76)
East	0.9x	1		X	2.25	■ ×	-	24.49] X]	0.5	×	0.9	╡ "	44.63	(76)
East	0.9x	1		X	2.25	→ ×		24.49] X]	0.5	_ ×	0.9	╡ -	22.32	(76)
East	0.9x	1		X	1.3	X		6.15	X	0.5	×	0.9	=	17.01	(76)
East	0.9x	1		X	1.3	X		6.15	X	0.5	X	0.9	=	17.01	(76)
East	0.9x	1		X	2.25	X		6.15	X	0.5	X	0.9	=	29.44	(76)
East	0.9x	1		X	2.25	X		6.15	X	0.5	X	0.9	=	14.72	(76)
South	0.9x	1		X	1.3	X		6.75	X	0.5	X	0.9	=	24.61	(78)
South	0.9x	1		X	2.25	X		6.75	X	0.5	X	0.9	=	42.6	(78)
South	0.9x	1		X	1.3	X	7	6.57	X	0.5	X	0.9	=	40.31	(78)
South	0.9x	1		X	2.25	X	7	6.57	X	0.5	X	0.9	=	69.77	(78)
South	0.9x	1		X	1.3	X	9	7.53	X	0.5	X	0.9	=	51.35	(78)
South	0.9x	1		x	2.25	X	9	7.53	X	0.5	X	0.9	=	88.88	(78)
South	0.9x	1		x	1.3	X	1	10.23	x	0.5	X	0.9	=	58.04	(78)
South	0.9x	1		x	2.25	X	1	10.23	X	0.5	X	0.9	=	100.45	(78)
South	0.9x	1		x	1.3	x	1	14.87	x	0.5	x	0.9	=	60.48	(78)
South	0.9x	1		x	2.25	×	1	14.87	х	0.5	x	0.9		104.68	(78)
South	0.9x	1		x	1.3	X	1	10.55	Х	0.5	Х	0.9		58.2	(78)
South	0.9x	1		x	2.25	X	1	10.55	x	0.5	Х	0.9	=	100.74	(78)
South	0.9x	1		x	1.3	x	1	08.01	j x	0.5	Х	0.9	=	56.87	(78)
South	0.9x	1		x	2.25	= x	1	08.01	x	0.5	Х	0.9	=	98.43	(78)
South	0.9x	1		x	1.3	x	1	04.89	Х	0.5	X	0.9		55.23	(78)
South	0.9x	1		x	2.25	= x	1	04.89	Х	0.5	Х	0.9	=	95.59	(78)
South	0.9x	1		x	1.3	x	1	01.89	X	0.5	X	0.9	-	53.64	(78)
South	0.9x	1		x	2.25	×	1	01.89	x	0.5	X	0.9		92.84	(78)
South	0.9x	1		X	1.3	X		2.59	x	0.5	X	0.9	-	43.48	(78)
South	0.9x	1		x	2.25	X	-	2.59	X	0.5	X	0.9	=	75.26	(78)
South	0.9x	1		x	1.3	٦ ×	—	55.42	X	0.5	X	0.9	=	29.18	(78)
South	0.9x	1		x	2.25	= x	-	55.42	X	0.5	X	0.9	=	50.5	(78)
South	0.9x	1		x	1.3	= x		40.4) x	0.5	X	0.9	=	21.27	(78)
South	0.9x	1		x	2.25	x	_	40.4)]	0.5	= x	0.9	= =	36.81	(78)
	L								J						` ′
Solar ga	ains in	watts, ca	alcula	ited	for each mo	nth			(83)m	ı = Sum(74)m	(82)m				
—	162.27	296.03	446.4	$\overline{}$	605.1 712		719.24	688.72	609	.02 502.64	339.3	8 198.2	136.25]	(83)
Total ga	ins – ii	nternal a	and so	olar	(84)m = (73))m +	(83)m	, watts		•		•	•	•	
(84)m=	752.63	882.27	1012	.12	1138.78 1213	3.41 1	190.68	1142.83	1071	.06 982.98	851.9	1 746.59	711.79		(84)
7. Mea	ın inter	nal temp	peratu	ıre (heating sea	son)							-		
				•	eriods in the		area	from Tal	ole 9	Th1 (°C)				21	(85)
Utilisat	ion fac	tor for g	ains f	or li	ving area, h	1,m (s	see Ta	ble 9a)		, ,					
Γ	Jan	Feb	Ma	-		ay T	Jun	Jul	Α	ug Sep	Oct	Nov	Dec]	
(86)m=	0.91	0.87	0.8	$\boldsymbol{ o}$	0.7 0.5	- 	0.42	0.31	0.3		0.75	0.87	0.92	1	(86)
L Mean i	nterna	l temper	ature	in li	ving area T	1 (follo	OW Sto	ns 3 to 7	7 in T	able 9c)	•		•	4	
(87)m=	19.01	19.35	19.8		20.37 20.		20.92	20.97	20.	i	20.37	19.65	19.01]	(87)
` ′ _				L										1	

_							_							
Temp (88)m=	erature 19.91	during h	neating p	eriods ir	19.97	dwelling 20.02	from Ta	ble 9, T	h2 (°C) 20	19.97	19.96	19.94		(88)
` '		!	<u>!</u>	<u>!</u>	!	<u>!</u>	<u> </u>	<u> </u>	20	19.97	19.90	19.94		(00)
			ains for	i		· `	i		0.40	0.74	0.05	0.04	1	(89)
(89)m=	0.9	0.86	0.79	0.67	0.52	0.36	0.24	0.27	0.46	0.71	0.85	0.91		(69)
		· ·	ature in	i		- ` `	ì	i 		 			ĺ	
(90)m=	17.31	17.79	18.46	19.23	19.67	19.94	20	20	19.85	19.25	18.25	17.33		(90)
									T	'LA = Livin	ig area ÷ (4	4) =	0.39	(91)
Mean	interna	l temper	ature (fo	r the wh	ole dwe	lling) = f	LA × T1	+ (1 – fL	A) × T2				•	
(92)m=	17.97	18.4	18.99	19.67	20.08	20.32	20.38	20.38	20.23	19.68	18.79	17.98		(92)
		i	he mear	i —		1	·			opriate			1	
(93)m=	17.97	18.4	18.99	19.67	20.08	20.32	20.38	20.38	20.23	19.68	18.79	17.98		(93)
			uirement											
			ternal ter or gains	•		ned at st	ep 11 of	Table 9	o, so tha	t Ti,m=(76)m an	d re-calc	ulate	
ine at	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Utilisa			ains, hm	<u> </u>	iviay	<u> </u>	l oui	7 tug	ОСР		1101	DCO	I	
(94)m=	0.87	0.83	0.76	0.65	0.53	0.38	0.27	0.3	0.48	0.7	0.83	0.88		(94)
Us <mark>e</mark> fu	ıl gains,	hmGm	, W = (9	4)m x (8	4)m									
(95)m=	656.53	731.27	771.27	745.69	640.23	452.22	307.91	319.16	471.31	594.76	618.92	628.44		(95)
Month	nly avera	age exte	ernal tem	perature	from T	able 8								
(96)m=	4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2		(96)
Heat l	l <mark>os</mark> s rate	e for me	<mark>an i</mark> ntern	al tempe	erature,	Lm , W :	=[(39)m :	x [(93)m	– (96)m]				
(97)m=	12 <mark>77.99</mark>	1251.5	1147.93	948.46	731.19	477	314.9	328.34	520.71	792.48	1038.37	1245.45		(97)
Space	e heatin	g requir	ement fo	r each n	nonth, k	Wh/mon	th = 0.02	24 x [(97)m – (95)m] x (4	<mark>1</mark>)m	· · · · · · · · · · · · · · · · · · ·		
(98)m=	462.37	349.59	280.24	145.99	67.67	0	0	0	0	147.1	302.01	459.06		
								Tota	l per year	(kWh/yeaı	r) = Sum(9	8) _{15,912} =	2214.03	(98)
Space	e heatin	g requir	ement in	kWh/m²	² /year								28.75	(99)
9a. En	ergy red	quiremer	nts – Ind	ividual h	eating s	ystems i	ncluding	micro-C	CHP)					
Space	e heatir	ng:												
Fracti	on of sp	ace hea	at from s	econdar	y/supple	ementary	system						0	(201)
Fracti	on of sp	ace hea	at from m	nain syst	em(s)			(202) = 1	- (201) =				1	(202)
Fracti	on of to	tal heati	ng from	main sys	stem 1			(204) = (2	02) x [1 –	(203)] =			1	(204)
Efficie	ency of i	main spa	ace heat	ing syste	em 1								90.5	(206)
Efficie	ency of	seconda	ry/suppl	ementar	y heatin	g systen	ո, %						0	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/y	— ear
Space			ement (c		<u> </u>		l oui	7 tug	ОСР	000	1101	Dec	, (VVIII) y	cui
	462.37	349.59	280.24	145.99	67.67	0	0	0	0	147.1	302.01	459.06		
(211)m	 \ = {[(98)m x (20)4)] } x 1	00 ÷ (20)6)		<u>!</u>	l	<u> </u>	l	<u>!</u>		ı	(211)
(= : : /:::	510.91	386.29	309.65	161.32	74.77	0	0	0	0	162.54	333.71	507.24		()
		<u> </u>	!				ļ	Tota	l (kWh/yea	ar) =Sum(2	1 211) _{15,1012}	<u> </u>	2446.44	(211)
Space	e heatin	a fuel (s	econdar	v). kWh/	month									
		•	00 ÷ (20	• •										
(215)m=		0	0	0	0	0	0	0	0	0	0	0		
!		•	-	•	•	-		Tota	l (kWh/yea	ar) =Sum(2	215) _{15,1012}	- F	0	(215)
												ı		_

Water heating										
Output from water heater (calculated		440.0	14445	454.74	454.00	170.04	100.00	105.70	1	
200.46 176.8 185.94 167. Efficiency of water heater	05 163.98	146.9	141.45	154.71	154.28	173.21	182.69	195.76	70.0	(216)
(217)m= 86.97 86.6 85.91 84.4	6 82.65	79.8	79.8	79.8	79.8	84.38	86.15	87.01	79.8	(217)
Fuel for water heating, kWh/month	0 02.00	75.0	7 3.0	7 3.0	7 3.0	04.50	00.13	07.01	J	(211)
(219) m = (64) m x $100 \div (217)$ m			1		T		1	1	٦	
(219)m= 230.48 204.16 216.45 197	8 198.39	184.09	177.25	193.87	193.33	205.27	212.06	224.98		7
Annual totals				rota	I = Sum(2	112	14/1- <i>h</i>	_	2438.13	(219)
Annual totals Space heating fuel used, main systems	em 1					K	Wh/yeaı		kWh/year 2446.44]
Water heating fuel used									2438.13	1
Electricity for pumps, fans and elect	ric keep-ho	t								_
mechanical ventilation - balanced,	extract or p	ositive i	nput fron	n outside	Э			176.76]	(230a)
central heating pump:								30	j	(230c)
Total electricity for the above, kWh/y	/ear			sum	of (230a).	(230g) =			206.76	(231)
Electricity for lighting									335.44	(232)
10a. Fuel costs - individual heating	systems:									
		Fu kW	el /h/year			Fuel P (Table			Fuel Cost £/year	
		(2.1						v 0.01		_
Space heating - main system 1		(21	1) x			3.4	18	$\times 0.01 =$	85.14	(240)
		(21)				3.4		x 0.01 = x 0.01 =		_
Space heating - main system 1 Space heating - main system 2 Space heating - secondary		(21:							0 0](240)](241)](242)
Space heating - main system 2		(21:	3) x 5) x			O	19	x 0.01 =	0	(241)
Space heating - main system 2 Space heating - secondary		(21)	3) x 5) x			13.	19	x 0.01 = x 0.01 =	0	(241)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel)	to (230g) se	(21) (21) (21) (23)	3) x 5) x 9) 1) y as app	licable a	nd apply	13. 3.4	19 18 19 ce accor	x 0.01 = x 0.01 = x 0.01 = x 0.01 =	0 0 84.85 27.27	(241) (242) (247)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel) Pumps, fans and electric keep-hot (if off-peak tariff, list each of (230a)		(21) (21) (21) (23) (23)	3) x 5) x 9) 1) y as app	licable a	nd apply	13. 3.4 13.	19 18 19 ce accor	x 0.01 = $x 0.01 =$ $x 0.01 =$ $x 0.01 =$ $x 0.01 =$	0 0 84.85 27.27 Table 12a	(241) (242) (247) (249)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel) Pumps, fans and electric keep-hot (if off-peak tariff, list each of (230a) Energy for lighting Additional standing charges (Table	12)	(21) (21) (23) (23) (23)	3) x 5) x 9) 11) y as app 2)	licable a	nd apply	13. 3.4 13.	19 18 19 ce accor	x 0.01 = $x 0.01 =$ $x 0.01 =$ $x 0.01 =$ $x 0.01 =$	0 84.85 27.27 Table 12a 44.24	(241) (242) (247) (247) (249) (250)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel) Pumps, fans and electric keep-hot (if off-peak tariff, list each of (230a) Energy for lighting	12)) and (254)	(213 (214 (233 (233) (233) (233)	3) x 5) x 9) 11) y as app 2)		nd apply	13. 3.4 13.	19 18 19 ce accor	x 0.01 = $x 0.01 =$ $x 0.01 =$ $x 0.01 =$ $x 0.01 =$	0 84.85 27.27 Table 12a 44.24	(241) (242) (247) (247) (249) (250)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel) Pumps, fans and electric keep-hot (if off-peak tariff, list each of (230a) Energy for lighting Additional standing charges (Table Appendix Q items: repeat lines (253)	12)) and (254) (245)((213 (214 (233 (233) (233) (233)	3) x 5) x 9) 11) y as app 2)		nd apply	13. 3.4 13.	19 18 19 ce accor	x 0.01 = $x 0.01 =$ $x 0.01 =$ $x 0.01 =$ $x 0.01 =$	0 84.85 27.27 Table 12a 44.24	(241) (242) (247) (249) (250) (251)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel) Pumps, fans and electric keep-hot (if off-peak tariff, list each of (230a) Energy for lighting Additional standing charges (Table Appendix Q items: repeat lines (253) Total energy cost	12)) and (254) (245)((213 (214 (233 (233) (233) (233)	3) x 5) x 9) 11) y as app 2)		nd apply	13. 3.4 13.	19 18 19 ce accor	x 0.01 = $x 0.01 =$ $x 0.01 =$ $x 0.01 =$ $x 0.01 =$	0 84.85 27.27 Table 12a 44.24	(241) (242) (247) (249) (250) (251)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel) Pumps, fans and electric keep-hot (if off-peak tariff, list each of (230a) Energy for lighting Additional standing charges (Table Appendix Q items: repeat lines (253) Total energy cost 11a. SAP rating - individual heating	12)) and (254) (245)(g systems	(213 (219 (233 (233) (234) (234) (234)	3) x 5) x 9) 11) y as app 2)	=	nd apply	13. 3.4 13.	19 18 19 ce accor	x 0.01 = $x 0.01 =$ $x 0.01 =$ $x 0.01 =$ $x 0.01 =$	0 84.85 27.27 Table 12a 44.24 120	(241) (242) (247) (249) (250) (251) (255)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel) Pumps, fans and electric keep-hot (if off-peak tariff, list each of (230a) Energy for lighting Additional standing charges (Table Appendix Q items: repeat lines (253 Total energy cost 11a. SAP rating - individual heating Energy cost deflator (Table 12)	12)) and (254) (245)(g systems	(213 (219 (233 (233) (234) (234) (234)	3) x 5) x 9) 11) y as app 2) ded 50)(254)	=	nd apply	13. 3.4 13.	19 18 19 ce accor	x 0.01 = $x 0.01 =$ $x 0.01 =$ $x 0.01 =$ $x 0.01 =$	0 84.85 27.27 Table 12a 44.24 120	(241) (242) (247) (249) (250) (251) (255)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel) Pumps, fans and electric keep-hot (if off-peak tariff, list each of (230a) Energy for lighting Additional standing charges (Table Appendix Q items: repeat lines (253) Total energy cost 11a. SAP rating - individual heating Energy cost deflator (Table 12) Energy cost factor (ECF)	12)) and (254) (245)() systems [(255) x	(213 (214) (233) (233) eparately (233) as need (247) + (25) (256)] ÷ [0	3) x 5) x 9) 11) y as app 2) ded 50)(254)	=		13. 3.4 13.	19 18 19 ce accor	x 0.01 = $x 0.01 =$ $x 0.01 =$ $x 0.01 =$ $x 0.01 =$	0 84.85 27.27 Table 12a 44.24 120 361.5	(241) (242) (247) (249) (250) (251) (255) (256) (257)
Space heating - main system 2 Space heating - secondary Water heating cost (other fuel) Pumps, fans and electric keep-hot (if off-peak tariff, list each of (230a) Energy for lighting Additional standing charges (Table Appendix Q items: repeat lines (253) Total energy cost 11a. SAP rating - individual heating Energy cost deflator (Table 12) Energy cost factor (ECF) SAP rating (Section 12)	12)) and (254) (245)() systems [(255) x	(213) (214) (215) (223) (223) (223) (2247) + (25) (256)] ÷ [((256)]]	3) x 5) x 9) 11) y as app 2) ded 50)(254)	=		13. 3.4 13. / fuel pri 13.	19 18 19 ce according	x 0.01 = x 0.01 = x 0.01 = x 0.01 = rding to x 0.01 =	0 84.85 27.27 Table 12a 44.24 120 361.5	(241) (242) (247) (249) (250) (251) (255) (256) (257) (258)

(215) x	0.519	=	0	(263)
(219) x	0.216	=	526.64	(264)
(261) + (262) + (263) + (264) =			1055.07	(265)
(231) x	0.519	=	107.31	(267)
(232) x	0.519	=	174.09	(268)
sum	of (265)(271) =		1336.47	(272)
(272	2) ÷ (4) =		17.36	(273)
			85	(274)
	(219) x (261) + (262) + (263) + (264) = (231) x (232) x	(219) x	(219) x 0.216 = $(261) + (262) + (263) + (264) = $ $(231) x 0.519 = $ $(232) x 0.519 = $ $sum of (265)(271) =$	$(219) \times 0.216 = 526.64$ $(261) + (262) + (263) + (264) = 1055.07$ $(231) \times 0.519 = 107.31$ $(232) \times 0.519 = 174.09$ $\text{sum of } (265)(271) = 1336.47$ $(272) \div (4) = 17.36$

13a.	Primary	/ Energy

13a. Primary Energy			
	Energy kWh/year	Primary factor	P. Energy kWh/year
Space heating (main system 1)	(211) x	1.22	2984.65 (261)
Space heating (secondary)	(215) x	3.07	0 (263)
Energy for water heating	(219) x	1.22	2974.52 (264)
Space and water heating	(261) + (262) + (263) + (264) =		5959.17 (265)
Electricity for pumps, fans and electric keep-hot	(231) x	3.07 =	634.75 (267)
Electricity for lighting	(232) x	0 =	1029.81 (268)
'Total Primary Energy	sum	of (265)(271) =	7623.73 (272)
Primary energy kWh/m²/year	(272)) ÷ (4) =	99.01 (273)

User Details:	
Assessor Name: Stroma Number: Software Name: Stroma FSAP 2012 Software Version: Version	on: 1.0.4.18
Property Address: GF03	71. 1.0.4.10
Address: 39, Fitzjohns Avenue, LONDON, NW3 5JY	
1. Overall dwelling dimensions:	
Area(m²) Av. Height(m)	Volume(m³)
Ground floor	387.2 (3a)
Total floor area TFA = $(1a)+(1b)+(1c)+(1d)+(1e)+(1n)$ [121] (4)	
Dwelling volume $(3a)+(3b)+(3c)+(3d)+(3e)+(3n) =$	387.2 (5)
2. Ventilation rate: main secondary other total heating heating	m³ per hour
Number of chimneys $0 + 0 = 0 \times 40 =$	0 (6a)
Number of open flues $0 + 0 + 0 = 0 \times 20 =$	0 (6b)
Number of intermittent fans 0 × 10 =	0 (7a)
Number of passive vents 0 x 10 =	0 (7b)
Number of flueless gas fires 0 x 40 =	0 (7c)
Air ch	nanges <mark>per</mark> hour
Infiltration due to chimneys, flues and fans = $(6a)+(6b)+(7a)+(7b)+(7c) = 0$ $\div (5) = 0$	0 (8)
If a pressurisation test has been carried out or is intended, proceed to (17), otherwise continue from (9) to (16)	
Number of storeys in the dwelling (ns)	1 (9)
Additional infiltration [(9)-1]x0.1 =	0 (10)
Structural infiltration: 0.25 for steel or timber frame or 0.35 for masonry construction if both types of wall are present, use the value corresponding to the greater wall area (after	0.35 (11)
deducting areas of openings); if equal user 0.35	
If suspended wooden floor, enter 0.2 (unsealed) or 0.1 (sealed), else enter 0	0 (12)
If no draught lobby, enter 0.05, else enter 0	0.05 (13)
Percentage of windows and doors draught stripped	100 (14)
Window infiltration $0.25 - [0.2 \times (14) \div 100] =$	0.05 (15)
Infiltration rate $(8) + (10) + (11) + (12) + (13) + (15) =$	0.45 (16)
Air permeability value, q50, expressed in cubic metres per hour per square metre of envelope area	0 (17)
If based on air permeability value, then $(18) = [(17) \div 20] + (8)$, otherwise $(18) = (16)$ Air permeability value applies if a pressurisation test has been done or a degree air permeability is being used	0.45 (18)
Number of sides sheltered	2 (19)
Shelter factor $(20) = 1 - [0.075 \times (19)] =$	0.85 (20)
Infiltration rate incorporating shelter factor (21) = (18) x (20) =	0.38 (21)
Infiltration rate modified for monthly wind speed	
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	
Monthly average wind speed from Table 7	
(22)m= 5.1 5 4.9 4.4 4.3 3.8 3.8 3.7 4 4.3 4.5 4.7	
Wind Factor (22a)m = (22)m ÷ 4	
(22a)m= 1.27 1.25 1.23 1.1 1.08 0.95 0.95 0.92 1 1.08 1.12 1.18	

Adjusted infiltr	ration rat	e (allowi	ng for sh	nelter an	d wind s	peed) =	(21a) x	(22a)m					
0.49 Calculate effe	0.48	0.47	0.42 rate for t	0.41 he appli	0.36	0.36	0.35	0.38	0.41	0.43	0.45		
If mechanic		_	ato 101 t	по арри	oabio oa	00						0.5	(23a
If exhaust air h	eat pump	using Appe	endix N, (2	3b) = (23a	a) × Fmv (e	equation (N	N5)) , othe	rwise (23b) = (23a)			0.5	(23b
If balanced wit	h heat reco	overy: effici	ency in %	allowing f	or in-use f	actor (from	Table 4h) =				77.35	(230
a) If balance	ed mech	anical ve	ntilation	with hea	at recove	ery (MVI	HR) (24a	a)m = (22)	2b)m + (23b) × [1 – (23c)	÷ 100]	
(24a)m= 0.6	0.59	0.58	0.53	0.52	0.48	0.48	0.47	0.5	0.52	0.54	0.56		(24a
b) If balance	ed mech	anical ve	ntilation	without	heat rec	overy (N	/IV) (24b	m = (22)	2b)m + (23b)		_	
(24b)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24
c) If whole h				•	•								
<u> </u>		< (23b), t	,	<u> </u>	<u> </u>	· · ·	<u> </u>	ŕ –	<u> </u>	ŕ	1	I	
(24c)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24
d) If natural if (22b)r		on or whe			•				0.5]				
24d)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24
Effective air	change	rate - en	ter (24a) or (24b	o) or (24	c) or (24	d) in box	(25)				_	
25)m= 0.6	0.59	0.58	0.53	0.52	0.48	0.48	0.47	0.5	0.52	0.54	0.56		(25
3. Heat losse	es and he	eat loss r	paramete	er:									
ELEMENT	Gros		Openin		Net Ar	ea	U-val	ue	AXU		k-value)	ΑΧk
	area	(m²)	· m		A ,r	n²	W/m2	:K	(W/I	K)	kJ/m²-l		kJ/K
Win <mark>dows</mark> Type	e 1				2.7	x1,	(1/(1.8)+	0.04] =	4.53				(27
Win <mark>dows</mark> Type	e 2				1.8	x1,	/[1/(1.8)+	0.04] =	3.02				(27
Windows Type	e 3				4.4	X1	/[1/(1.8)+	0.04] =	7.39				(27
Windows Type	e 4				2.16	x1,	/[1/(1.8)+	0.04] =	3.63				(27
Vindows Type	e 5				5.61	x1,	/[1/(1.8)+	0.04] =	9.42				(27
Walls Type1	6		0		6	x	0.25	=	1.5				(29
Nalls Type2	14	<u></u>	2.7		11.3	x	0.25	₹ - i	2.82	T i		7 F	(29
Walls Type3	40.	5	8		32.5	X	0.25		8.12	=		i iii	(29
Walls Type4	22	2	9.93		12.07	, x	0.25	=	3.02	T i		i iii	(29
Fotal area of e	elements	 s, m²			82.5								(31
for windows and	d roof wind	ows, use e			alue calcul	ated using	formula 1	/[(1/U-valu	ıe)+0.04] a	as given in	paragraph	1 3.2	(-
Fabric heat los				o ana pan			(26)(30)) + (32) =				50.11	(33
Heat capacity		•	-,					((28).	(30) + (32	2) + (32a).	(32e) =	11755.3	
hermal mass		` '	? = Cm ÷	- TFA) ir	n kJ/m²K				tive Value		, ,	100	(35
For design assestan be used inste	sments wh	ere the de	tails of the	,			ecisely the				able 1f	100	
Thermal bridg				using Ap	pendix ł	<						12.38	(36
f details of therm Fotal fabric he	al bridging	,			•			(33) +	(36) =				(37
/entilation he		alculated	monthly	,					$= 0.33 \times ($	25)m x (5))	62.48	(37
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	l	
Jan	I i GD	IVIAI	ΑΡΙ	iviay	l Juli	Jui	Aug	l ogb	1 000	1,404		i	

(38)m= 76.79 75.56 74.34	68.23 67.01	60.9	60.9	59.68	63.34	67.01	69.45	71.9		(38)
Heat transfer coefficient, W/K					(39)m	= (37) + (38)m			
(39)m= 139.27 138.05 136.82	130.71 129.49	123.38	123.38	122.16	125.83	129.49	131.94	134.38		_
Heat loss parameter (HLP), W	//m²K					Average = = (39)m ÷	Sum(39) ₁ .	12 /12=	130.41	(39)
(40)m= 1.15 1.14 1.13	1.08 1.07	1.02	1.02	1.01	1.04	1.07	1.09	1.11		
			ļ.	ļ.	,	Average =	Sum(40) ₁	12 /12=	1.08	(40)
Number of days in month (Tab	' ' 	1 .	l				T			
Jan Feb Mar	Apr May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		(41)
(41)m= 31 28 31	30 31	30	31	31	30	31	30	31		(41)
4. Water heating energy requ	viromont:							kWh/yea	or:	
4. Water heating energy requ	mement.							KVVII/yea	al.	
Assumed occupancy, N if TFA > 13.9, N = 1 + 1.76 x	x [1 - exp(-0.000	349 x (TF	FA -13.9)2)] + 0.0	0013 x (TFA -13.		87		(42)
if TFA £ 13.9, N = 1 Annual average hot water usa	ae in litres per d	av Vd av	erage =	(25 x N)	+ 36		10	2.29		(43)
Reduce the annual average hot water	r usage by 5% if the	dwelling is	designed t			se target o		2.29		(40)
not more that 125 litres per person pe		hot and co	ld)							
Jan Feb Mar Hot water usage in litres per day for e	Apr May	Jun	Jul Table 10 x	Aug	Sep	Oct	Nov	Dec		
					100.05	404.04	400.40			
(44)m= 112.52 108.43 104.34	100.25 96.16	92.06	92.06	96.16	100.25	104.34	108.43 m(44) ₁₁₂ =	112.52	1227.52	(44)
Energy content of hot water used - ca	lculated monthly = 4	.190 x Vd,ı	n x nm x E	OTm / 3600					1221.32	(++)
(45)m= 166.87 145.94 150.6	131.3 125.98	108.71	100.74	115.6	116.98	136.33	148.81	161.6		
If instantaneous water heating at poin	at of use (no hot water	or storago)	ontor 0 in	hoves (16		Total = Su	m(45) ₁₁₂ =		1609.48	(45)
	· ·	1	ı		, ,	00.45	00.00	24.04		(46)
(46)m= 25.03 21.89 22.59 Water storage loss:	19.69 18.9	16.31	15.11	17.34	17.55	20.45	22.32	24.24		(46)
Storage volume (litres) includi	ng any solar or V	VWHRS	storage	within sa	ame ves	sel		300		(47)
If community heating and no to	•			. ,						
Otherwise if no stored hot wat	er (this includes	instantar	neous co	mbi boil	ers) ente	er '0' in (47)			
Water storage loss: a) If manufacturer's declared	loss factor is kno	own (kWł	n/dav):				1	69		(48)
Temperature factor from Table		, (, aay / .					54		(49)
Energy lost from water storage				(48) x (49)) =			.91		(50)
b) If manufacturer's declared	cylinder loss fac									, ,
Hot water storage loss factor f		/h/litre/da	ay)					0		(51)
If community heating see sect Volume factor from Table 2a	ion 4.3							0		(52)
Temperature factor from Table	e 2b						—	0		(52)
Energy lost from water storage				(47) x (51)) x (52) x (53) =		0		(54)
Enter (50) or (54) in (55)	, ,				. , (•	_	91		(55)
Water storage loss calculated	for each month			((56)m = (55) × (41)	m				
(56)m= 28.29 25.55 28.29	27.38 28.29	27.38	28.29	28.29	27.38	28.29	27.38	28.29		(56)
If cylinder contains dedicated solar sto	orage, (57)m = (56)n	n x [(50) – (H11)] ÷ (5	0), else (5	7)m = (56)	m where (H11) is fro	m Appendix	Н	
(57)m= 28.29 25.55 28.29	27.38 28.29	27.38	28.29	28.29	27.38	28.29	27.38	28.29		(57)

Primary circuit loss (annual) fr	om Table 3					0			(58)
Primary circuit loss calculated	for each month	(59)m = (58)	÷ 365 × (41)m	_				
(modified by factor from Tal	ole H5 if there is	solar water he	eating and a	a cylinder	thermos	tat)			
(59)m= 23.26 21.01 23.26	22.51 23.26	22.51 23.	26 23.26	22.51	23.26	22.51	23.26		(59)
Combi loss calculated for each	h month (61)m =	(60) ÷ 365 ×	(41)m						
(61)m= 0 0 0	0 0	0 0	0	0	0	0	0		(61)
Total heat required for water h	neating calculated	d for each mo	nth (62)m =	= 0.85 × (4	15)m + (4	46)m + (5	57)m +	(59)m + (61)m	
(62)m= 218.42 192.51 202.15	181.19 177.54	158.6 152	.29 167.15	166.87	187.88	198.7	213.16		(62)
Solar DHW input calculated using Ap	pendix G or Appendix	x H (negative qua	antity) (enter '()' if no solar	contributio	n to water l	heating)		
(add additional lines if FGHRS	and/or WWHRS	applies, see	Appendix (G)					
(63)m= 0 0 0	0 0	0 0	0	0	0	0	0		(63)
Output from water heater						-			
(64)m= 218.42 192.51 202.15	181.19 177.54	158.6 152	.29 167.15	166.87	187.88	198.7	213.16		_
			Out	put from wat	ter heater ((annual) ₁₁₂	2	2216.47	(64)
Heat gains from water heating	, kWh/month 0.2	5 ´ [0.85 × (4	5)m + (61)r	n] + 0.8 x	[(46)m +	- (57)m +	(59)m]	
(65)m= 96.73 85.78 91.32	83.57 83.13	76.06 74.	74 79.68	78.81	86.57	89.39	94.98		(65)
include (57)m in calculation	of (65)m only if	ylinder is in t	he dwelling	or hot wa	iter is fro	m comm	unity h	eating	
5. Internal gains (see Table	5 and 5a):								
Metabolic gains (Table 5), Wa	tts								
Jan Feb Mar	Apr May	Jun J	ıl Aug	Sep	Oct	Nov	Dec		
(66)m= 172.03 172.03 172.03	172.03 172.03	172.03 172	.03 172.03	172.03	172.03	172.03	172.03		(66)
Lighting gains (calculated in A	ppendix L, equat	tion L9 or L9a	ı), also see	Table 5		•	_		
(67)m= 63.86 56.72 46.13	34.92 26.1	22.04 23.	81 30.95	41.54	52.75	61.57	65.63		(67)
Appliances gains (calculated i	n Appendix L, eq	uation L13 or	L13a), also	o see Tab	le 5	•			
(68)m= 427.63 432.06 420.88	397.08 367.03	338.78 319	.91 315.48	326.66	350.46	380.52	408.76		(68)
Cooking gains (calculated in A	Appendix L, equa	tion L15 or L	15a), also s	ee Table 5	5	•			
(69)m= 55.07 55.07 55.07	55.07 55.07	55.07 55.		55.07	55.07	55.07	55.07		(69)
Pumps and fans gains (Table	5a)		•		<u> </u>	•			
(70)m= 3 3 3	3 3	3 3	3	3	3	3	3		(70)
Losses e.g. evaporation (nega	ative values) (Tal	ole 5)	•	•	-	•			
(71)m= -114.68 -114.68 -114.68	-114.68 -114.68	-114.68 -114	.68 -114.68	-114.68	-114.68	-114.68 -	114.68		(71)
Water heating gains (Table 5)	1					<u>'</u>			
(72)m= 130.01 127.65 122.74	116.07 111.74	105.64 100	.45 107.1	109.46	116.36	124.16	127.66		(72)
Total internal gains =		(66)m + (67)m + (68)m	+ (69)m + (7	'0)m + (71))m + (72)m			
(73)m= 736.9 731.84 705.16	663.47 620.28	581.87 559	.59 568.94	593.07	634.99	681.65	717.46		(73)
6. Solar gains:									
Solar gains are calculated using solar	ar flux from Table 6a	and associated	equations to c	onvert to the	applicable	e orientatio	n.		
Orientation: Access Factor	Area	Flux		g_ -	_	FF		Gains	
Table 6d	m²	Table 6	a T	Table 6b	Tal	ble 6c		(W)	
South 0.9x 1	2.7	x 46.75	x	0.5	x	0.9	_ = [51.12	(78)
South 0.9x 1	1.8	x 46.75	x	0.5	x	0.9	= [68.16	(78)

South	0.9x	1	x	4.4	x	46.75	x	0.5	x	0.9	=	83.31	(78)
South	0.9x	1	x	2.7	x	76.57	x	0.5	x	0.9	=	83.73	(78)
South	0.9x	1	x	1.8	x	76.57	x	0.5	x	0.9	=	111.64	(78)
South	0.9x	1	x	4.4	x	76.57	x	0.5	x	0.9	=	136.44	(78)
South	0.9x	1	x	2.7	x	97.53	x	0.5	x	0.9	=	106.65	(78)
South	0.9x	1	x	1.8	x	97.53	x	0.5	x	0.9	=	142.2	(78)
South	0.9x	1	x	4.4	x	97.53	x	0.5	x	0.9	=	173.81	(78)
South	0.9x	1	x	2.7	x	110.23	x	0.5	x	0.9	=	120.54	(78)
South	0.9x	1	X	1.8	X	110.23	x	0.5	X	0.9	=	160.72	(78)
South	0.9x	1	x	4.4	x	110.23	x	0.5	x	0.9	=	196.44	(78)
South	0.9x	1	x	2.7	x	114.87	x	0.5	x	0.9	=	125.61	(78)
South	0.9x	1	X	1.8	X	114.87	x	0.5	X	0.9	=	167.48	(78)
South	0.9x	1	x	4.4	x	114.87	x	0.5	x	0.9	=	204.7	(78)
South	0.9x	1	X	2.7	x	110.55	x	0.5	x	0.9	=	120.88	(78)
South	0.9x	1	x	1.8	x	110.55	x	0.5	x	0.9	=	161.18	(78)
South	0.9x	1	X	4.4	x	110.55	x	0.5	x	0.9	=	197	(78)
South	0.9x	1	x	2.7	x	108.01	x	0.5	x	0.9	=	118.11	(78)
South	0.9x	1	x	1.8	X	108.01	Х	0.5	X	0.9	=	157.48	(78)
South	0.9x	1	x	4.4	х	108.01	x	0.5	x	0.9	=	192.48	(78)
South	0.9x	1	x	2.7	x	104.89	×	0.5	x	0.9	=	114.7	(78)
South	0.9x	1	X	1.8	X	104.89	X	0.5	x	0.9	=	152.94	(78)
South	0.9x	1	x	4.4	x	104.89	Х	0.5	x	0.9	=	186.92	(78)
South	0.9x	1	x	2.7	x	101.89	X	0.5	x	0.9	=	111.41	(78)
South	0.9x	1	X	1.8	х	101.89	X	0.5	x	0.9	=	148.55	(78)
South	0.9x	1	X	4.4	X	101.89	X	0.5	X	0.9	=	181.56	(78)
South	0.9x	1	X	2.7	X	82.59	X	0.5	X	0.9	=	90.31	(78)
South	0.9x	1	X	1.8	x	82.59	X	0.5	X	0.9	=	120.41	(78)
South	0.9x	1	X	4.4	X	82.59	X	0.5	X	0.9	=	147.17	(78)
South	0.9x	1	x	2.7	x	55.42	X	0.5	X	0.9	=	60.6	(78)
South	0.9x	1	x	1.8	x	55.42	X	0.5	X	0.9	=	80.8	(78)
South	0.9x	1	x	4.4	x	55.42	X	0.5	X	0.9	=	98.75	(78)
South	0.9x	1	X	2.7	x	40.4	X	0.5	X	0.9	=	44.18	(78)
South	0.9x	1	x	1.8	x	40.4	X	0.5	X	0.9	=	58.9	(78)
South	0.9x	1	X	4.4	X	40.4	X	0.5	X	0.9	=	71.99	(78)
West	0.9x	1	X	2.16	X	19.64	X	0.5	X	0.9	=	34.36	(80)
West	0.9x	1	x	5.61	x	19.64	x	0.5	x	0.9	=	44.62	(80)
West	0.9x	1	x	2.16	x	38.42	X	0.5	x	0.9	=	67.22	(80)
West	0.9x	1	x	5.61	x	38.42	X	0.5	x	0.9	=	87.29	(80)
West	0.9x	1	x	2.16	x	63.27	x	0.5	X	0.9	=	110.7	(80)
West	0.9x	1	x	5.61	x	63.27	x	0.5	x	0.9	=	143.76	(80)
West	0.9x	1	x	2.16	X	92.28	x	0.5	X	0.9	=	161.45	(80)

West	0.9x	1	X	5.61		x [92.28	X	0.5	X	0.9	=	209.66	(80)
West	0.9x	1	X	2.16		x [113.09	X	0.5	X	0.9	=	197.87	(80)
West	0.9x	1	X	5.61		x [113.09	X	0.5	X	0.9	=	256.95	(80)
West	0.9x	1	X	2.16		x [115.77	X	0.5	X	0.9	=	202.55	(80)
West	0.9x	1	X	5.61		x $lacksquare$	115.77	x	0.5	X	0.9	=	263.04	(80)
West	0.9x	1	x	2.16		x $ar{ar{\Box}}$	110.22	X	0.5	X	0.9		192.84	(80)
West	0.9x	1	X	5.61		× $\overline{ m \Gamma}$	110.22	X	0.5	x	0.9		250.42	(80)
West	0.9x	1	x	2.16		× $ extstyle ext$	94.68	X	0.5	x	0.9		165.64	(80)
West	0.9x	1	X	5.61		x $ar{ar{\Box}}$	94.68	X	0.5	X	0.9		215.11	(80)
West	0.9x	1	X	2.16		x $ar{ar{\ }}$	73.59	X	0.5	x	0.9	=	128.75	(80)
West	0.9x	1	x	5.61		x $ar{ar{ar{ar{ar{ar{ar{ar{ar{ar{$	73.59	X	0.5	X	0.9	=	167.2	(80)
West	0.9x	1	X	2.16		x $lacksquare$	45.59	X	0.5	X	0.9	=	79.76	(80)
West	0.9x	1	x	5.61		x $ar{ar{\ }}$	45.59	X	0.5	X	0.9	=	103.58	(80)
West	0.9x	1	x	2.16		x $ar{ar{ar{ar{ar{ar{ar{ar{ar{ar{$	24.49	X	0.5	X	0.9	=	42.85	(80)
West	0.9x	1	X	5.61		x $ar{ar{\Box}}$	24.49	X	0.5	X	0.9	=	55.64	(80)
West	0.9x	1	x	2.16		x $ar{ar{\ }}$	16.15	X	0.5	X	0.9	=	28.26	(80)
West	0.9x	1	X	5.61		x [16.15	X	0.5	X	0.9	=	36.7	(80)
Solar (gains in wa	tts, calcul	ated	for each	month			(83)m	n = Sum(74)m	(82)m				
(83)m=			'.13		952.61	944		835	.31 737.47	541.23	338.64	240.02		(83)
Total g	gains – inte	rnal and s	solar	(84)m = ((73)m +	- (83)m , watts			_				
(84)m=	1018.49 12	18.16 138	2.28	1512.29 1	1572.89	1526	5.52 1470.92	1404	1.25 1330.54	1176.2	1 1020.29	957.48		(84)
7. Me	an internal	temperat	ure (heating s	eason)									
Temp	erature du	ring heati	ng pe	<mark>eriod</mark> s in t	the livin	ig ar	ea f <mark>rom T</mark> a	ble 9	, Th1 (°C)				21	(85)
Utilis	ation factor	for gains	for li	ving area	ı, h1,m	(see	Table 9a)					_		
	Jan	Feb M	1ar	Apr	May	Jı	ın Jul	A	ug Sep	Oct	Nov	Dec		
(86)m=	0.93	0.89	34	0.75	0.63	0.4	7 0.35	0.3	0.57	0.78	0.9	0.94		(86)
Mear	n internal te	mperatur	e in li	iving area	a T1 (fo	llow	steps 3 to	7 in T	able 9c)					
(87)m=	18.97	9.32 19.	.78	20.32	20.67	20	9 20.97	20.	96 20.82	20.35	19.61	18.97		(87)
Temp	erature du	ring heati	ng pe	eriods in i	rest of o	dwe	ling from Ta	able 9	9, Th2 (°C)			-		
(88)m=		9.97 19.		- 1	20.03	20.		20.	<u> </u>	20.03	20.01	19.99		(88)
l Itilis:	ation factor	for gains	for r	est of dw	ellina h	12 m	(see Table	9a)	!	1			ı	
(89)m=	The state of the s	0.88 0.8	$\overline{}$	0.72	0.58	0.4	<u> </u>	0.3	31 0.51	0.75	0.88	0.93		(89)
				ho root of	الميدة			222	to 7 in Tob	اه ۵۵٪		l	l	
		7.78 18.		-	19.67	19. 19.	'	20.	to 7 in Tab	19.26	18.23	17.29		(90)
(90)m=	1 17 27 1 1		.⊤∪ I	10.2	10.07	10.	20.00	1 20.	!	ļ	ring area ÷ (ļ	0.29	(91)
(90)m=	17.27 1	7.70									`	<i>'</i>	0.23	(0.)
Mear	internal te	mperature						- `	– fLA) × T2	1	140.04	47.70		(02)
Mear (92)m=	internal te	mperature	.82	19.52	19.96	20.	25 20.32	20.	32 20.16	19.58		17.78		(92)
Mear (92)m= Apply	internal te	mperature 8.24 18. at to the m	.82 nean	19.52 internal t	19.96 empera	20.	25 20.32 from Table	20. e 4e ,	32 20.16 where appr	19.58	!	!		, ,
Mear (92)m= Apply (93)m=	n internal te 17.77 1: v adjustmen 17.77 1:	mperature 8.24 18. at to the m 8.24 18.	.82 nean .82	19.52 internal t	19.96	20.	25 20.32 from Table	20.	32 20.16 where appr	19.58	!	17.78		(92)
Mear (92)m= Apply (93)m= 8. Sp	n internal te 17.77 16 display adjustmen 17.77 16 ace heating	mperature 8.24 18. 1 to the m 8.24 18.	.82 nean .82 nent	19.52 internal t 19.52	19.96 empera 19.96	20. ature 20.	25 20.32 from Table 25 20.32	20. 20. 20.	32 20.16 where appr	19.58 copriate 19.58	18.64	17.78	culate	, ,

Sep

Aug

Oct

Nov

Dec

Apr

Mar

May

Jun

Jul

the utilisation factor for gains using Table 9a

Feb

l Itilisat	tion facto	or for a:	ains, hm	ı .										
(94)m=	0.9	0.85	0.79	0.7	0.58	0.43	0.3	0.33	0.51	0.73	0.85	0.91		(94)
· · · L	gains, h	nmGm ,	W = (94	1)m x (84	4)m				!	<u> </u>	<u>!</u>	<u> </u>		
_			1095.72	1057	913.32	653.06	446.51	463.15	683.56	855.94	872.32	867.62		(95)
Monthl	ly avera	ge exte	rnal tem	perature	from Ta	able 8			ļ.	ļ.				
(96)m=	4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2		(96)
Heat Ic	oss rate	for mea	an intern	al tempe	erature,	Lm , W =	=[(39)m :	x [(93)m	– (96)m]		•	ı	
(97)m=	1876.1	1840.85	1686.24	1388.82	1070.08	696.88	458.49	478.29	762.33	1162.75	1522.45	1825.4		(97)
· · -	Ť					r	r	24 x [(97)	``	í - `	ŕ		1	
(98)m=	717.16	539.26	439.35	238.91	116.63	0	0	0	0	228.27	468.09	712.59		_
								Tota	l per year	(kWh/yeaı	r) = Sum(9	8) _{15,912} =	3460.25	(98)
Space	heating	require	ement in	kWh/m²	?/year								28.6	(99)
9a. Ene	rgy requ	uiremen	ıts – Indi	vidual h	eating sy	ystems i	ncluding	micro-C	CHP)					
•	heating	_										i		_
Fractio	n of spa	ace hea	t from se	econdar	y/supple	mentary	system						0	(201)
Fractio	n of spa	ace hea	t from m	nain syst	em(s)			(202) = 1 -	- (201) =				1	(202)
Fractio	n of tota	al heatir	ng from	main sys	stem 1			(204) = (2	02) x [1 –	(203)] =			1	(204)
Efficier	ncy of m	ain spa	ce heat	ing syste	em 1								90.5	(206)
Efficier	ncy of se	econda	ry/supple	ementar	y heat <mark>in</mark> g	g system	າ, %						0	(208)
Г	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/yea	- ar
Space	heating	require	ement (c	alculate	d above))								
	7 17.16	539.26	439.35	238.91	116.63	0	0	0	0	228.27	468.09	712.59		
(211 <mark>)m</mark>	= {[(98)r	m x (20	4)] } x 1	00 ÷ (20)6)									(211)
	792.44	595.87	485.47	263.99	128.87	0	0	0	0	252.23	517.22	787.39		_
								Tota	ıl (kWh/yea	ar) =Sum(2	211),15,1012	F	3823.48	(211)
•	_	•		y), kWh/	month									
= {[(98)r														
(215)m=	0	0	0	0	0	0	0	0 Tota	0 II (kWh/yea	0 or) =Sum('	0	0		7(045)
147-41								Tota	ii (KVVII/yea	ai) =50iii(2	213) _{15,1012}	F	0	(215)
Water h	_	tor hoa	tor (calc	ulated al	hove)									
-		192.51	202.15	181.19	177.54	158.6	152.29	167.15	166.87	187.88	198.7	213.16		
Efficiend	cy of wa	ter hea	ter			<u> </u>	l	<u>!</u>	!	<u>!</u>	!	<u> </u>	79.8	(216)
(217)m=	87.75	87.42	86.83	85.55	83.72	79.8	79.8	79.8	79.8	85.33	87.02	87.79		(217)
Fuel for	water h	eating,	kWh/mo	onth					ı	ı	ı		l	
` ' -			÷ (217)				<u> </u>						l	
(219)m=	248.9	220.22	232.81	211.79	212.05	198.75	190.84	209.46	209.11	220.17	228.34	242.8		7
.	4-4							ıota	II = Sum(2		A/II. /		2625.25	(219)
Annual Space h		اروا بروم	d main	system	1					K	Wh/year	· 	kWh/year 3823.48	
	•			5,5(5)11										_
Water h	_												2625.25	
Electrici	ity for pu	umps, fa	ans and	electric	keep-ho	t								

			_
mechanical ventilation - balanced, extract or pos	itive input from outside	330.6	(230a)
central heating pump:		30	(230c)
Total electricity for the above, kWh/year	sum of (230	0a)(230g) =	360.67 (231)
Electricity for lighting			451.09 (232)
10a. Fuel costs - individual heating systems:			
	Fuel kWh/year	Fuel Price (Table 12)	Fuel Cost £/year
Space heating - main system 1	(211) x	3.48 x 0.01 =	133.06 (240)
Space heating - main system 2	(213) x	0 x 0.01 =	0 (241)
Space heating - secondary	(215) x	13.19 x 0.01 =	0 (242)
Water heating cost (other fuel)	(219)	3.48 x 0.01 =	91.36 (247)
Pumps, fans and electric keep-hot	(231)	13.19 x 0.01 =	47.57 (249)
(if off-peak tariff, list each of (230a) to (230g) sepa Energy for lighting	arately as applicable and ap	pply fuel price according to	
Additional standing charges (Table 12)			120 (251)
11a. SAP rating - individual heating systems Energy cost deflator (Table 12) Energy cost factor (ECF) SAP rating (Section 12)	7) + (250)(254) = 56)] ÷ [(4) + 45.0] =		0.42 (256) 1.14 (257) 84.06 (258)
12a. CO2 emissions – Individual heating system	s including micro-CHP		
	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating (main system 1)	(211) x	0.216 =	825.87 (261)
Space heating (secondary)	(215) x	0.519	0 (263)
Water heating	(219) x	0.216	567.05 (264)
Space and water heating	(261) + (262) + (263) + (264) =		1392.93 (265)
Electricity for pumps, fans and electric keep-hot	(231) x	0.519 =	187.19 (267)
Electricity for lighting	(232) x	0.519 =	234.12 (268)
Total CO2, kg/year	Su	m of (265)(271) =	1814.23 (272)
CO2 emissions per m ²	(27	72) ÷ (4) =	14.99 (273)
El rating (section 14)			85 (274)
13a. Primary Energy			
	Energy kWh/year	Primary factor	P. Energy kWh/year
Space heating (main system 1)	(211) x	1.22	4664.65 (261)

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Space heating (secondary)	(215) x	3.07	=	0	(263)
Energy for water heating	(219) x	1.22	=	3202.81	(264)
Space and water heating	(261) + (262) + (263) + (264	4) =		7867.46	(265)
Electricity for pumps, fans and electric keep-hot	(231) x	3.07	=	1107.25	(267)
Electricity for lighting	(232) x	0	=	1384.84	(268)
'Total Primary Energy		sum of (265)(271) =		10359.55	(272)
Primary energy kWh/m²/year		(272) ÷ (4) =		85.62	(273)

		User D	etails:						
Assessor Name: Software Name: Stroma FSA	AP 2012		Stroma Softwa	-			Versio	on: 1.0.4.18	
Sustrial States			Address:		0.011.		7 0 10 10		
Address: 39, Fitzjohns	s Avenue, LOND								
1. Overall dwelling dimensions:									
		Area	a(m²)		Av. He	ight(m)		Volume(m ³	3)
Ground floor			72	(1a) x	3	3.2	(2a) =	230.4	(3a)
Total floor area TFA = $(1a)+(1b)+(1c)+($	1d)+(1e)+(1n)	72	(4)					_
Dwelling volume				(3a)+(3b)	+(3c)+(3d	l)+(3e)+	.(3n) =	230.4	(5)
2. Ventilation rate: main heating	secondary heating	y	other		total			m³ per hou	ır
Number of chimneys 0	+ 0	+	0	=	0	X 4	40 =	0	(6a)
Number of open flues 0	+ 0	Ī + Ē	0	j = F	0	x 2	20 =	0	(6b)
Number of intermittent fans		_		, <u> </u>	0	x -	10 =	0	(7a)
Number of passive vents				Ī	0	x ′	10 =	0	(7b)
Number of flueless gas fires				Ī	0	X 4	40 =	0	(7c)
				_			Air ch	nanges per ho	our
Infiltration due to chimneys, flues and fa					0		÷ (5) =	0	(8)
If a pressurisation test has been carried out or		d to (17), o	otherwise o	ontinue fr	om (9) to ((16)	ı		_
Number of storeys in the dwelling (ns Additional infiltration)					[(Q).	-1]x0.1 =	0	(9) (10)
Structural infiltration: 0.25 for steel or	timber frame or	0.35 for	masonr	v constr	uction	[(0)	1]XU.1 =	0.35	(11)
if both types of wall are present, use the val deducting areas of openings); if equal user	ue corresponding to							0.30	()
If suspended wooden floor, enter 0.2		1 (seale	d), else	enter 0				0	(12)
If no draught lobby, enter 0.05, else e	enter 0							0.05	(13)
Percentage of windows and doors dra	aught stripped							100	(14)
Window infiltration			0.25 - [0.2	x (14) ÷ 1	00] =			0.05	(15)
Infiltration rate			(8) + (10)	+ (11) + (1	2) + (13) -	+ (15) =		0.45	(16)
Air permeability value, q50, expresse		•	•	•	etre of e	nvelope	area	0	(17)
If based on air permeability value, then								0.45	(18)
Air permeability value applies if a pressurisation Number of sides sheltered	n test has been don	e or a deg	ree air pei	meability	is being us	sed			(19)
Shelter factor			(20) = 1 - [0.075 x (1	9)] =			0.85	(20)
Infiltration rate incorporating shelter fact	tor		(21) = (18)	x (20) =				0.38	(21)
Infiltration rate modified for monthly win								0.00	` ′
Jan Feb Mar Apr	May Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind speed from Table	e 7								
(22)m= 5.1 5 4.9 4.4	4.3 3.8	3.8	3.7	4	4.3	4.5	4.7		
Wind Factor (22a)m = (22)m ÷ 4									
(22a)m= 1.27 1.25 1.23 1.1	1.08 0.95	0.95	0.92	1	1.08	1.12	1.18		

Adjusted infiltra	ation rat	e (allowi	ng for sh	nelter an	d wind s	speed) =	(21a) x	(22a)m				_	
0.49	0.48	0.47	0.42	0.41	0.36	0.36	0.35	0.38	0.41	0.43	0.45		
Calculate effect If mechanica		_	rate for t	he appli	cable ca	se						0.5	(23
If exhaust air he	eat pump i	using Appe	endix N, (2	3b) = (23a	a) × Fmv (e	equation (N	N5)) , othe	wise (23b) = (23a)			0.5	(23
If balanced with	heat reco	overy: effic	iency in %	allowing f	or in-use f	actor (fron	n Table 4h) =				77.35	5 (23
a) If balance	d mech	anical ve	entilation	with he	at recove	ery (MVI	HR) (24a	n)m = (22	2b)m + (23b) × [1	1 – (23c)	÷ 100]	
24a)m= 0.6	0.59	0.58	0.53	0.52	0.48	0.48	0.47	0.5	0.52	0.54	0.56]	(24
b) If balance	d mech	anical ve	entilation	without	heat red	covery (N	ЛV) (24b)m = (22	2b)m + (2	23b)		-	
24b)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24
c) If whole h				•	-				5 × (23b	o)	-		
24c)m= 0	0	0	0	0	0	0	0	0	0	0	0]	(24
d) If natural if (22b)m				•	•				0.5]	!	!		
24d)m= 0	0	0	0	0	0	0	0	0	0	0	0]	(24
Effective air	change	rate - er	nter (24a) or (24b	o) or (24	c) or (24	d) in box	(25)	•	•	•	•	
25)m= 0.6	0.59	0.58	0.53	0.52	0.48	0.48	0.47	0.5	0.52	0.54	0.56		(25
3. Heat losses	c and he	ot loce i	o aramot	or:									_
ELEMENT	Gros area	SS	Openin m	gs	Net Ar A ,r		U-valı W/m2		A X U (W/I	K)	k-value	-	A X k kJ/K
Vin <mark>dows</mark> Type	: 1				1.44	x1.	/[1/(1.8)+	0.04] =	2.42				(27
Vin <mark>dows</mark> Type	2				5.4	x1.	/[1/(1.8)+	0.04] =	9.07	Ħ			(27
Vindows Type	3				1.8	x1.	/[1/(1.8)+	0.04] =	3.02	Ħ			(27
Valls Type1	36	,	5.76		30.24	x	0.25	= [7.56	٦ r		7 6	(29
Valls Type2	30		12.6	_	17.4	x	0.25	<u> </u>	4.35	F i			(29
otal area of e	lements	, m²			66								(3:
for windows and * include the area					alue calcul	ated using	ı formula 1	/[(1/U-valu	ie)+0.04] a	as given in	paragrapl	ı 3.2	·
abric heat los	s, W/K :	= S (A x	U)	,			(26)(30)	+ (32) =				42.74	4 (3:
leat capacity	Cm = S((Axk)						((28)	.(30) + (32	2) + (32a).	(32e) =	7842	2 (3
hermal mass	parame	ter (TMF	c = Cm -	- TFA) ir	n kJ/m²K			Indica	tive Value	: Low		100	(3
or design assess an be used instea				construct	ion are no	t known pr	ecisely the	indicative	values of	TMP in Ta	able 1f		
hermal bridge	es : S (L	x Y) cal	culated (using Ap	pendix l	<						9.9	(3
details of therma		are not kn	own (36) =	= 0.05 x (3	1)								
otal fabric he								` '	(36) =			52.64	4 (3
entilation hea			· ·			_			T -	25)m x (5)		1	
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ļ	
38)m= 45.69	44.96	44.24	40.6	39.87	36.24	36.24	35.51	37.69	39.87	41.33	42.78	J	(3
leat transfer o	oefficier	nt, W/K			,		,	(39)m	= (37) + (3	38)m	1	1	
39)m= 98.33	97.6	96.87	93.24	92.51	88.88	88.88	88.15	90.33	92.51	93.97	95.42		
									Average =	Sum(39) ₁	12 /12=	93.06	3 (3

leat loss para	meter (H	HLP), W/	m²K					(40)m	= (39)m ÷	- (4)			
0)m= 1.37	1.36	1.35	1.29	1.28	1.23	1.23	1.22	1.25	1.28	1.31	1.33		
lumber of day	e in moi	oth (Tah	la 1a)					,	Average =	Sum(40) ₁ .	12 /12=	1.29	(40)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1)m= 31	28	31	30	31	30	31	31	30	31	30	31		(41)
4. Water heat	ing ener	rgy requi	rement:								kWh/ye	ar:	
ssumed occu if TFA > 13.9 if TFA £ 13.9	0, N = 1		[1 - exp	(-0.0003	349 x (TF	FA -13.9)2)] + 0.0	0013 x (¯	ΓFA -13.		29		(42)
nnual averag educe the annua ot more that 125	l average	hot water	usage by	5% if the c	lwelling is	designed t			se target o		.34		(43)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
ot water usage ir	•	day for ea		Vd,m = fa	ctor from T	Table 1c x	(43)						
4)m= 102.68	98.94	95.21	91.48	87.74	84.01	84.01	87.74	91.48	95.21	98.94	102.68	4400.44	
nergy content of	hot water	used - cal	culated mo	onthly $= 4$.	190 x Vd,r	n x nm x E	Tm / 3600			m(44) ₁₁₂ = ables 1b, 1		1120.11	(44
5)m= 152.27	133.17	137.42	119.81	114.96	99.2	91.92	105.48	106.74	124.4	135.79	147.46		
				last and to					Γotal = Su	m(45) ₁₁₂ =		1468.63	(45
instantaneous w									40.00	22.27	00.40		(46
6)m= 22.84 Vater storage	19.98 loss:	20.61	17.97	17.24	14.88	13.79	15.82	16.01	18.66	20.37	22.12		(46
torage volum	e (litres)	includin	ig any so	olar or W	/WHRS	storage	within sa	ame ves	sel		300		(47
community h	-			-			' '						
otherwise if no Vater storage		hot wate	er (this in	icludes i	nstantar	neous co	mbi boil	ers) ente	er '0' in (47)			
a) If manufact		eclared l	oss facto	or is kno	wn (kWł	n/day):				1.	69		(48
emperature fa	actor fro	m Table	2b							0.	54		(49
nergy lost fro	m water	storage	, kWh/ye	ear			(48) x (49)) =		0.	91		(50
) If manufact lot water stora			-										(54
community h	•			e z (KVV	ii/iiiie/ua	iy <i>)</i>					0		(51
olume factor	_										0		(52
emperature fa	actor fro	m Table	2b								0		(53
nergy lost fro	m water	storage	, kWh/ye	ear			(47) x (51)	x (52) x (53) =		0		(54
Enter (50) or (54) in (5	55)								0.	91		(55
Vater storage	loss cal	culated f	or each	month			((56)m = (55) × (41)ı	m				
66)m= 28.29 cylinder contains	25.55 dedicate	28.29	27.38 rage. (57):	28.29 n = (56)m	27.38 x [(50) – (28.29 H11)] ÷ (5	28.29 0), else (5	27.38 7)m = (56)	28.29 m where (27.38 H11) is fro	28.29 m Appendi	x H	(56
i7)m= 28.29	25.55	28.29	27.38	28.29	27.38	28.29	28.29	27.38	28.29	27.38	28.29		(57
´						20.20	20.20	21.00	20.20				(58
rimary circuit rimary circuit	loss cal	culated f	or each	month (•	. ,	, ,				0		(30
(modified by	factor fi	rom Tabl	e H5 if t	here is s	solar wat	er heatii	ng and a	cylinde	r thermo	stat)			
9)m= 23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26		(59

Combi loss calcul	ated for eacl	n month	(61)m =	(60) ÷ 3	65 x (41)m						
(61)m= 0	0 0	0	0	0	0	0	0	0	0	0		(61)
Total heat require	d for water h	eating c	alculated	l for eac	h month	(62)m	= 0.85 ×	(45)m +	(46)m +	(57)m +	ı (59)m + (61)m	
(62)m= 203.82 17	9.74 188.98	169.7	166.51	149.09	143.48	157.0	4 156.63	175.95	185.68	199.01		(62)
Solar DHW input calcu	lated using Ap	pendix G o	r Appendix	H (negati	ve quantity	y) (enter	'0' if no sola	r contribut	tion to wate	er heating)	_	
(add additional lin	es if FGHRS	and/or \	WWHRS	applies	, see Ap	pendix	(G)				_	
(63)m= 0	0 0	0	0	0	0	0	0	0	0	0		(63)
Output from water	heater										_	
(64)m= 203.82 17	9.74 188.98	169.7	166.51	149.09	143.48	157.0	156.63	175.95	185.68	199.01		_
						0	utput from w	ater heate	r (annual)	112	2075.63	(64)
Heat gains from w	ater heating	, kWh/m	onth 0.2	5 ´ [0.85	× (45)m	+ (61	m] + 0.8	x [(46)m	+ (57)m	+ (59)m]	
(65)m= 91.87 81	.53 86.94	79.75	79.47	72.9	71.81	76.32	75.4	82.61	85.06	90.27		(65)
include (57)m ir	calculation	of (65)m	only if c	ylinder i	s in the	dwellin	g or hot w	ater is f	rom com	munity h	neating	
5. Internal gains	(see Table	5 and 5a):									
Metabolic gains (able 5), Wa	tts										
Jan I	eb Mar	Apr	May	Jun	Jul	Aug	g Sep	Oct	Nov	Dec		
(66)m= 137.62 13	7.62 137.62	137.62	137.62	137.62	137.62	137.6	2 137.62	137.62	137.62	137.62		(66)
Ligh <mark>ting gains (ca</mark>	culated in A	ppendix	L, equ <mark>at</mark>	ion L9 o	r L9a), <mark>a</mark>	lso se	Table 5					
(67)m= 45 39	.97 32.51	24.61	18.4	15.53	16.78	21.81	29.28	37.17	43.39	46.25		(67)
App <mark>liance</mark> s gains	(ca <mark>lculat</mark> ed i	n Appen	dix L, eq	uation L	13 or L1	3a), al	so see Ta	ble 5				
(68)m= 301.37 30	296.62	279.84	258.66	238.76	225.46	222.3	3 230.22	246.99	268.17	288.07		(68)
Cooking gains (ca	Iculated in A	ppendix	L, equa	tion L15	or L15a), also	see Table	5				
(69)m= 51.06 5	.06 51.06	51.06	51.06	51.06	51.06	51.06	51.06	51.06	51.06	51.06		(69)
Pumps and fans g	ains (Table	5a)									-	
(70)m= 3	3 3	3	3	3	3	3	3	3	3	3		(70)
Losses e.g. evapo	ration (nega	ative valu	es) (Tab	le 5)	_	_						
(71)m= -91.75 -9	1.75 -91.75	-91.75	-91.75	-91.75	-91.75	-91.7	-91.75	-91.75	-91.75	-91.75		(71)
Water heating gai	ns (Table 5)			_	-				•			
(72)m= 123.48 12	1.33 116.85	110.76	106.81	101.24	96.51	102.5	3 104.73	111.03	118.14	121.34		(72)
Total internal gai	ns =			(66))m + (67)m	n + (68)r	n + (69)m +	(70)m + (7	71)m + (72))m		
(73)m= 569.79 56	5.73 545.9	515.14	483.8	455.46	438.69	446.6	5 464.15	495.13	529.63	555.59		(73)
6. Solar gains:												
Solar gains are calcu	_					itions to		ne applical		tion.		
Orientation: Acce Table		Area m²		Flu Ta	ıx ble 6a		g_ Table 6b	т	FF able 6c		Gains (W)	
			1			, –					` '	7,-0
North 0.9x	1 ×			-	10.63]	0.5		0.9	=	24.81	<u></u> (74)
North 0.9x North 0.9x	1 ×				20.32] X _	0.5		0.9	=	47.4](74)
	1 ×	<u> </u>			34.53]	0.5	×	0.9	=	80.55](74)
	1 ×				55.46	X	0.5	X	0.9	=	129.39](74)
North 0.9x	1 ×	1.4	44	X 7	74.72	X	0.5	X	0.9	=	174.3	(74)

Morth	Г					_			1		_				7
North	0.9x	1		X	1.44	X		9.99	X	0.5	×	0.9	=	186.59	(74)
North	0.9x	1		X	1.44	X	7	4.68	X	0.5	×	0.9	╡ =	174.21	(74)
North	0.9x	1		X	1.44	X	5	9.25	X	0.5	X	0.9	_ =	138.21	(74)
North	0.9x	1		X	1.44	X	4	1.52	X	0.5	X	0.9	=	96.85	(74)
North	0.9x	1		X	1.44	X	2	4.19	X	0.5	X	0.9	=	56.43	(74)
North	0.9x	1		X	1.44	X	1	3.12	X	0.5	X	0.9	=	30.6	(74)
North	0.9x	1		X	1.44	X		3.86	X	0.5	X	0.9	=	20.68	(74)
West	0.9x	1		x	5.4	X	1	9.64	x	0.5	X	0.9	=	85.91	(80)
West	0.9x	1		x	1.8	X	1	9.64	x	0.5	X	0.9	=	14.32	(80)
West	0.9x	1		x	5.4	X	3	8.42	X	0.5	X	0.9	=	168.05	(80)
West	0.9x	1		X	1.8	X	3	8.42	X	0.5	X	0.9	=	28.01	(80)
West	0.9x	1		x	5.4	X	6	3.27	X	0.5	X	0.9	=	276.76	(80)
West	0.9x	1		x	1.8	X	6	3.27	X	0.5	x	0.9	=	46.13	(80)
West	0.9x	1		x	5.4	X	9	2.28	x	0.5	x	0.9	=	403.63	(80)
West	0.9x	1		x	1.8	X	9	2.28	x	0.5	x	0.9	=	67.27	(80)
West	0.9x	1		x	5.4	X	1	13.09	x	0.5	x	0.9	=	494.67	(80)
West	0.9x	1		x	1.8	X	1	13.09	x	0.5	×	0.9	_ =	82.44	(80)
West	0.9x	1		x	5.4	X	1	15.77	Х	0.5	X	0.9	=	506.38	(80)
West	0.9x	1		x	1.8	X	1	15.77	х	0.5	Х	0.9	=	84.4	(80)
West	0.9x	1		x	5.4	х	1	10.22	x	0.5	Х	0.9	=	482.09	(80)
West	0.9x	1		x	1.8	5 x	1	10.22	X	0.5	Х	0.9	=	80.35	(80)
West	0.9x	1		x	5.4	X	9	4.68	Х	0.5	Х	0.9	=	414.11	(80)
West	0.9x	1		x	1.8	i x	9	4.68	X	0.5	Х	0.9	=	69.02	(80)
West	0.9x	1		x	5.4	х	7	3.59	x	0.5	Х	0.9	=	321.88	(80)
West	0.9x	1		x	1.8	j x	7	3.59	x	0.5	×	0.9	_ =	53.65	(80)
West	0.9x	1		x	5.4	i x	4	5.59	x	0.5	x	0.9	=	199.41	(80)
West	0.9x	1		x	1.8	j x	4	5.59	x	0.5	x	0.9	=	33.23	(80)
West	0.9x	1		x	5.4	j x	2	4.49	x	0.5	×	0.9	_ =	107.12	(80)
West	0.9x	1		X	1.8	X	2	4.49	X	0.5	×	0.9	= =	17.85	(80)
West	0.9x	1		x	5.4	X	1	6.15	x	0.5	×	0.9		70.65	(80)
West	0.9x	1		x	1.8	X	1	6.15	X	0.5	×	0.9	=	11.77	(80)
	L					_									_
Solar g	ains in	watts, ca	alcula	ited	for each mor	nth			(83)m	n = Sum(74)m	(82)m				
(83)m=	125.03	243.46	403.	43	600.29 751.4	41 7	77.37	736.65	621	.34 472.38	289.0	7 155.57	103.1		(83)
Total g	ains – iı	nternal a	and so	olar	(84)m = (73)	m + (83)m	, watts							
(84)m=	694.82	809.19	949.	34	1115.43 1235.	21 1	232.83	1175.34	1067	7.99 936.53	784.2	685.2	658.69		(84)
7. Mea	an inter	nal temp	peratu	ıre (heating seas	on)									
Tempe	erature	during h	neatin	g pe	eriods in the l	iving	area	from Tab	ole 9,	, Th1 (°C)				21	(85)
Utilisa	ition fac	tor for g	ains f	or li	ving area, h1	,m (s	ee Ta	ble 9a)							_
	Jan	Feb	Ma	ar	Apr Ma	ay	Jun	Jul	A	ug Sep	Oc	: Nov	Dec		
(86)m=	0.92	0.89	0.8	3	0.71 0.57	7	0.42	0.32	0.3	0.56	0.78	0.89	0.93		(86)
Mean	interna	l temper	ature	in li	ving area T1	(follo	w ste	ps 3 to 7	in T	able 9c)					
(87)m=	18.68	19.02	19.5	-	20.21 20.6	$\dot{-}$	20.89	20.96	20.		20.17	19.36	18.68]	(87)
L			•			-			•		•		•	•	

Temn	erature	durina h	neating r	neriods ir	n rest of	dwelling	ı from Ta	ahle 9 Ti	h2 (°C)					
(88)m=	19.79	19.8	19.81	19.84	19.85	19.89	19.89	19.9	19.88	19.85	19.84	19.82		(88)
Utilisa	ation fac	tor for g	ains for	rest of d	welling,	h2,m (se	ee Table	9a)			-	-		
(89)m=	0.91	0.87	0.8	0.68	0.52	0.36	0.24	0.28	0.49	0.74	0.87	0.92		(89)
Mean	interna	temper	ature in	the rest	of dwelli	ing T2 (f	ollow ste	eps 3 to	7 in Tabl	e 9c)				
(90)m=	16.77	17.26	18.01	18.92	19.48	19.8	19.87	19.87	19.66	18.89	17.76	16.78		(90)
								Į.	f	LA = Livin	g area ÷ (4	4) =	0.35	(91)
Mean	interna	temper	ature (fo	or the wh	ole dwe	llina) = f	LA × T1	+ (1 – fl	A) x T2					
(92)m=	17.44	17.87	18.55	19.37	19.88	20.17	20.25	20.24	20.04	19.34	18.32	17.44		(92)
Apply	adjustn	nent to t	he mear	ı interna	l temper	ature fro	m Table	4e, whe	ere appro	priate				
(93)m=	17.44	17.87	18.55	19.37	19.88	20.17	20.25	20.24	20.04	19.34	18.32	17.44		(93)
8. Sp	ace hea	ting requ	uirement			,	,				•	•		
				•		ned at st	ep 11 of	Table 9	b, so tha	t Ti,m=(76)m an	d re-calc	culate	
the ut				using Ta	1			Ι	0	0.1			1	
Litilio	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(94)m=		0.84	ains, hm	0.66	0.52	0.38	0.27	0.3	0.5	0.72	0.84	0.89		(94)
				4)m x (84		0.00	0.21	0.0	0.0	0.72	0.01	0.00		()
(95)m=		679.08	733.35	736.13	648.07	463.84	314.66	325.41	469.14	564.63	575.42	584.4		(95)
		age exte	rnal tem	perature	e from Ta	able 8								
(96)m=	4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2		(96)
Heat	loss rate	for mea	an intern	al tempe	erature,	Lm , W :	=[(39)m :	x [(93)m	– (96)m]				
(97)m=	1291.64	1265.87	1167.09	976.33	756.92	495.48	324.14	338.54	536.57	808.19	1054.05	1263.34		(97)
Space	e heatin	g require	ement fo	r each n	nonth, k	Wh/mon	th = 0.02	24 x [(97)m – (95)m] x (4	1)m			
(98)m=	507.37	394.32	322.7	172.94	80.98	0	0	0	0	181.2	344.61	505.13		
								Tota	l per year	(kWh/year	r) = Sum(9	8)15,912 =	2509.27	(98)
Space	e heatin	g require	ement in	kWh/m²	²/year								34.85	(99)
9a. En	ergy rec	uiremer	nts – Indi	ividual h	eating s	ystems i	ncluding	micro-C	CHP)					
Spac	e heatir	ıg:												
Fracti	ion of sp	ace hea	it from se	econdar	y/supple	ementary	system						0	(201)
Fracti	ion of sp	ace hea	it from m	nain syst	:em(s)			(202) = 1	- (201) =				1	(202)
Fracti	ion of to	tal heatii	ng from	main sys	stem 1			(204) = (2	02) x [1 –	(203)] =			1	(204)
Efficie	ency of r	nain spa	ace heat	ing syste	em 1								90.5	(206)
Efficie	ency of s	seconda	ry/supple	ementar	y heating	g systen	n, %						0	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/y	 rear
Space					d above	L		19					, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
·	507.37	394.32	322.7	172.94	80.98	0	0	0	0	181.2	344.61	505.13		
(211)m	า = {[(98)m x (20	(4)] } x 1	00 ÷ (20)6)			ı		Į.			l	(211)
` ,	560.63	435.72	356.58	191.1	89.48	0	0	0	0	200.22	380.78	558.16		
						•	•	Tota	l (kWh/yea	ar) =Sum(2	211) _{15,1012}	<u></u>	2772.67	(211)
Space	e heatin	g fuel (s	econdar	y), kWh/	month									
		•	00 ÷ (20											
(215)m=	0	0	0	0	0	0	0	0	0	0	0	0		
									ıl (kWh/yea					(215)

Water heating										
Output from water heater (calculated		440.00	142.40	457.04	450.00	475.05	405.00	100.04	1	
203.82 179.74 188.98 169.7 Efficiency of water heater	166.51	149.09	143.48	157.04	156.63	175.95	185.68	199.01	79.8	(216)
(217)m= 87.15 86.85 86.23 84.86	83.01	79.8	79.8	79.8	79.8	84.89	86.44	87.2	79.0	(217)
Fuel for water heating, kWh/month]	, ,
$(219)m = (64)m \times 100 \div (217)m$									1	
(219)m= 233.87 206.94 219.15 199.96	200.59	186.83	179.8	196.79	196.28 Il = Sum(2	207.27	214.81	228.24	0.470.50	7(040)
Annual totals				1010	ii – Guiii(2		Wh/year	•	2470.53 kWh/year	(219)
Space heating fuel used, main system	n 1						viin y cai		2772.67	7
Water heating fuel used									2470.53	Ī
Electricity for pumps, fans and electric	c keep-hot									_
mechanical ventilation - balanced, ea	xtract or p	ositive i	nput fron	n outside	Э			165.28]	(230a)
central heating pump:								30		(230c)
Total electricity for the above, kWh/ye	ear			sum	of (230a).	(230g) =			195.28	(231)
Electricity for lighting									317.91	(232)
10a. Fuel costs - individual heating s	systems:									
		Fu kW	el /h/ye <mark>ar</mark>			Fuel P (Table			Fuel Cost £/year	
Space heating - main system 1		(21	1) x			3.4	8	x 0.01 =	96.49	(240)
Space heating - main system 2		(21:	3) x			0		x 0.01 =	0	
Space heating - secondary		(21	5) x			13.	19	x 0.01 =	0	(242)
Water heating cost (other fuel)		(219	9)			3.4		x 0.01 =	85.97	
Pumps, fans and electric keep-hot		(23	1)			13.	19	x 0.01 =	25.76	(249)
(if off-peak tariff, list each of (230a) to	(230g) se	parately	/ as app	licable a	nd apply	fuel pri	ce accor	ding to	Table 12a	_
Energy for lighting		(232	2)			13.	19	x 0.01 =	41.93	(250)
Additional standing charges (Table 12	2)								120	(251)
Appendix Q items: repeat lines (253)	and (254)	as need	ded							
Total energy cost	(245)(247) + (25	50)(254)	=					370.15	(255)
11a. SAP rating - individual heating	systems									
Energy cost deflator (Table 12)									0.42	(256)
Energy cost factor (ECF)	[(255) x	(256)] ÷ [((4) + 45.0]	=					1.33	(257)
SAP rating (Section 12)									81.46	(258)
12a. CO2 emissions – Individual hea	ating syste	ms incl	uding mi	cro-CHF						
			ergy /h/year			Emiss kg CO	ion fac 2/kWh	tor	Emissions kg CO2/yea	
			•			•			,	

Space heating (secondary)	(215) x	0.519	=	0	(263)
Water heating	(219) x	0.216	=	533.63	(264)
Space and water heating	(261) + (262) + (263) + (264) =			1132.53	(265)
Electricity for pumps, fans and electric keep-hot	(231) x	0.519	=	101.35	(267)
Electricity for lighting	(232) x	0.519	=	164.99	(268)
Total CO2, kg/year	sum	of (265)(271) =		1398.88	(272)
CO2 emissions per m ²	(272)) ÷ (4) =		19.43	(273)
El rating (section 14)				84	(274)

13a. Primary Energy

13a. I filliary Effergy			
	Energy kWh/year	Primary factor	P. Energy kWh/year
Space heating (main system 1)	(211) x	1.22	3382.66 (261)
Space heating (secondary)	(215) x	3.07	0 (263)
Energy for water heating	(219) x	1.22	3014.04 (264)
Space and water heating	(261) + (262) + (263) + (264) =		6396.7 (265)
Electricity for pumps, fans and electric keep-hot	(231) x	3.07	599.51 (267)
Electricity for lighting	(232) x	0 =	975.98 (268)
'Total Primary Energy	sum	of (265)(271) =	7972.19 (272)
Primary energy kWh/m²/year	(272)) ÷ (4) =	110.72 (273)

			User D	etails:						
Assessor Name:				Stroma	a Num	ber:				
Software Name:	Stroma FSAP 201	12		Softwa				Versio	n: 1.0.4.18	
		Pro	operty A	Address:	SF03					
Address :	39, Fitzjohns Avenu	ie, LOND(ON, NV	√3 5JY						
1. Overall dwelling dime	nsions:									
			Area	n(m²)		Av. He	ight(m)		Volume(m³)
Ground floor			1	156	(1a) x	3	3.2	(2a) =	499.2	(3a)
Total floor area TFA = (1a	a)+(1b)+(1c)+(1d)+(1e	e)+(1n)	1	156	(4)					
Dwelling volume					(3a)+(3b))+(3c)+(3d	l)+(3e)+	.(3n) =	499.2	(5)
2. Ventilation rate:										
		econdary neating	•	other		total			m³ per hou	r
Number of chimneys	0 +	0] + [0	=	0	X e	40 =	0	(6a)
Number of open flues	0 +	0] + [0] = [0	x :	20 =	0	(6b)
Number of intermittent far	 ns					0	X	10 =	0	(7a)
Number of passive vents					Ī	0	X	10 =	0	(7b)
Number of flueless gas fir	res					0	X ·	40 =	0	(7c)
								Δir ch	anges per ho	ur
Infiltration due to chimney	vs. fluor and fans – (6	(a)+(6b)+(7a)+(7h)+(3	70) -						_
If a pressurisation test has be					ontinue fr	0 om (9) to (÷ (5) =	0	(8)
Number of storeys in th		ια, μισσσσα				(6) (6)	. 3)		1	(9)
Additional infiltration							[(9)	-1]x0.1 =	0	(10)
Structural infiltration: 0.	25 for steel or timber	frame or (0.35 for	masonr	y constr	uction			0.35	(11)
if both types of wall are pro		sponding to t	the greate	er wall area	a (after			'		_
deducting areas of opening If suspended wooden fl	• /- •	led) or 0.1	l (seale	d) else	enter 0				0	(12)
If no draught lobby, ent	,	104) 01 0.1	(ocaio	a), 0.00	011101 0				0.05	(13)
Percentage of windows	·	tripped							100	(14)
Window infiltration				0.25 - [0.2	x (14) ÷ 1	00] =			0.05	(15)
Infiltration rate				(8) + (10)	+ (11) + (1	2) + (13) -	+ (15) =		0.45	(16)
Air permeability value,	q50, expressed in cul	oic metres	per ho	ur per so	quare m	etre of e	nvelope	area	0	(17)
If based on air permeabili	ty value, then (18) = [(1	7) ÷ 20]+(8)	, otherwi	se (18) = (16)				0.45	(18)
Air permeability value applies	s if a pressurisation test ha	s been done	or a deg	ıree air pei	meability	is being u	sed	'		_
Number of sides sheltered	d			(22)		-17			2	(19)
Shelter factor				(20) = 1 - [9)] =			0.85	(20)
Infiltration rate incorporati				(21) = (18)	x (20) =				0.38	(21)
Infiltration rate modified for		 			_			_	1	
<u> </u>	Mar Apr May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind spe									1	
(22)m= 5.1 5	4.9 4.4 4.3	3.8	3.8	3.7	4	4.3	4.5	4.7		
Wind Factor (22a)m = (22	?)m ÷ 4									
(22a)m= 1.27 1.25 1	1.23 1.1 1.08	0.95	0.95	0.92	1	1.08	1.12	1.18		

Adjusted infiltr	ation rat	e (allowi	ng for sh	nelter an	d wind s	peed) =	(21a) x	(22a)m					
0.49 Calculate effe	0.48	0.47	0.42	0.41 he appli	0.36	0.36	0.35	0.38	0.41	0.43	0.45]	
If mechanic		_	410 707 1	по арри	ouble ou							0.5	(23a
If exhaust air h	eat pump	using Appe	endix N, (2	3b) = (23a	a) × Fmv (e	equation (N	N5)) , othe	rwise (23b) = (23a)			0.5	(23b
If balanced wit	h heat reco	overy: effic	iency in %	allowing f	or in-use f	actor (from	Table 4h) =				75.65	(230
a) If balance	ed mech	anical ve	ntilation	with he	at recove	ery (MVI	HR) (24a	a)m = (22)	2b)m + (23b) × [1 – (23c)	÷ 100]	
(24a)m= 0.61	0.6	0.59	0.54	0.53	0.49	0.49	0.48	0.5	0.53	0.55	0.57]	(24a
b) If balance	ed mech	anical ve	ntilation	without	heat rec	overy (N	/IV) (24b)m = (22	2b)m + (23b)		_	
(24b)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24b
c) If whole h				•	•								
	1	< (23b), t		<u> </u>	<u> </u>	· · ·	<u> </u>	ŕ –	· ` `	ŕ	ı	1	
(24c)m= 0	0	0	0	0	0	0	0	0	0	0	0	J	(240
d) If natural if (22b)r		on or wh en (24d)			•				0.5]			_	
(24d)m= 0	0	0	0	0	0	0	0	0	0	0	0]	(240
Effective air	change	rate - er	iter (24a) or (24b	o) or (24	c) or (24	d) in box	(25)				_	
(25)m= 0.61	0.6	0.59	0.54	0.53	0.49	0.49	0.48	0.5	0.53	0.55	0.57		(25)
3. Heat losse	s and he	eat loss r	paramete	er:									
ELEMENT	Gros		Openin		Net Ar	ea	U-val	ue	AXU		k-value	Э	ΑΧk
	area	(m ²)	· m		A ,r	n²	W/m2	!K	(W/I	K)	kJ/m²-	K	kJ/K
Windows Type	e 1				3.04	x1,	(1/(1.8)+	0.04] =	5.1				(27)
Win <mark>dows</mark> Type	e 2				3.23	x1,	/[1/(1.8)+	0.04] =	5.42				(27)
Windows Type	e 3				3.52	x1	/[1/(1.8)+	0.04] =	5.91				(27)
Windows Type	e 4				3.36	x1,	/[1/(1.8)+	0.04] =	5.64				(27)
Windows Type	e 5				3.52	x1,	/[1/(1.8)+	0.04] =	5.91				(27)
Walls Type1	15	5	3.04		11.96	x	0.25	 	2.99				(29)
Walls Type2	21		3.23		17.77	, x	0.25	<u> </u>	4.44			$\exists \ $	(29)
Walls Type3	27.	5	6.88		20.62	2 x	0.25	= i	5.16	T i		7 <u> </u>	(29)
Walls Type4	22.	5	3.52		18.98	x	0.25	<u> </u>	4.75	=		i i	(29)
Total area of e	elements	 s, m²			86								(31)
* for windows and ** include the are						ated using	formula 1	/[(1/U-valu	re)+0.04] a	as given in	paragrapl	1 3.2	` '
Fabric heat los				- a.ia paii			(26)(30)) + (32) =				45.32	(33)
Heat capacity		,	•,						.(30) + (32	2) + (32a).	(32e) =	13172.7	
Thermal mass		` ,	P = Cm ÷	- TFA) ir	n kJ/m²K				tive Value		` '	100	(35)
For design asses	sments wh	nere the de	tails of the	,			ecisely the				able 1f		
Thermal bridg				usina An	pendix k	<						12.9	(36)
if details of therma Total fabric he	al bridging	,			•			(33) ±	(36) =				
Ventilation he		alculated	l monthly	,						(25)m x (5)	1	58.22	(37)
	Feb	Mar			lun	lul	۸۰۰۰				1	1	
Jan	Len	iviai	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	J	

(38)m= 100.4	98.82	97.25	89.37	87.79	79.92	79.92	78.34	83.07	87.79	90.94	94.1		(38)
Heat transfer of	coefficier	nt, W/K						(39)m	= (37) + (3	38)m	_	_	
(39)m= 158.62	157.04	155.47	147.59	146.02	138.14	138.14	136.57	141.29	146.02	149.17	152.32		_
Heat loss para	meter (H	HLP). W/	m²K						Average = = (39)m ÷	Sum(39)₁ - (4)	12 /12=	147.2	(39)
(40)m= 1.02	1.01	1	0.95	0.94	0.89	0.89	0.88	0.91	0.94	0.96	0.98		
					I	I			Average =	Sum(40) ₁	12 /12=	0.94	(40)
Number of day	i	· ` `	· ·				T .			T	_	1	
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		(44)
(41)m= 31	28	31	30	31	30	31	31	30	31	30	31	j	(41)
4. Water hea	ting ene	rgy requi	irement:								kWh/ye	ear:	
Assumed occu	ıpancy, l	N								2	.94		(42)
if TFA > 13.5		+ 1.76 x	[1 - exp	(-0.0003	849 x (TF	FA -13.9)2)] + 0.0	0013 x (ΓFA -13.	.9)		I	
if TFA £ 13.9 Annual average	•	ator usac	na in litra	s nar da	y Vd av	orano –	(25 v NI)	⊥ 36		40	0.50	1	(43)
Reduce the annua									se target o		9.58	l	(43)
not more that 125	litres per _l	person per	day (all w	ater use, i	hot and co	ld)							
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Hot w <mark>ater u</mark> sage i	n litres per	day for ea	ach month	Vd,m = fa	ctor from T	Table 1c x	(43)						
(44)m= 120.54	116.15	111.77	107.39	103.01	98.62	98.62	103.01	107.39	111.77	116.15	120.54		
Energy content of	hot water	used - cal	culated me	onthly – 4	100 v Vd r	m v nm v [)Tm / 3600			m(44) ₁₁₂ =		1314.96	(44)
											· ·	1	
(45)m= 178.75	156.34	161.33	140.65	134.96	116.46	107.92	123.83	125.31	146.04	159.41 m(45) ₁₁₂ :	173.11	1724.12	(45)
If instantaneous w	ater heatii	ng at point	of use (no	hot water	r storage),	enter 0 in	boxes (46		rolai = Su	III(43) ₁₁₂ :		1724.12	(40)
(46)m= 26.81	23.45	24.2	21.1	20.24	17.47	16.19	18.58	18.8	21.91	23.91	25.97		(46)
Water storage	loss:				<u> </u>	<u> </u>	<u> </u>			<u> </u>			
Storage volum	e (litres)	includin	ng any so	olar or W	/WHRS	storage	within sa	ame ves	sel		300		(47)
If community h	•			•			` '						
Otherwise if no		hot wate	er (this in	icludes i	nstantar	neous co	mbi boil	ers) ente	er '0' in ((47)			
Water storage a) If manufact		eclared l	oss facto	or is kno	wn (kWh	n/dav):				1	.69	1	(48)
Temperature f					(., e. e. j / :					.54	 	(49)
Energy lost fro				ear			(48) x (49)) =			.91	 	(50)
b) If manufact		•	-		or is not		(-) (-)				.51	l	(00)
Hot water stor	-			e 2 (kW	h/litre/da	ay)					0		(51)
If community h			on 4.3									1	
Volume factor Temperature f			2h								0		(52) (53)
•							(47) v (E4)	. v. (EQ) v. (E0)		0	 	` '
Energy lost fro Enter (50) or		-	, KVV11/ye	zai			(47) x (51)	x (32) X (J3) =		0 .91		(54) (55)
Water storage	. , .	•	for each	month			((56)m = (55) × (41):	m		1	I	(00)
	25.55				27.38					27.20	20.20	l	(56)
(56)m= 28.29 If cylinder contains		28.29 d solar sto	27.38 rage. (57)	28.29 m = (56)m		28.29 H11)l ÷ (5	28.29 0), else (5	27.38 7)m = (56)	28.29 m where (27.38 H11) is fro	28.29 m Append	j lix H	(30)
	1											1	(E7)
(57)m= 28.29	25.55	28.29	27.38	28.29	27.38	28.29	28.29	27.38	28.29	27.38	28.29	j	(57)

												_	
Primary circuit loss (annua	•										0		(58)
Primary circuit loss calcula			`	,	` ,	,	,		41	o a t a t \			
(modified by factor from (59)m= 23.26 21.01 23			23.26	22.		11g ar		22.51	23.26	22.51	23.26	1	(59)
` '								22.01	20.20	22.01	20.20	_	(00)
Combi loss calculated for e		<u>`</u>		ì						1 .		٦	(64)
)	0	0	(0		0	0	0	0		(61)
Total heat required for water						ř		`		ì	`	· (59)m + (61)m ¬	
(62)m= 230.31 202.9 212			86.51	166		175.		175.2	197.59		224.67		(62)
Solar DHW input calculated using									contribu	ition to wate	er heating)	
(add additional lines if FGF		o T	VHKS 0	арр	<u> </u>	pena 0	Ť	0	0	0	0	7	(63)
	<u>, </u>	0	0		, 0			0	0	0	0	_	(00)
Output from water heater		400.54	00.54	400	05 450 47	175	<u> </u>	475.0	407.50	1 000 0	004.07	7	
(64)m= 230.31 202.9 212	88	190.54	86.51	166	.35 159.47	175.		175.2	197.59		224.67	2331.11	(64)
				- / -	. 05 (45)					er (annual) ₁			
Heat gains from water hea	<u> </u>					r `	- -		-	- ` 	<u> </u>	ו <u>ן</u> ד	(CE)
(65)m= 100.68 89.23 94.		ļ	36.12	78.	ļ	82.4		81.58	89.8	92.92	98.8		(65)
include (57)m in calculat		` ′	nly if c	ylinc	ler is in the	dwelli	ng o	r hot wa	ater is	from com	munity I	neating	
5. Internal gains (see Tal	ole 5	and 5a):							٠.	_			
Metabolic gains (Table 5),										_		7	
	lar		May	_	ın Jul	Αι		Sep	Oct	Nov	Dec	_	
(66)m= 176.59 176.59 176	5.59	176.59	76.59	176	.59 176.59	176.	59	176.59	176.59	176.59	176.59		(66)
Lighting gains (calculated i	n Ap	pendix L, e	equati	ion L	.9 or L9a), a	lso s	ee Ta	able 5				_	
(67)m= 75.53 67.09 54	.56	41.3	80.88	26.	07 28.17	36.6	61	49.14	62.39	72.82	77.63		(67)
Appliances gains (calculate	ed in	Appendix	L, eq	uatic	n L13 or L1	3a), a	also s	see Tab	ole 5			_	
(68)m= 488.02 493.09 480	.33	453.16 4	18.86	386	.63 365.1	360.	04	372.8	399.96	434.26	466.49		(68)
Cooking gains (calculated	in Ap	pendix L,	equat	ion I	_15 or L15a), also	see	e Table	5			_	
(69)m= 55.6 55.6 55	.6	55.6	55.6	55	.6 55.6	55.	6	55.6	55.6	55.6	55.6]	(69)
Pumps and fans gains (Tal	ole 5	a)											
(70)m= 3 3 3	3	3	3	(3)	3	3		3	3	3	3		(70)
Losses e.g. evaporation (n	egati	ive values)) (Tab	le 5)									
(71)m= -117.73 -117.73 -117	7.73	-117.73 -1	17.73	-117	7.73 -117.73	-117.	73 -	-117.73	-117.73	-117.73	-117.73		(71)
Water heating gains (Table	5)	-						-		-		-	
(72)m= 135.32 132.79 127	'.53	120.39 1	15.75	109	.21 103.66	110.	78	113.3	120.7	129.05	132.8		(72)
Total internal gains =		•			(66)m + (67)m	n + (68)m + ((69)m + (1	70)m + (71)m + (72))m	-	
(73)m= 816.34 810.43 779	.88	732.32 6	82.95	639	.38 614.39	624.	89	652.71	700.52	753.6	794.39]	(73)
6. Solar gains:	-												
Solar gains are calculated using	solar	flux from Tal	ble 6a a	and a	ssociated equa	ations t	o con	vert to the	e applica	ble orienta	tion.		
Orientation: Access Facto	r	Area			Flux			g_		FF		Gains	
Table 6d		m²			Table 6a		Tal	ble 6b	-	Table 6c		(W)	
East 0.9x 1	X	3.04		x	19.64	X		0.5	x [0.9	=	24.18	(76)
East 0.9x 1	X	3.23		x	19.64	X		0.5	x	0.9	=	25.69	(76)

			ı		ı		ı						_
East	0.9x	1	Х	3.04	X	38.42	X	0.5	X	0.9	=	47.3	(76)
East	0.9x	1	X	3.23	X	38.42	X	0.5	X	0.9	=	50.26	(76)
East	0.9x	1	X	3.04	X	63.27	X	0.5	X	0.9	=	77.9	(76)
East	0.9x	1	х	3.23	X	63.27	X	0.5	X	0.9	=	82.77	(76)
East	0.9x	1	X	3.04	X	92.28	X	0.5	X	0.9	=	113.62	(76)
East	0.9x	1	x	3.23	x	92.28	X	0.5	X	0.9	=	120.72	(76)
East	0.9x	1	X	3.04	X	113.09	X	0.5	X	0.9	=	139.24	(76)
East	0.9x	1	x	3.23	x	113.09	x	0.5	x	0.9	=	147.94	(76)
East	0.9x	1	x	3.04	x	115.77	x	0.5	x	0.9	=	142.54	(76)
East	0.9x	1	x	3.23	x	115.77	x	0.5	x	0.9] =	151.45	(76)
East	0.9x	1	x	3.04	x	110.22	x	0.5	x	0.9	=	135.7	(76)
East	0.9x	1	х	3.23	x	110.22	x	0.5	x	0.9	=	144.18	(76)
East	0.9x	1	x	3.04	x	94.68	x	0.5	x	0.9	=	116.56	(76)
East	0.9x	1	х	3.23	x	94.68	x	0.5	x	0.9	=	123.85	(76)
East	0.9x	1	х	3.04	x	73.59	x	0.5	x	0.9	=	90.6	(76)
East	0.9x	1	х	3.23	х	73.59	x	0.5	x	0.9	=	96.27	(76)
East	0.9x	1	х	3.04	х	45.59	x	0.5	x	0.9	=	56.13	(76)
East	0.9x	1	x	3.23	X	45.59	Х	0.5	X	0.9	=	59.64	(76)
East	0.9x	1	х	3.04	х	24.49	x	0.5	x	0.9	=	30.15	(76)
East	0.9x	1	х	3.23	х	24.49	x	0.5	x	0.9	=	32.04	(76)
East	0.9x	1	х	3.04	X	16.15	x	0.5	x	0.9	=	19.89	(76)
East	0.9x	1	x	3.23	x	16.15	Х	0.5	x	0.9] =	21.13	(76)
South	0.9x	1	x	3.52	x	46.75	X	0.5	x	0.9] =	66.65	(78)
South	0.9x	1	х	3.36	х	46.75	x	0.5	x	0.9	=	63.62	(78)
South	0.9x	1	х	3.52	x	46.75	x	0.5	x	0.9] =	66.65	(78)
South	0.9x	1	х	3.52	x	76.57	x	0.5	x	0.9	=	109.16	(78)
South	0.9x	1	х	3.36	х	76.57	x	0.5	x	0.9	=	104.19	(78)
South	0.9x	1	х	3.52	x	76.57	x	0.5	x	0.9] =	109.16	(78)
South	0.9x	1	х	3.52	x	97.53	x	0.5	x	0.9] =	139.04	(78)
South	0.9x	1	х	3.36	х	97.53	x	0.5	x	0.9	=	132.72	(78)
South	0.9x	1	х	3.52	х	97.53	x	0.5	x	0.9	=	139.04	(78)
South	0.9x	1	х	3.52	x	110.23	x	0.5	x	0.9	=	157.15	(78)
South	0.9x	1	х	3.36	х	110.23	x	0.5	x	0.9	=	150.01	(78)
South	0.9x	1	х	3.52	х	110.23	x	0.5	x	0.9	=	157.15	(78)
South	0.9x	1	х	3.52	x	114.87	x	0.5	x	0.9] =	163.76	(78)
South	0.9x	1	х	3.36	x	114.87	x	0.5	x	0.9	j =	156.32	(78)
South	0.9x	1	х	3.52	x	114.87	x	0.5	x	0.9	=	163.76	(78)
South	0.9x	1	x	3.52	x	110.55	x	0.5	x	0.9] =	157.6	(78)
South	0.9x	1	х	3.36	x	110.55	x	0.5	x	0.9	j =	150.43	(78)
South	0.9x	1	х	3.52	x	110.55	x	0.5	x	0.9	=	157.6	(78)
South	0.9x	1	х	3.52	x	108.01	x	0.5	x	0.9	j =	153.98	(78)
	_		•		•		•				•		_

South	0.9x 1	X	3.36	X	10	08.01	x	0.5	x	0.9	= [146.98	(78)
South	0.9x 1	x	3.52	X	10	08.01	x	0.5	x	0.9	<u> </u>	153.98	(78)
South	0.9x 1	x	3.52	×	10)4.89	x	0.5	x	0.9	- = [149.54	(78)
South	0.9x 1	x	3.36	×	10)4.89	х	0.5	x	0.9	-	142.74	(78)
South	0.9x 1	x	3.52	x	10)4.89	x	0.5	x	0.9	<u> </u>	149.54	(78)
South	0.9x 1	x	3.52	x	10)1.89	X	0.5	x	0.9	=	145.25	(78)
South	0.9x 1	x	3.36	X	10	1.89	X	0.5	x	0.9	=	138.65	(78)
South	0.9x 1	x	3.52	X	10)1.89	х	0.5	×	0.9	=	145.25	(78)
South	0.9x 1	x	3.52	×	8:	2.59	x	0.5	x	0.9	=	117.73	(78)
South	0.9x 1	x	3.36	x	8:	2.59	x	0.5	x	0.9	<u> </u>	112.38	(78)
South	0.9x 1	x	3.52	x	8:	2.59	х	0.5	x	0.9	=	117.73	(78)
South	0.9x 1	x	3.52	x	5:	5.42	X	0.5	x	0.9	=	79	(78)
South	0.9x 1	x	3.36	x	5:	5.42	х	0.5	T x	0.9	=	75.41	(78)
South	0.9x 1	x	3.52	x	5:	5.42	x	0.5	x	0.9	=	79	(78)
South	0.9x 1	x	3.52	x	4	0.4	x	0.5	x	0.9	- = [57.59	(78)
South	0.9x 1	x	3.36	x	4	0.4	x	0.5	x	0.9	<u> </u>	54.97	(78)
South	0.9x 1	x	3.52	×	4	0.4	x	0.5	x	0.9	<u> </u>	57.59	(78)
		_											
Solar g	ains in watts, calc	ulated	for each mo	nth			(83)m	= Sum(74)m .	(82)m				
(83)m=	246.79 420.07 5	71.49	698.64 771	.02 7	′5 9.61	734.83	682	616.01	463.62	295.6	211.17		(83)
Total g	ains – internal and	solar	(84)m = (73))m + (83)m ,	watts							
(0.4)	4000 44 4000 5 46												
(84)m=	1063.14 1230.5 13	351.37	1430.95 1453	.97 1	398.99	1349.22	1307	7.12 1268.72	1164.1	4 1049.2	10 <mark>05.56</mark>		(84)
` ′	an internal temper				398.99	1349.22	1307	7.12 1268.72	1164.1	4 1049.2	1005.56	_	(84)
7. Me		ature (heating sea	son)					1164.1	4 1049.2	1005.56	21	(84)
7. Mea	an internal temper	ature (heating sea eriods in the	son) living	area f	rom Tat			1164.1	4 1049.2	1005.56	21	
7. Mea	an internal temper erature during hea tion factor for gain	ature (heating sea eriods in the ving area, h	son) living	area f	rom Tat	ole 9,		1164.1 Oct		1005.56 Dec	21	
7. Mea	an internal temper erature during hea ution factor for gain Jan Feb	ature (ating pe	heating sea eriods in the ving area, h	son) living 1,m (s	area f	rom Tab	ole 9,	Th1 (°C)				21	
7. Met Temp Utilisa (86)m=	erature during heation factor for gain Jan Feb 0.95 0.93	ature (ating pens for li Mar 0.89	heating sea eriods in the ving area, h Apr M	living 1,m (say	area f see Ta Jun 0.57	rom Tab ble 9a) Jul 0.43	ole 9,	Th1 (°C) ug Sep 5 0.65	Oct	Nov	Dec	21	(85)
7. Met Temp Utilisa (86)m=	erature during heation factor for gain Jan Feb 0.95 0.93 internal temperature	ature (ating pens for li Mar 0.89	heating sea eriods in the ving area, h Apr M	living 1,m (s ay	area f see Ta Jun 0.57	rom Tab ble 9a) Jul 0.43	ole 9,	Th1 (°C) ug Sep 5 0.65 able 9c)	Oct	Nov 0.93	Dec	21	(85)
7. Mer Temp Utilisa (86)m= Mean (87)m=	erature during heation factor for gain Jan Feb 0.95 0.93 internal temperature during heation factor for gain 19.04 19.33 1	ature (ating pens for limited Mar 0.89 ure in limited	heating sea eriods in the ving area, h Apr M 0.82 0.7 iving area T	living 1,m (say 2 1 (follo	area f see Ta Jun 0.57 ow step 20.88	rom Tab ble 9a) Jul 0.43 os 3 to 7 20.96	ole 9, 0.4 7 in T	Th1 (°C) ug Sep 5 0.65 able 9c) 96 20.81	Oct 0.84	Nov 0.93	Dec 0.96	21	(85)
7. Meta Temp Utilisa (86)m= Mean (87)m= Temp	an internal temper erature during heattion factor for gain Jan Feb 0.95 0.93 internal temperature 19.04 19.33 11 erature during heat	ature (ating pens for li Mar 0.89 ure in li 19.73	heating sea eriods in the ving area, h Apr M 0.82 0.7 iving area T 20.25 20.	son) living 1,m (s ay 2 I (follo	area for see Ta Jun 0.57 Dw step 20.88	rom Tab ble 9a) Jul 0.43 os 3 to 7 20.96 from Ta	Ole 9, O.4 7 in T 20.9 able 9	Th1 (°C) ug Sep 5 0.65 able 9c) 96 20.81 9, Th2 (°C)	Oct 0.84	Nov 0.93	Dec 0.96	21	(85)
7. Meta Temp Utilisa (86)m= Mean (87)m= Temp (88)m=	an internal temper erature during heation factor for gain Jan Feb 0.95 0.93 internal temperature during heat 20.07 20.08 2	ature (ating pens for li Mar 0.89 ure in li 19.73 ating pe	heating sea eriods in the ving area, h Apr M 0.82 0.7 iving area T 20.25 20. eriods in res 20.13 20.	living 1,m (say 2 1 (follo	area for see Ta Jun 0.57 Dw step 20.88 velling 20.18	rom Tab ble 9a) Jul 0.43 os 3 to 7 20.96 from Ta	Ole 9, O.4 7 in T 20.9 able 9	Th1 (°C) ug Sep 5 0.65 able 9c) 96 20.81 9, Th2 (°C)	Oct 0.84	Nov 0.93	Dec 0.96	21	(85)
7. Me Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa	erature during heation factor for gain Jan Feb 0.95 0.93 internal temperature during heating during heating heating heating heating heating heating heating factor for gain	ature (ating pens for limited Mar 0.89 ure in limited	heating sea eriods in the ving area, h Apr M 0.82 0.7 iving area T 20.25 20. eriods in res 20.13 20.	living 1,m (say 2 1 (follo 62 : t of dv 14 :	area for see Ta Jun 0.57 Dw step 20.88 velling 20.18	rom Tak ble 9a) Jul 0.43 os 3 to 7 20.96 from Ta 20.18 e Table	Ole 9, Th1 (°C) ug Sep 5 0.65 able 9c) 96 20.81 9, Th2 (°C) 19 20.16	Oct 0.84 20.33	Nov 0.93 19.65	Dec 0.96 19.06 20.1	21	(85) (86) (87) (88)	
7. Me Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m=	erature during head tion factor for gain Jan Feb 0.95 0.93 internal temperature during head 20.07 20.08 2 stion factor for gain 0.95 0.92	ature (ating pens for limited	heating sea eriods in the ving area, h Apr M 0.82 0.7 iving area T 20.25 20. eriods in res 20.13 20. est of dwelling 0.8	living 1,m (say 2 1 (follo 62 : t of dv 14 :	area for see Ta Jun 0.57 Dw step 20.88 velling 20.18 c,m (se 0.51	rom Tak ble 9a) Jul 0.43 os 3 to 7 20.96 from Ta 20.18 e Table 0.36	Ole 9, Th1 (°C) ug Sep 5 0.65 able 9c) 96 20.81 9, Th2 (°C) 19 20.16	Oct 0.84 20.33 20.14	Nov 0.93	Dec 0.96	21	(85)	
7. Meta Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m= Mean	an internal temper erature during heation factor for gain Jan Feb 0.95 0.93 internal temperature during heat 20.07 20.08 2 atton factor for gain 0.95 0.92 internal temperature during heat 20.07 20.08 2 atton factor for gain 0.95 0.92 internal temperature	ature (ating pens for li Mar 0.89 ure in li 19.73 ating pens for re 0.88 ure in t	heating sea eriods in the ving area, h Apr M 0.82 0.7 iving area T 20.25 20. eriods in res 20.13 20. est of dwelling 0.8 0.6	living 1,m (say 2 1 (follo	area for see Ta Jun 0.57 Dw step 20.88 velling 20.18 c,m (see 0.51	rom Table 9a) Jul 0.43 0.5 3 to 7 20.96 from Ta 20.18 e Table 0.36 bllow ste	Ole 9, Th1 (°C) ug Sep 5 0.65 able 9c) 96 20.81 9, Th2 (°C) 19 20.16 8 0.59 to 7 in Table	Oct 0.84 20.33 20.14 0.81 e 9c)	Nov 0.93 19.65 20.12	Dec 0.96 19.06 20.1 0.95	21	(85) (86) (87) (88) (89)	
7. Me Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m=	an internal temper erature during heation factor for gain Jan Feb 0.95 0.93 internal temperature during heat 20.07 20.08 2 atton factor for gain 0.95 0.92 internal temperature during heat 20.07 20.08 2 atton factor for gain 0.95 0.92 internal temperature	ature (ating pens for limited	heating sea eriods in the ving area, h Apr M 0.82 0.7 iving area T 20.25 20. eriods in res 20.13 20. est of dwelling 0.8	living 1,m (say 2 1 (follo	area for see Ta Jun 0.57 Dw step 20.88 velling 20.18 c,m (se 0.51	rom Tak ble 9a) Jul 0.43 os 3 to 7 20.96 from Ta 20.18 e Table 0.36	Ole 9, Th1 (°C) ug Sep 5 0.65 able 9c) 96 20.81 0, Th2 (°C) 19 20.16 8 0.59 to 7 in Table 16 19.97	Oct 0.84 20.33 20.14 0.81 e 9c) 19.33	Nov 0.93 19.65 20.12 0.92	Dec 0.96 19.06 20.1 0.95		(85) (86) (87) (88) (89)	
7. Meta Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m= Mean	an internal temper erature during heation factor for gain Jan Feb 0.95 0.93 internal temperature during heat 20.07 20.08 2 atton factor for gain 0.95 0.92 internal temperature during heat 20.07 20.08 2 atton factor for gain 0.95 0.92 internal temperature	ature (ating pens for li Mar 0.89 ure in li 19.73 ating pens for re 0.88 ure in t	heating sea eriods in the ving area, h Apr M 0.82 0.7 iving area T 20.25 20. eriods in res 20.13 20. est of dwelling 0.8 0.6	living 1,m (say 2 1 (follo	area for see Ta Jun 0.57 Dw step 20.88 velling 20.18 c,m (see 0.51	rom Table 9a) Jul 0.43 0.5 3 to 7 20.96 from Ta 20.18 e Table 0.36 bllow ste	Ole 9, Th1 (°C) ug Sep 5 0.65 able 9c) 96 20.81 0, Th2 (°C) 19 20.16 8 0.59 to 7 in Table 16 19.97	Oct 0.84 20.33 20.14 0.81 e 9c) 19.33	Nov 0.93 19.65 20.12	Dec 0.96 19.06 20.1 0.95	0.25	(85) (86) (87) (88) (89)	
7. Mer Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m= Mean (90)m=	an internal temper erature during heation factor for gain Jan Feb 0.95 0.93 internal temperature during heat 20.07 20.08 2 atton factor for gain 0.95 0.92 internal temperature during heat 20.07 20.08 2 atton factor for gain 0.95 0.92 internal temperature	ature (ating pens for limited	heating sea eriods in the ving area, h Apr M 0.82 0.7 iving area T 20.25 20. eriods in res 20.13 20. est of dwelling 0.8 0.6 he rest of dwelling 19.2 19.	living 1,m (s ay 2 I (follo 62 1 of dv 14 1 mg, h2 8 velling	area for see Ta Jun 0.57 Dw step 20.88 velling 20.18 c,m (se 0.51 g T2 (for 20.07	rom Table 9a) Jul 0.43 0.5 3 to 7 20.96 from Ta 20.18 e Table 0.36 bllow ste 20.15	ole 9, O.4 7 in T 20.9 able 9 0.3 eps 3	Th1 (°C) ug Sep 5 0.65 able 9c) 96 20.81 9, Th2 (°C) 19 20.16 8 0.59 to 7 in Table 16 19.97	Oct 0.84 20.33 20.14 0.81 e 9c) 19.33	Nov 0.93 19.65 20.12 0.92	Dec 0.96 19.06 20.1 0.95		(85) (86) (87) (88) (89)
7. Me Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m= Mean (90)m=	erature during heation factor for gain Jan Feb 0.95 0.93 internal temperature during heat 20.07 20.08 2 erature during heat 20.07 20.08 2 ention factor for gain 0.95 0.92 internal temperature during heat 20.07 20.08 2 ention factor for gain 0.95 0.92 1 internal temperature during heat 20.07 20.08 2 internal	ature (ating pens for limited	heating sea eriods in the ving area, h Apr M 0.82 0.7 iving area T 20.25 20. eriods in res 20.13 20. est of dwelling 0.8 0.6 he rest of dwelling 19.2 19.	living 1,m (s ay 2 I (follo 52 t of dv 14 mg, h2 8 welling 71	area for see Ta Jun 0.57 Dw step 20.88 velling 20.18 c,m (se 0.51 g T2 (for 20.07	rom Table 9a) Jul 0.43 0.5 3 to 7 20.96 from Ta 20.18 e Table 0.36 bllow ste 20.15	ole 9, O.4 7 in T 20.9 able 9 0.3 eps 3	Th1 (°C) ug Sep 5 0.65 able 9c) 96 20.81 9, Th2 (°C) 19 20.16 8 0.59 to 7 in Tabl 16 19.97 f - fLA) x T2	Oct 0.84 20.33 20.14 0.81 e 9c) 19.33	Nov 0.93 19.65 20.12 0.92 18.36 ring area ÷ (4	Dec 0.96 19.06 20.1 0.95		(85) (86) (87) (88) (89)
7. Me Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m= Mean (90)m= Mean (92)m= Apply	erature during head ation factor for gain Jan Feb 0.95 0.93 internal temperature during head 20.07 20.08 20.07 20.08 20.095 0.92 internal temperature during head 20.07 20.08 20.095 0.92 internal temperature during head 20.095 0.992 internal temperature during head 20.095 0.992 internal temperature during head 20.095 0.992 internal temperature during head 20.095 0.993 during head 20.095 0.992 internal temperature during head 20.095 0.993 during head 20.095 during head 20.09	ature (ating pens for line) Mar 0.89 ure in line) ating pens for reconstance in the line in the	heating sea eriods in the ving area, h Apr M 0.82 0.7 iving area T 20.25 20. eriods in res 20.13 20. est of dwellin 0.8 0.6 he rest of dw 19.2 19.	living 1,m (s ay 2 I (follo 52 t of dv 14 mg, h2 welling 71 lwelling perati	area for see Ta Jun 0.57 Dow step 20.88 velling 20.18 d,m (se 0.51 g T2 (for 20.07) ng) = fL 20.27 ure from	rom Take ble 9a) Jul 0.43 0.5 3 to 7 20.96 from Ta 20.18 e Table 0.36 bllow ste 20.15 A × T1 20.36 m Table	ole 9, Au 0.4 7 in T 20.9 able 9 20.0 9a) 0.3 eps 3 20.0 + (1 - 20.0 2 4e, 9	Th1 (°C) ug Sep 5 0.65 able 9c) 96 20.81 9, Th2 (°C) 19 20.16 8 0.59 to 7 in Table 16 19.97 f - fLA) x T2 36 20.18 where approximates a second content of the conte	Oct 0.84 20.33 20.14 0.81 e 9c) 19.33 LA = Liv	Nov 0.93 19.65 20.12 0.92 18.36 ring area ÷ (4	Dec 0.96 19.06 20.1 0.95 17.49 1 = 17.88		(85) (86) (87) (88) (89) (90) (91) (92)
7. Me Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m= Mean (90)m= Mean (92)m= Apply (93)m=	erature during head tion factor for gain Jan Feb 0.95 0.93 internal temperature during head 20.07 20.08 20.07 20.08 20.07 20.08 20.07 20.08 20.07 20.08 20.07 20.08 20.07 20.08 20.095 0.92 internal temperature during head 20.095 0.93 during head 20.095 0.93 during head 20.095 0.93 during head 20.095 0.92 during head 20.095 0.93 during head 20.095 during he	ature (ating pens for limited	heating sea eriods in the ving area, h Apr M 0.82 0.7 iving area T 20.25 20. eriods in res 20.13 20. est of dwelling 0.8 0.6 he rest of dwelling 19.2 19.	living 1,m (s ay 2 I (follo 52 t of dv 14 mg, h2 welling 71 lwelling perati	area f see Ta Jun 0.57 ow ster 20.88 velling 20.18 d.,m (se 0.51 g T2 (fo 20.07	rom Table 9a) Jul 0.43 0.5 3 to 7 20.96 from Ta 20.18 e Table 0.36 bllow ste 20.15 A × T1 20.36	ole 9, Au 0.4 7 in T 20.9 able 9 0.3 eps 3 20. + (1 20.6	Th1 (°C) ug Sep 5 0.65 able 9c) 96 20.81 9, Th2 (°C) 19 20.16 8 0.59 to 7 in Table 16 19.97 f - fLA) x T2 36 20.18 where approximates a second content of the conte	Oct 0.84 20.33 20.14 0.81 e 9c) 19.33 LA = Liv	Nov 0.93 19.65 20.12 0.92 18.36 ring area ÷ (4	Dec 0.96 19.06 20.1 0.95 17.49 4) =		(85) (86) (87) (88) (89) (90) (91)
7. Me Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m= Mean (90)m= Mean (92)m= Apply (93)m= 8. Spa	erature during head ation factor for gain Jan Feb 0.95 0.93 internal temperature during head 20.07 20.08 20.07 20.08 20.095 0.92 internal temperature during head 20.07 20.08 20.095 0.92 internal temperature during head 20.095 0.992 internal temperature during head 20.095 0.992 internal temperature during head 20.095 0.992 internal temperature during head 20.095 0.993 during head 20.095 0.992 internal temperature during head 20.095 0.993 during head 20.095 during head 20.09	ature (ating pens for line 19.73 ating pens for reconstruction 18.45 ating pens for reconstruction 18.	heating sea eriods in the ving area, h Apr M 0.82 0.7 iving area T 20.25 20. eriods in res 20.13 20. est of dwellin 0.8 0.6 he rest of dw 19.2 19. the whole of 19.46 19. internal tem 19.46 19.	living 1,m (s ay 2 I (follo 52 t of dv 14 mg, h2 8 I welling 71 I welling peratu 93	area for see Ta Jun 0.57 Dw step 20.88 velling 20.18 dr T2 (for 20.07) arg) = fL 20.27 ure from 20.27	rom Take ble 9a) Jul 0.43 0s 3 to 7 20.96 from Ta 20.18 e Table 0.36 bllow ste 20.15 A × T1 20.36 m Table 20.36	Ole 9, Ol	Th1 (°C) ug Sep 5 0.65 able 9c) 96 20.81 0, Th2 (°C) 19 20.16 8 0.59 to 7 in Table 16 19.97 f - fLA) × T2 36 20.18 where approx 36 20.18	Oct 0.84 20.33 20.14 0.81 e 9c) 19.33 LA = Liv 19.58 ppriate 19.58	Nov 0.93 19.65 20.12 0.92 18.36 ing area ÷ (4) 18.68	Dec 0.96 19.06 20.1 0.95 17.49 17.88	0.25	(85) (86) (87) (88) (89) (90) (91) (92)

Apr

Mar

May

Jul

Jun

Sep

Aug

Oct

Nov

Dec

the utilisation factor for gains using Table 9a

Feb

Jan

l Itilicatio	on factor fo	r gains hr	n·										
	0.93 0.9	0.85	0.78	0.67	0.51	0.37	0.4	0.59	0.79	0.89	0.93		(94)
Useful gains, hmGm , W = (94)m x (84)m									, ,				
		63 1151.28	, 		720.22	501.84	519.44	752.25	921	938.39	938.61		(95)
Monthly average external temperature from Table 8													
(96)m=	4.3 4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2		(96)
Heat loss rate for mean internal temperature, Lm , W =[(39)m x [(93)m- (96)m]									•				
(97)m= 21	147.58 2093	99 1907.14	1559.16	1202.37	783.59	518.82	540.18	858.82	1310.64	1727.56	2083.89		(97)
Space heating requirement for each month, kWh/month = 0.024 x [(97)m - (95)m] x (41)m								I					
(98)m= 8	65.79 666.	562.36	320.61	165.72	0	0	0	0	289.89	568.2	852.09		_
							Tota	ıl per year	(kWh/yea	r) = Sum(9	8) _{15,912} =	4291.52	(98)
Space h	neating req	uirement i	n kWh/m ²	²/year								27.51	(99)
9a. Energ	gy requirer	nents – Ind	dividual h	eating s	ystems i	ncluding	micro-C	CHP)					
Space heating:								_					
Fraction	of space I	eat from s	secondar	y/supple	mentary	system						0	(201)
Fraction	of space l	eat from i	main syst	tem(s)			(202) = 1	- (201) =				1	(202)
Fraction of total heating from main system 1 (204) = (202) × [1 - (203)] =								1	(204)				
Effi <mark>cien</mark> d	cy of main	space hea	ting syste	em 1								90.5	(206)
Efficiend	cy of secor	dary/supp	l <mark>eme</mark> ntar	y heat <mark>in</mark>	g systen	າ, %						0	(208)
	Jan Fe	b Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/ye	– ar
Space h	eating req	uirement (calculate	d above)								
8	6 5.79 666.	36 56 2.36	320.61	165.72	0	0	0	0	289.89	568.2	852.09		
$(211)m = \{[(98)m \times (204)] \} \times 100 \div (206)$								(211)					
9	56.67 736.	621.39	354.26	183.11	0	0	0	0	320.32	627.85	941.54		
							Tota	al (kWh/yea	ar) =Sum(2	211) _{15,1012}	=	4742.01	(211)
•	neating fue	•	- /	month/									
	x (201)] }			1	ı	ı	ī	ī	ī			ı	
(215)m=	0 0	0	0	0	0	0	0 	0	0	0	0		¬
							Tota	ıı (Kvvn/yea	ar) =Sum(2	215) _{15,1012}	.=	0	(215)
Water heating Output from water heater (calculated above)													
	30.31 202			186.51	166.35	159.47	175.39	175.2	197.59	209.3	224.67		
	y of water h	L eater			l	l	l	l	l	<u> </u>	<u> </u>	79.8	(216)
(217)m= 8	38.02 87.7	6 87.29	86.19	84.5	79.8	79.8	79.8	79.8	85.83	87.35	88.04		(217)
Fuel for water heating, kWh/month													
(219)m <u>=</u>	: (64)m x	100 ÷ (217	<u>')m</u>									l	
(219)m= 2	61.65 231.	22 243.89	221.07	220.72	208.46	199.83	219.78	219.55	230.2	239.62	255.2		_
Total = Sum(219a) ₁₁₂ =									2751.19	(219)			
Annual totals Space heating fuel used, main system 1								kWh/year	¬				
							4742.01	╣					
Water heating fuel used								2751.19					
Electricity for pumps, fans and electric keep-hot													

			_
mechanical ventilation - balanced, extract or pos	itive input from outside	520.1	(230a)
central heating pump:		30	(230c)
Total electricity for the above, kWh/year	sum of (23	0a)(230g) =	550.11 (231)
Electricity for lighting			533.57 (232)
10a. Fuel costs - individual heating systems:			
	Fuel kWh/year	Fuel Price (Table 12)	Fuel Cost £/year
Space heating - main system 1	(211) x	3.48 × 0.01 =	165.02 (240)
Space heating - main system 2	(213) x	0 x 0.01 :	0 (241)
Space heating - secondary	(215) x	13.19 × 0.01 :	0 (242)
Water heating cost (other fuel)	(219)	3.48 × 0.01 :	95.74 (247)
Pumps, fans and electric keep-hot	(231)	13.19 × 0.01 :	72.56 (249)
(if off-peak tariff, list each of (230a) to (230g) sepa Energy for lighting	arately as applicable and ap	oply fuel price according to	
Additional standing charges (Table 12)			120 (251)
11a. SAP rating - individual heating systems Energy cost deflator (Table 12) Energy cost factor (ECF) SAP rating (Section 12)	7) + (250)(254) = 56)] ÷ [(4) + 45.0] =		0.42 (256) 1.09 (257) 84.73 (258)
12a. CO2 emissions – Individual heating system	s including micro-CHP		
	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating (main system 1)	(211) x	0.216 =	1024.27 (261)
Space heating (secondary)	(215) x	0.519 =	0 (263)
Water heating	(219) x	0.216 =	594.26 (264)
Space and water heating	(261) + (262) + (263) + (264) =	=	1618.53 (265)
Electricity for pumps, fans and electric keep-hot	(231) x	0.519 =	285.51 (267)
Electricity for lighting	(232) x	0.519 =	276.92 (268)
Total CO2, kg/year	SU	ım of (265)(271) =	2180.96 (272)
CO2 emissions per m ²	(2	72) ÷ (4) =	13.98 (273)
El rating (section 14)			85 (274)
13a. Primary Energy			
	Energy kWh/year	Primary factor	P. Energy kWh/year
Space heating (main system 1)	(211) x	1.22	5785.25 (261)

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Space heating (secondary)	(215) x	3.07	=	0	(263)
Energy for water heating	(219) x	1.22	=	3356.46	(264)
Space and water heating	(261) + (262) + (263) + (264	·) =		9141.71	(265)
Electricity for pumps, fans and electric keep-hot	(231) x	3.07	=	1688.83	(267)
Electricity for lighting	(232) x	0	=	1638.06	(268)
'Total Primary Energy		12468.59	(272)		
Primary energy kWh/m²/year		79.93	(273)		

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9.3. Appendix 3 – SAP Worksheets 'Be Clean'

(Refer to Appendix 2. 'Be Clean' and 'Be Lean' SAP Worksheets are identical)



9.4. Appendix 4 – SAP Worksheets 'Be Green'

				User D	etails:						
Assessor Name: Software Name:	Stroma FS	AP 2012			Softwa	a Num are Ver			Versio	n: 1.0.4.18	
	00 57 1	•			Address	: LG01					
Address:	39, Fitzjohn	s Avenue	e, LONL	ON, NV	V3 5JY						
Overall dwelling dime	ensions:			A #04	n/m 2\		Av. Hai	iaht/m\		\/aluma/m3\	
Basement					a(m²) 132	(1a) x		ight(m) 3.2	(2a) =	Volume(m³) 422.4	(3a)
					132]]
Ground floor					132	(1b) x	3	3.2	(2b) =	422.4	(3b)
Total floor area TFA = (1	la)+(1b)+(1c)+	(1d)+(1e))+(1r	1)	264	(4)					
Dwelling volume						(3a)+(3b))+(3c)+(3d	l)+(3e)+	.(3n) =	844.8	(5)
2. Ventilation rate:											
	main heating		condar	у	other		total			m³ per hour	
Number of chimneys	0	7 +	0	+ [0] = [0	X 4	40 =	0	(6a)
Number of open flues	0	T + F	0	Ī + Ē	0	ī - F	0	x2	20 =	0	(6b)
Number of intermittent fa	ans						0	x ′	10 =	0	(7a)
Number of passive vents	S					Ē	0	x ′	10 =	0	(7b)
Number of flueless gas f	fires					\	0	X 4	40 =	0	(7c)
									Air ch	anges <mark>per</mark> hou	ır
Infiltration due to chimne	eys, flu <mark>es an</mark> d f	ans = (68	a)+(6b)+(7	(a)+(7b)+(7c) =		0	Π.	÷ (5) =	0	(8)
If a pressurisation test has			d, proceed	d to (17), d	otherwise (continue fr	om (9) to ((16)	,		-
Number of storeys in t	the dw <mark>elling</mark> (no	s) <u> </u>								2	(9)
Additional infiltration	0.05 for stool o	. 4: 4		0.05 ([(9)-	-1]x0.1 =	0.1	(10)
Structural infiltration: (if both types of wall are p						•	uction			0.35	(11)
deducting areas of open			oriding to	ine great	ci wan arc	a (anoi					
If suspended wooden	floor, enter 0.2	(unseale	ed) or 0.	1 (seale	ed), else	enter 0				0	(12)
If no draught lobby, er	nter 0.05, else	enter 0								0.05	(13)
Percentage of window	s and doors di	aught str	ripped							100	(14)
Window infiltration					•	! x (14) ÷ 1	- 1			0.05	(15)
Infiltration rate					. , . ,	+ (11) + (1	, , ,	, ,		0.55	(16)
Air permeability value				•		•	etre of e	nvelope	area	0	(17)
If based on air permeabi	-						is hoine	end		0.55	(18)
Number of sides shelter		on lest nas	been don	ie or a deg	угее ан ре	ппеаышу	is being us	seu		2	(19)
Shelter factor	- -				(20) = 1 -	[0.075 x (1	9)] =			0.85	(20)
Infiltration rate incorpora	iting shelter fac	tor			(21) = (18) x (20) =				0.47	(21)
Infiltration rate modified	for monthly wir	nd speed									_
Jan Feb	Mar Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Monthly average wind sp	peed from Tab	e 7									
(22)m= 5.1 5	4.9 4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7		

Wind F	<u> </u>	22a)m =	`	4		T			1	1			1		
(22a)m=	1.27	1.25	1.23	1.1	1.08	0.95	0.95	0.92	1	1.08	1.12	1.18			
Adjuste	ed infiltra	ation rat	e (allowi	ng for sh	elter an	d wind s	speed) =	(21a) x	(22a)m						
	0.6	0.58	0.57	0.51	0.5	0.44	0.44	0.43	0.47	0.5	0.53	0.55]		
		<i>ctive air</i> al ventila	change i	rate for t	he appli	cable ca	se	-	-		-	-	- -	0.5	(23a
			using Appe	endix N. (2	3b) = (23a	a) × Fmv (e	eguation (N	N5)) . othe	rwise (23b) = (23a)				0.5	(23)
If bala	anced with	heat reco	overy: effici	iency in %	allowing f	or in-use f	actor (from	n Table 4h) =	, , ,				7.35	(230
a) If I	balance	d mech	anical ve	entilation	with he	at recov	erv (MVI	HR) (24a	a)m = (2)	2b)m + (23b) x [1 – (23c)			(
(24a)m=		0.7	0.69	0.63	0.62	0.56	0.56	0.55	0.58	0.62	0.64	0.66]		(24
b) If I	balance	d mech	anical ve	ntilation	without	heat red	covery (N	лV) (24b	m = (22)	2b)m + (2	23b)	1	ı		
(24b)m=	0	0	0	0	0	0	0	0	0	0	0	0]		(24
c) If v	whole h	ouse ex	tract ven	tilation o	r positiv	e input	ventilatio	n from o	outside		•	•	•		
ii	f (22b)n	n < 0.5 ×	(23b), t	hen (24d	c) = (23b); other	wise (24	c) = (22l	o) m + 0.	5 × (23b)		,		
(24c)m=	0	0	0	0	0	0	0	0	0	0	0	0]		(240
,			on or when (24d)		•					O E 1					
ا =(24d) =		0	0	0	0	0	0	0.5 + [(2	0	0.5]	0	0			(24
` ' L			rate - er										J		(
(25)m=	ouve an	change	rate ci	itei (Z+a) 01 (24))	C) OI (2-	u) 111 002	(20)						
	0.71	0.7	0.69	0.63	0.62	0.56	0.56	0.55	0.58	0.62	0.64	0.66			(25)
						0.56	0.56	0.55	0.58	0.62	0.64	0.66]		(25)
3. Hea	at losse:	s and he	eat loss p	paramete	er:						0.64				
	at losse:		eat loss p		er:	0.56 Net Ar A ,r	ea	0.55 U-val W/m2	ue	0.62 A X U (W/I		0.66 k-value kJ/m²-l		A . kJ	X k
3. Hea	at losse:	s and he Gros	eat loss p	oaramete Openin	er:	Net Ar	ea m²	U-val	ue PK	AXU		k-value			X k
3. Hea	at losse:	s and he Gros area	eat loss p	oaramete Openin	er:	Net Ar A ,r	ea m² x1/	U-val W/m2	ue 2K 0.04] =	A X U (W/I		k-value			X k /K
3. Head Section 1. Sec	at losses	Gros area e 1	eat loss p	oaramete Openin	er:	Net Ar A ,r 4.75	ea m² x1/	U-val W/m2 /[1/(1.8)+	ue 2K 0.04] = 0.04] =	A X U (W/I		k-value			X k /K (27)
3. Head Section 1. Window Window Window Window	at losses IENT ws Type ws Type	Gros area e 1	eat loss p	oaramete Openin	er:	Net Ar A ,r 4.75	ea m² x1/ x1/ x1/	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+	0.04] = 0.04] = 0.04] = 0.04]	A X U (W/I 7.98 3.36		k-value			X k /K (27) (27)
3. Head Window Window Window Window Window	at losse: IENT ws Type ws Type ws Type	Gros area e 1	eat loss p	oaramete Openin	er:	Net Ar A ,r 4.75	x1/ x1/ x1/	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+	0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04]	A X U (W/I 7.98 3.36 7.98		k-value			X k /K (27) (27) (27)
3. Head Window Window Window Window Window Window	at losses IENT ws Type ws Type ws Type ws Type	Gros area e 1 e 2 e 3 e 4	eat loss p	oaramete Openin	er:	Net Ar A ,r 4.75 2 4.75	ea m² x1/ x1/ x1/ x1/ x1/	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+	ue 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] =	A X U (W/I 7.98 3.36 7.98 3.36		k-value			X k /K (27) (27) (27) (27)
3. Head Window W	at losses IENT ws Type ws Type ws Type ws Type ws Type	Gros area e 1 e 2 e 3 e 4	eat loss p	oaramete Openin	er:	Net Ar A ,r 4.75 2 4.75 2	ea m² x1/ x1/ x1/ x1/ x1/	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+	ue 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] =	A X U (W/I 7.98 3.36 7.98 3.36 3.36		k-value			X k /K (27) (27) (27) (27) (27)
3. Head Window Window Window Window Window Window	at losses IENT ws Type	Gros area e 1 e 2 e 3 e 4	eat loss participations of the control of the contr	oaramete Openin	gs 2	Net Ar A ,r 4.75 2 4.75 2 2 2	x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+	0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04]	A X U (W/I 7.98 3.36 7.98 3.36 3.36 3.36		k-value			X k /K (27) (27) (27) (27) (27) (27)
3. Head Window Window Window Window Window Window Window Window Floor	at losses IENT ws Type ws Type ws Type ws Type ws Type ws Type	Gros area 2 2 3 4 4 4 5 5 6 6	eat loss participations of the control of the contr	Openin m	gs 2	Net Ar A ,r 4.75 2 4.75 2 2 132	x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.2	0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = = 0.04] =	A X U (W/I 7.98 3.36 7.98 3.36 3.36 3.36 26.4		k-value			X k /K (27) (27) (27) (27) (27) (27)
3. Head Window W	at losses IENT ws Type ws Type ws Type ws Type ws Type fype1 Type2	Gros area 2 2 3 4 4 5 5 6 6 32	eat loss participations of the control of the contr	Openin m	gs 2	Net Ar A ,r 4.75 2 4.75 2 2 2 132 15.75	x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.2	0.04] = [0.04]	A X U (W/I 7.98 3.36 7.98 3.36 3.36 3.36 3.94		k-value			X k /K (27) (27) (27) (27) (27) (28) (29)
3. Head Window W	at losses IENT ws Type ws Type ws Type ws Type ws Type fype1 fype2 fype3	Gros area e 1 e 2 e 3 e 4 e 5 e 6 e 6	eat loss particular (m²)	Openin m	gs 2	Net Ar A ,r 4.75 2 4.75 2 2 2 132 15.75 36	x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.2 0.25	0.04] = [0.04]	A X U (W/I 7.98 3.36 7.98 3.36 3.36 3.36 3.94 9		k-value			X k /K (27) (27) (27) (27) (27) (27) (28) (29)
3. Head Window W	at losses IENT ws Type ws Type ws Type ws Type ws Type fype1 fype2 fype3 fype4	S and he Gros area at 1 at 2 at 2 at 3 at 4 at 5 at 6 at 2	eat loss participations (m²)	16.25 4 16.25	gs 2	Net Ar A ,r 4.75 2 4.75 2 132 15.75 36 15.75 22	x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.2 0.25 0.25 0.25	0.04] = [0.04]	A X U (W/I 7.98 3.36 7.98 3.36 3.36 3.36 3.94 9 3.94 5.5		k-value			X k /K (27) (27) (27) (27) (27) (27) (28) (29) (29) (29)
3. Head Window W	at losses IENT ws Type ws Type ws Type ws Type ws Type fype1 fype2 fype3 fype4 fype5	Gros area e 1 e 2 e 3 e 4 e 5 e 6 e 6 e 32 e 40 e 32	eat loss participation (m²)	16.25 4	gs 2	Net Ar A ,r 4.75 2 4.75 2 2 2 132 15.75 36	x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.2 0.25 0.25	0.04] = [0.04]	A X U (W/I 7.98 3.36 7.98 3.36 3.36 3.36 3.94 9 3.94		k-value			X k /K (27) (27) (27) (27) (27) (28) (29) (29) (29)
3. Head Selection Window Windo	at losses IENT ws Type ws Type ws Type ws Type ws Type fype1 fype2 fype3 fype4 fype5 rea of e	S and he Gros area at 1 at 2 at 2 at 3 at 4 at 5 at 6 at 1 at 2 at 1 at 1 at 1 at 1 at 1 at 1	eat loss participation (m²)	16.28 4 16.28 0	gs 2	Net Ar A ,r 4.75 2 4.75 2 2 132 15.75 36 15.75 22 14 276	x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2 x1/2	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.2 0.25 0.25 0.25	0.04] = [0.04]	A X U (W/I 7.98 3.36 7.98 3.36 3.36 3.36 3.94 9 3.94 5.5 3.5	()	k-value kJ/m²-	k		X k /K (27) (27) (27) (27) (28) (29) (29) (29)
3. Head Selection of the control of	at losses IENT ws Type ws Type ws Type ws Type ws Type fype1 fype2 fype3 fype4 fype5 rea of e dows and e the area	s and he Gros area at 1 at 2 at 3 at 4 at 5 at 6 at 6 at 1 at 2 at 1 at 1 at 1 at 1 at 1 at 1	eat loss part (m²), m²	Openin m 16.25 4 16.25 0 4 ffective winternal wall	gs 2	Net Ar A ,r 4.75 2 4.75 2 15.75 36 15.75 22 14 276 alue calculus	ea m² x1/	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.2 0.25 0.25 0.25	0.04] = [0.04]	A X U (W/I 7.98 3.36 7.98 3.36 3.36 3.36 3.94 9 3.94 5.5 3.5	()	k-value kJ/m²-	k		X k /K (27) (27) (27) (27) (27) (28) (29) (29) (29) (29) (31)
3. Head Selection of the selection of th	at losses IENT ws Type ws Type ws Type ws Type ws Type fype1 fype2 fype3 fype4 fype5 rea of e dows and e the area heat los	s and he Gros area at 1 at 2 at 2 at 3 at 4 at 5 at 6 at 6 at 1 at 2 at 1 at 1 at 1 at 1 at 1 at 1	eat loss part los pa	Openin m 16.25 4 16.25 0 4 ffective winternal wall	gs 2	Net Ar A ,r 4.75 2 4.75 2 15.75 36 15.75 22 14 276 alue calculus	ea m² x1/	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.2 0.25 0.25 0.25	Ue K 0.04 = 0.04	A X U (W/I) 7.98 3.36 7.98 3.36 3.36 3.36 26.4 3.94 9 3.94 5.5 3.5	<)	k-value kJ/m²-	K 3.2		X k /K (27) (27) (27) (27) (27) (28) (29) (29) (29) (31)
3. Head Selection of the selection of th	at losses IENT ws Type ws Type ws Type ws Type ws Type fype1 fype2 fype3 fype4 fype5 rea of e dows and e the area heat los apacity	s and he Gros area e 1 e 2 e 3 e 4 e 5 e 6 32 40 32 22 18 ellements eroof winder es on both es, W/K =	eat loss part los pa	Openin m 16.25 4 16.25 0 4 Iffective winternal wall U)	gs 2 5 mdow U-vals and pand	Net Ar A ,r 4.75 2 4.75 2 132 15.75 36 15.75 22 14 276 alue calculatitions	rea m² x1/	U-val W/m2 /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.2 0.25 0.25 0.25	Ue	A X U (W/I 7.98 3.36 7.98 3.36 3.36 3.36 3.94 9 3.94 5.5 3.5	(s) (32a).	k-value kJ/m²-	n 3.2	kJ	X k /K (27 (27 (27 (27 (27 (27 (29 (29 (29 (31

For design assessments where the details of the construction are not known precisely the indicative values of TMP in Table 1f

can be used instead of a detailed calculation Thermal bridges: S (L x Y) calculated using Appendix K (36)41.4 if details of thermal bridging are not known (36) = $0.05 \times (31)$ Total fabric heat loss (33) + (36) =(37)161.68 Ventilation heat loss calculated monthly (38)m = $0.33 \times (25)$ m x (5)Feb Mar Jul Aug Sep Dec .lan Apr May Jun Oct Nov (38)m =197.74 194.49 191.23 174.94 171.68 155.39 155.39 152.13 161.9 171.68 178.2 184.71 (38)Heat transfer coefficient, W/K (39)m = (37) + (38)m (39)m =359.42 356.17 352.91 336.62 333.36 317.07 317.07 313.81 323.58 333.36 339.87 346.39 Average = Sum(39)_{1...12} /12= (39)335.8 Heat loss parameter (HLP), W/m²K (40)m = (39)m \div (4)1.36 1.35 1.34 1.28 1.26 1.2 1.2 1.19 1.23 1.26 1.29 1.31 (40)m =(40)Average = $Sum(40)_{1...12}/12=$ 1.27 Number of days in month (Table 1a) Jan Feb Mar Jun May Jul Aug Sep Oct Nov Apr Dec (41)31 28 31 30 31 30 31 31 30 31 30 31 (41)m =4. Water heating energy requirement: Assumed occupancy, N (42)3.09 if TFA > 13.9, $N = 1 + 1.76 \times [1 - \exp(-0.000349 \times (TFA - 13.9)2)] + 0.0013 \times (TFA - 13.9)$ if TFA £ 13.9, N = 1Annual average hot water usage in litres per day Vd, average = (25 x N) + 36 (43)107.47 Reduce the annual average hot water usage by 5% if the dwelling is designed to achieve a water use target of not more that 125 litres per person per day (all water use, hot and cold) Jan Feb Mar Apr May Jun Aug Sep Oct Nov Dec Hot water usage in litres per day for each month Vd,m = factor from Table 1c x (43) 118.22 113.92 109.62 105.32 101.02 101.02 105.32 113.92 118.22 (44)m =96.72 96.72 109.62 (44)Total = $Sum(44)_{1...12}$ = 1289.66 Energy content of hot water used - calculated monthly = 4.190 x Vd,m x nm x DTm / 3600 kWh/month (see Tables 1b, 1c, 1d) 169.78 (45)m =175.32 153.33 158.22 137.94 132.36 114.22 105.84 121.45 122.9 143.23 156.35 (45)Total = $Sum(45)_{1...12}$ = 1690.95 If instantaneous water heating at point of use (no hot water storage), enter 0 in boxes (46) to (61) 26.3 23.73 20.69 17.13 15.88 18.22 18.44 21.48 23.45 25.47 (46)19.85 Water storage loss: Storage volume (litres) including any solar or WWHRS storage within same vessel 300 (47)If community heating and no tank in dwelling, enter 110 litres in (47) Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in (47) Water storage loss: a) If manufacturer's declared loss factor is known (kWh/day): 1.69 (48)Temperature factor from Table 2b (49)0.54 Energy lost from water storage, kWh/year $(48) \times (49) =$ 0.91 (50)b) If manufacturer's declared cylinder loss factor is not known: Hot water storage loss factor from Table 2 (kWh/litre/day) 0 (51)If community heating see section 4.3 Volume factor from Table 2a (52)0 Temperature factor from Table 2b 0 (53)

Energy lost from water storage, kWh/year	(47) x (51) x (52) x (53) =	0	(54)
Enter (50) or (54) in (55) Water storage loss calculated for each month	$((56)m = (55) \times (41)m$	0.91	(55)
	· · · · · · · ·	07.00	(56)
(56)m= 28.29 25.55 28.29 27.38 28.29 27.38 28.29 27.38 28.29 If cylinder contains dedicated solar storage, (57)m = (56)m x [(50) – (H11)] ÷		27.38 28.29 (H11) is from Append	(56) ix H
(57)m= 28.29 25.55 28.29 27.38 28.29 27.38 28.29		27.38 28.29	(57)
Primary circuit loss (annual) from Table 3		0	(58)
Primary circuit loss calculated for each month (59) m = $(58) \div$	365 × (41)m		l
(modified by factor from Table H5 if there is solar water hea	iting and a cylinder thermo	ostat)	
(59)m= 23.26 21.01 23.26 22.51 23.26 22.51 23.26	23.26 22.51 23.26	22.51 23.26	(59)
Combi loss calculated for each month (61)m = (60) \div 365 × (4	1)m		
(61)m= 0 0 0 0 0 0	0 0 0	0 0	(61)
Total heat required for water heating calculated for each mon	th (62) m = $0.85 \times (45)$ m +	(46)m + (57)m +	(59)m + (61)m
(62)m= 226.87 199.9 209.78 187.83 183.91 164.11 157.3	9 173 172.79 194.78	206.24 221.34	(62)
Solar DHW input calculated using Appendix G or Appendix H (negative quant	tity) (enter '0' if no solar contribu	tion to water heating)	
(add additional lines if FGHRS and/or WWHRS applies, see A	Appendix G)	,	
(63)m= 0 0 0 0 0 0	0 0 0	0 0	(63)
Output from water heater			
(64)m= 226.87 199.9 209.78 187.83 183.91 164.11 157.3	9 173 172.79 194.78	206.24 221.34	
	Output from water heate	r (annual) ₁₁₂	2297.95 (64)
Heat gains from water heating, kWh/month 0.25 / [0.85 x (45)	$m + (61)ml + 0.8 \times [(46)m]$	+ (57)m + (59)m	1
	(8 l/m] . die x [(le/m	1 (67)111 1 (66)111	, 1
(65)m= 99.53 88.23 93.85 85.78 85.25 77.89 76.43		91.9 97.7	(65)
	81.63 80.78 88.87	91.9 97.7	(65)
(65)m= 99.53 88.23 93.85 85.78 85.25 77.89 76.43	81.63 80.78 88.87	91.9 97.7	(65)
(65)m= 99.53 88.23 93.85 85.78 85.25 77.89 76.43 include (57)m in calculation of (65)m only if cylinder is in the	81.63 80.78 88.87	91.9 97.7	(65)
(65)m= 99.53 88.23 93.85 85.78 85.25 77.89 76.43 include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a):	81.63 80.78 88.87	91.9 97.7	(65)
(65)m= 99.53 88.23 93.85 85.78 85.25 77.89 76.43 include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts	81.63 80.78 88.87 e dwelling or hot water is f Aug Sep Oct	91.9 97.7 rom community h	(65)
include (57)m in calculation of (65)m only if cylinder is in the first that the second	81.63 80.78 88.87 e dwelling or hot water is f Aug Sep Oct 1 185.11 185.11 185.11	91.9 97.7 rom community h	(65) leating
(65)m= 99.53 88.23 93.85 85.78 85.25 77.89 76.43 include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 185.11 185.11 185.11 185.11 185.11 185.11	81.63 80.78 88.87 e dwelling or hot water is f Aug Sep Oct 1 185.11 185.11 185.11 also see Table 5	91.9 97.7 rom community h	(65) leating
(65)m= 99.53 88.23 93.85 85.78 85.25 77.89 76.43 include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 18	Aug Sep Oct 1 185.11 185.11 185.11 also see Table 5 46.28 62.12 78.87	91.9 97.7 rom community h Nov Dec 185.11 185.11	(65) leating (66)
(65)m= 99.53 88.23 93.85 85.78 85.25 77.89 76.43 include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 185.11 185.11 185.11 185.11 185.11 185.11 Lighting gains (calculated in Appendix L, equation L9 or L9a), (67)m= 95.48 84.81 68.97 52.21 39.03 32.95 35.61	Aug Sep Oct 1 185.11 185.11 185.11 also see Table 5 46.28 62.12 78.87	91.9 97.7 rom community h Nov Dec 185.11 185.11	(65) leating (66)
(65)m= 99.53 88.23 93.85 85.78 85.25 77.89 76.43 include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 18	Aug Sep Oct 1 185.11 185.11 185.11 also see Table 5 46.28 62.12 78.87 1.13a), also see Table 5 6 471.73 488.45 524.05	91.9 97.7 rom community h Nov Dec 185.11 185.11 92.06 98.14	(65) leating (66) (67)
(65)m= 99.53 88.23 93.85 85.78 85.25 77.89 76.43 include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 185.1	Aug Sep Oct 1 185.11 185.11 185.11 also see Table 5 46.28 62.12 78.87 1.13a), also see Table 5 6 471.73 488.45 524.05	91.9 97.7 rom community h Nov Dec 185.11 185.11 92.06 98.14	(65) leating (66) (67)
(65)m= 99.53 88.23 93.85 85.78 85.25 77.89 76.43 include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 185.1	Aug Sep Oct 1 185.11 185.11 185.11 also see Table 5 46.28 62.12 78.87 .13a), also see Table 5 6 471.73 488.45 524.05 a), also see Table 5	91.9 97.7 rom community h Nov Dec 185.11 185.11 92.06 98.14 568.98 611.21	(65) leating (66) (67) (68)
(65)m= 99.53 88.23 93.85 85.78 85.25 77.89 76.43 include (57)m in calculation of (65)m only if cylinder is in the 5. Internal gains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 185.1	Aug Sep Oct 1 185.11 185.11 185.11 also see Table 5 46.28 62.12 78.87 .13a), also see Table 5 6 471.73 488.45 524.05 a), also see Table 5	91.9 97.7 rom community h Nov Dec 185.11 185.11 92.06 98.14 568.98 611.21	(65) leating (66) (67) (68)
include (57)m in calculation of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (66)m only if cylinder is in the final state o	Aug Sep Oct 1 185.11 185.11 185.11 also see Table 5 46.28 62.12 78.87 13a), also see Table 5 6 471.73 488.45 524.05 1a), also see Table 5 56.6 56.6 56.6	91.9 97.7 rom community h Nov Dec 185.11 185.11 92.06 98.14 568.98 611.21 56.6 56.6	(65) leating (66) (67) (68) (69)
include (57)m in calculation of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (66)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (66)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (66)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (66)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (65)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (65)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (65)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (65)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (65)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (65)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (65)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (65)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (65)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (65)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (65)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (65)m. Herefore, and the final state of (65)m only if cylinder is in the final state of (65)m. Herefore, and the final state of (65)m. Herefore, and	Aug Sep Oct 1 185.11 185.11 185.11 also see Table 5 46.28 62.12 78.87 .13a), also see Table 5 6 471.73 488.45 524.05 a), also see Table 5 56.6 56.6 56.6	91.9 97.7 rom community h Nov Dec 185.11 185.11 92.06 98.14 568.98 611.21 56.6 56.6	(65) leating (66) (67) (68) (69)
include (57)m in calculation of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (66)m. Herefore, Table 5), Watts Metabolic gains (Table 5), Watts Jan	Aug Sep Oct 1 185.11 185.11 185.11 also see Table 5 46.28 62.12 78.87 .13a), also see Table 5 6 471.73 488.45 524.05 a), also see Table 5 56.6 56.6 56.6	91.9 97.7 rom community h Nov Dec 185.11 185.11 92.06 98.14 568.98 611.21 56.6 56.6 3 3	(65) leating (66) (67) (68) (69) (70)
include (57)m in calculation of (65)m only if cylinder is in the final state of (57)m in calculation of (65)m only if cylinder is in the final state of (57)m in calculation of (65)m only if cylinder is in the final state of (57)m in calculation of (65)m only if cylinder is in the final state of (57)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m only if cylinder is in the final state of (65)m. Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m Jul	Aug Sep Oct 1 185.11 185.11 185.11 also see Table 5 46.28 62.12 78.87 .13a), also see Table 5 6 471.73 488.45 524.05 a), also see Table 5 56.6 56.6 56.6 3 3 3 3 1 -123.41 -123.41 -123.41	91.9 97.7 rom community h Nov Dec 185.11 185.11 92.06 98.14 568.98 611.21 56.6 56.6 3 3	(65) leating (66) (67) (68) (69) (70)
include (57)m in calculation of (65)m only if cylinder is in the final pains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 1	Aug Sep Oct 1 185.11 185.11 185.11 also see Table 5 46.28 62.12 78.87 .13a), also see Table 5 6 471.73 488.45 524.05 a), also see Table 5 56.6 56.6 56.6 3 3 3 3 1 -123.41 -123.41 -123.41	91.9 97.7 rom community h Nov Dec 185.11 185.11 92.06 98.14 568.98 611.21 56.6 56.6 3 3 -123.41 -123.41 127.64 131.31	(65) leating (66) (67) (68) (69) (70) (71)
include (57)m in calculation of (65)m only if cylinder is in the final pains (see Table 5 and 5a): Metabolic gains (Table 5), Watts Jan Feb Mar Apr May Jun Jul (66)m= 185.11 1	Aug Sep Oct 1 185.11 185.11 185.11 also see Table 5 46.28 62.12 78.87 .13a), also see Table 5 6 471.73 488.45 524.05 a), also see Table 5 56.6 56.6 56.6 3 3 3 3 1 -123.41 -123.41 -123.41 3 109.71 112.19 119.44	91.9 97.7 rom community h Nov Dec 185.11 185.11 92.06 98.14 568.98 611.21 56.6 56.6 3 3 -123.41 -123.41 127.64 131.31	(65) leating (66) (67) (68) (69) (70) (71)

Solar gains are calculated using solar flux from Table 6a and associated equations to convert to the applicable orientation.

Orientati	on:	Access Factor Table 6d	·	Area m²		Flux Table 6a		g_ Table 6b		FF Table 6c		Gains (W)	
North	0.9x	1	X	2	x	10.63	x	0.5	x	0.9	=	17.23	(74)
North	0.9x	1	X	2	x	10.63	х	0.5	x	0.9] =	17.23	(74)
North	0.9x	1	X	2	х	20.32	х	0.5	x	0.9	<u> </u>	32.92	(74)
North	0.9x	1	X	2	x	20.32	х	0.5	x	0.9] =	32.92	(74)
North	0.9x	1	X	2	x	34.53	х	0.5	x	0.9] =	55.94	(74)
North	0.9x	1	X	2	x	34.53	х	0.5	x	0.9	=	55.94	(74)
North	0.9x	1	X	2	x	55.46	х	0.5	x	0.9	=	89.85	(74)
North	0.9x	1	X	2	x	55.46	x	0.5	x	0.9	=	89.85	(74)
North	0.9x	1	X	2	x	74.72	x	0.5	x	0.9	=	121.04	(74)
North	0.9x	1	X	2	x	74.72	x	0.5	x	0.9	=	121.04	(74)
North	0.9x	1	X	2	x	79.99	x	0.5	x	0.9	=	129.58	(74)
North	0.9x	1	X	2	x	79.99	x	0.5	x	0.9	=	129.58	(74)
North	0.9x	1	X	2	x	74.68	x	0.5	x	0.9	=	120.98	(74)
North	0.9x	1	X	2	x	74.68	x	0.5	x	0.9	=	120.98	(74)
North	0.9x	1	X	2	x	59.25	x	0.5	x	0.9	=	95.98	(74)
North	0.9x	1	X	2	X	59.25	X	0.5	X	0.9] =	95.98	(74)
North	0.9x	1	X	2	x	41.52	х	0.5	x	0.9		67.26	(74)
North	0.9x	1	X	2	х	41.52	×	0.5	x	0.9	=	67.26	(74)
North	0.9x	1	X	2	x	24.19	x	0.5	x	0.9	=	39.19	(74)
North	0.9x	1	X	2	x	24.19	х	0.5	x	0.9	=	39.19	(74)
North	0.9x	1	X	2	x	13.12	X	0.5	x	0.9	=	21.25	(74)
North	0.9x	1	X	2	х	13.12	x	0.5	x	0.9	=	21.25	(74)
North	0.9x	1	x	2	x	8.86	x	0.5	x	0.9	=	14.36	(74)
North	0.9x	1	X	2	x	8.86	x	0.5	x	0.9	=	14.36	(74)
West	0.9x	1	X	4.75	X	19.64	X	0.5	X	0.9	=	113.35	(80)
West	0.9x	1	X	2	x	19.64	X	0.5	x	0.9	=	15.91	(80)
West	0.9x	1	X	4.75	x	19.64	X	0.5	X	0.9	=	113.35	(80)
West	0.9x	1	X	2	x	19.64	x	0.5	X	0.9	=	15.91	(80)
West	0.9x	1	X	4.75	x	38.42	x	0.5	x	0.9	=	221.73	(80)
West	0.9x	1	X	2	X	38.42	X	0.5	X	0.9	=	31.12	(80)
West	0.9x	1	X	4.75	x	38.42	X	0.5	X	0.9	=	221.73	(80)
West	0.9x	1	X	2	x	38.42	x	0.5	X	0.9	=	31.12	(80)
West	0.9x	1	X	4.75	X	63.27	X	0.5	X	0.9	=	365.17	(80)
West	0.9x	1	X	2	X	63.27	X	0.5	X	0.9	=	51.25	(80)
West	0.9x	1	X	4.75	x	63.27	x	0.5	x	0.9	=	365.17	(80)
West	0.9x	1	X	2	x	63.27	x	0.5	x	0.9	=	51.25	(80)
West	0.9x	1	X	4.75	x	92.28	x	0.5	x	0.9	=	532.57	(80)
West	0.9x	1	X	2	x	92.28	x	0.5	x	0.9	=	74.75	(80)
West	0.9x	1	X	4.75	X	92.28	X	0.5	X	0.9	=	532.57	(80)

West	0.9x	1		、 [2	X	92	2.28	X	0.5	X	0.9	=	74.75	(80)
West	0.9x	1		· [4.75	x	11	3.09	X	0.5	X	0.9	=	652.69	(80)
West	0.9x	1		· [2	x	11	3.09	X	0.5	X	0.9	=	91.61	(80)
West	0.9x	1		· [4.75	x	11	3.09	X	0.5	X	0.9	=	652.69	(80)
West	0.9x	1		〈 [2	x	11	3.09	x	0.5	X	0.9	=	91.61	(80)
West	0.9x	1		ζĒ	4.75	x	11	5.77	X	0.5	X	0.9	=	668.14	(80)
West	0.9x	1		ΥĒ	2	x	11	5.77	X	0.5	X	0.9	=	93.77	(80)
West	0.9x	1		٠ [4.75	x	11	5.77	x	0.5	X	0.9	=	668.14	(80)
West	0.9x	1		- <u> </u>	2	x	11	5.77	x	0.5	X	0.9		93.77	(80)
West	0.9x	1		ΥĒ	4.75	x	11	0.22	X	0.5	X	0.9	=	636.1	(80)
West	0.9x	1		٠ [2	x	11	0.22	x	0.5	X	0.9	=	89.28	(80)
West	0.9x	1		- <u> </u>	4.75	x	11	0.22	x	0.5	X	0.9		636.1	(80)
West	0.9x	1	:	· [2	x	11	0.22	x	0.5	x	0.9	_ =	89.28	(80)
West	0.9x	1		⟨┌	4.75	x	94	1.68	x	0.5	X	0.9	_ =	546.4	(80)
West	0.9x	1	=	⟨┌	2	x	94	1.68	x	0.5	X	0.9	=	76.69	(80)
West	0.9x	1		· [4.75	x	94	1.68	x	0.5	x	0.9	_ =	546.4	(80)
West	0.9x	1		⟨┌	2	x	94	1.68	x	0.5	x	0.9	=	76.69	(80)
West	0.9x	1	=	(<u> </u>	4.75	X	73	3.59	Х	0.5	Х	0.9		424.7	(80)
West	0.9x	1		ΥĒ	2	x	73	3.59	х	0.5	х	0.9		59.61	(80)
West	0.9x	1	T	⟨┌	4.75	х	73	3.59	x	0.5	Х	0.9	=	424.7	(80)
West	0.9x	1	-	ΥĒ	2	x	73	3.59	x	0.5	Х	0.9	=	59.61	(80)
West	0.9x	1	7	ΥĒ	4.75	x	45	5.59	Х	0.5	х	0.9	_ =	263.11	(80)
West	0.9x	1	7	([2	x	45	5.59	X	0.5	Х	0.9		36.93	(80)
West	0.9x	1			4.75	х	45	5.59	X	0.5	Х	0.9	=	263.11	(80)
West	0.9x	1		< [2	x	45	5.59	X	0.5	X	0.9	=	36.93	(80)
West	0.9x	1		ζĒ	4.75	x	24	1.49	X	0.5	X	0.9	=	141.33	(80)
West	0.9x	1		ΥĒ	2	x	24	1.49	X	0.5	X	0.9	=	19.84	(80)
West	0.9x	1		< [4.75	x	24	1.49	X	0.5	X	0.9	=	141.33	(80)
West	0.9x	1		ζĒ	2	x	24	1.49	X	0.5	X	0.9	=	19.84	(80)
West	0.9x	1		ΥĒ	4.75	x	16	6.15	X	0.5	X	0.9	=	93.21	(80)
West	0.9x	1		٠ [2	x	16	6.15	x	0.5	X	0.9	=	13.08	(80)
West	0.9x	1		- <u> </u>	4.75	x	16	6.15	x	0.5	X	0.9		93.21	(80)
West	0.9x	1		ΥĒ	2	x	16	3.15	x	0.5	X	0.9	=	13.08	(80)
															_
Solar g	ains in	watts, ca	lculate	d fo	or each mont	th_			(83)m	ı = Sum(74)m	.(82)m	1		_	
(83)m=	292.97	571.55	944.71		394.34 1730.6		782.98	1692.7	1438	3.13 1103.13	678.4	364.84	241.31		(83)
Total g				Ť	34)m = (73)m	<u> </u>		-						7	
(84)m=	1282.96	1555.01	1890.4	3 2	280.73 2554.3	9 2	551.99	2430.7	2187	7.15 1887.19	1522	.1 1274.81	1203.27		(84)
7. Me	an interi	nal temp	erature	e (h	eating seasc	n)									
Temp	erature	during he	eating	per	iods in the li	ving	area fi	om Tab	ole 9,	Th1 (°C)				21	(85)
Utilisa	ation fac	tor for ga	ins fo	livi	ng area, h1,	Ť	ee Tal	ole 9a)						-	
	Jan	Feb	Mar		Apr May	/	Jun	Jul	Αι	ug Sep	Oc	t Nov	Dec		

(86)m=	0.98	0.97	0.94	0.88	0.78	0.63	0.5	0.56	0.77	0.92	0.97	0.98		(86)
Mean ii	nternal	tempera	ature in	living are	ea T1 (fo	ollow ste	ps 3 to 7	in Table	e 9c)					
	18.01	18.32	18.88	19.66	20.27	20.72	20.89	20.85	20.49	19.66	18.75	18.03		(87)
Tempe	rature o	durina h	eating p	eriods ir	rest of	dwellina	from Ta	ble 9. Ti	h2 (°C)					
· -	19.79	19.8	19.81	19.86	19.87	19.92	19.92	19.93	19.9	19.87	19.85	19.83		(88)
∟ Htilieati	ion fact	or for a	ains for	rest of d	welling	h2 m (se	a Tahla	0a)						
(89)m=	0.98	0.96	0.93	0.86	0.73	0.56	0.4	0.46	0.71	0.9	0.96	0.98		(89)
	ntornal	tompor	oturo in	the rest	of duralli	na T2 /f/	ollow oto	no 2 to -	Tin Tobl	o 0o)				
	15.81	16.27	17.07	18.21	19.06	19.67	19.85	19.83	7 in Tabl	18.23	16.91	15.86		(90)
(30)111=	10.01	10.27	17.07	10.21	13.00	10.07	13.00	10.00			g area ÷ (4		0.5	(91)
								, , ,			J (′		(0.7
			`	r the wh		, , , , , , , , , , , , , , , , , , ,	1	<u> </u>		10.04	47.00	40.04		(02)
` ′ _	16.91	17.29	17.97	18.93	19.67	20.19	20.37	20.34	19.94	18.94	17.83	16.94	ı	(92)
· · · · · -	16.91	17.29	17.97	18.93	19.67	20.19	20.37	20.34	re appro	18.94	17.83	16.94		(93)
` ′			uirement		19.07	20.19	20.37	20.54	19.94	10.94	17.00	10.94		(00)
					e obtain	ed at ste	ep 11 of	Table 9	o, so tha	t Ti.m=(76)m an	d re-calc	:ulate	
				using Ta		ou ut ou				,	r o)iii aii	a ro dale	uluto	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Utilisati	ion fact	or for g	ains, hm	:										
(94)m=	0.96	0.94	0.91	0.83	0.73	0.58	0.45	0.5	0.72	0.88	0.95	0.97		(94)
	_		•	4)m x (84	_								ı	(0-1)
(95)m= 1		1467.7	1713.22			1477.56	1085.84	1092.51	1350.32	1344.38	1209.13	1164.7	ı	(95)
	y avera	ge exte	rnal tem 6.5	perature 8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2		(96)
(96)m=									– (96)m		7.1	4.2		(30)
(97)m= 4		4414.34		3376.94	2655.77	1773.81			1889.04	2781.8	3646.8	4413.75		(97)
)m – (95					, ,
· -	ř	1980.14	1738.14		597.6	0	0	0	0	1069.44	1755.13	2417.29		
								Tota	l per year	(kWh/year) = Sum(9	8) _{15,912} =	13073.45	(98)
Space	heating	ı reauire	ement in	kWh/m²	/vear								49.52	(99)
9a. Ener		-			-	vetome i	neludina	micro-C	'UD/					
Space			its – Iriui	Muuai III	zauriy s	ysterris i	ricidaling	TIIIGIO-C)					
•		_	t from s	econdary	//supple	mentary	system						0	(201)
Fraction	n of spa	ace hea	t from m	nain syst	em(s)			(202) = 1 -	- (201) =				1	(202)
	•			, main sys	, ,			(204) = (2	02) × [1 – ((203)] =			1	(204)
			•	ing syste				, , ,	, .	`			90.5	(206)
	•	-		ementar		a cyctom	0/							(208)
Ellicien	.												0	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/y	/ear
· -	ř		1738.14	alculated	597.6	0	0	0	0	1069.44	1755 12	2417.29		
_						U U		U	, v	1003.44	1700.13	2411.29		(04.1)
(211)m =	= {[(98) 2709.45	m x (20 2188	4)] } x 1 1920.6	00 ÷ (20 1175.29	660.33	0	0	0	0	1181.71	1020 27	2671.04		(211)
Ľ	109.45	Z100	1320.0	11/3.29	000.33	U	l ⁰		l (kWh/yea				11115	(211)
								· ota	(, 34.11(2	- · · /15,1012	2	14445.8	(211)

Space heating fuel (secondary)										
$= \{[(98)m \times (201)] \} \times 100 \div (208)$ $(215)m = 0 $	0 0	0	0	0	0	0	0	0]	
				Tota	l (kWh/yea	ar) =Sum(2	215) _{15,101}		0	(215)
Water heating										_
Output from water heater (calculations of the calculations)				l .=-			l	1	1	
226.87 199.9 209.78 209.	187.83 183.91	164.11	157.39	173	172.79	194.78	206.24	221.34	70.0	(216)
	88.71 87.73	79.8	79.8	79.8	79.8	88.67	89.24	89.49	79.8	(217)
Fuel for water heating, kWh/mon		1		1		1 00.01	00.21	00.10		()
(219) m = (64) m x $100 \div (217)$ m			1		1				1	
(219)m= 253.53 223.6 235.15 2	211.73 209.63	205.65	197.23	216.8	216.53	219.68	231.1	247.32		٦,,,,,
Annual totals				TOla	I = Sum(2		Mbhaa		2667.94 kWh/year	(219)
Space heating fuel used, main sy	ystem 1					N.	Wh/yea		14445.8	7
Water heating fuel used									2667.94	<u> </u>
Electricity for pumps, fans and el	ectric keep-ho	t								_
mechanical ventilation - balance	ed, extract or p	ositive i	nput fror	n outside	Э			721.46		(230a)
central heating pump:								30		(230c)
Total electricity for the above, kV	Vh/year			sum	of (230a).	(230g) =	:		7 <mark>51.46</mark>	(231)
Electricity for lighting									674.51	(232)
Electricity generated by PVs									-714.86	(233)
10a. Fuel costs - individual hea	ting systems:									
		E.				E. al D			Fuel Coat	
		Fu kW	ei /h/year			Fuel P (Table			Fuel Cost £/year	
Space heating - main system 1		(21	1) x			3.4	18	x 0.01 =	502.71	(240)
Space heating - main system 2		(213	3) x			0		x 0.01 =	0	(241)
Space heating - secondary		(21	5) x			13.	19	x 0.01 =	0	(242)
Water heating cost (other fuel)		(219	9)			3.4	18	x 0.01 =	92.84	(247)
Pumps, fans and electric keep-he	ot	(23	1)			13.	19	x 0.01 =	99.12	(249)
(if off-peak tariff, list each of (230 Energy for lighting	a) to (230g) se	eparately		licable a	nd apply	fuel pri		rding to - x 0.01 =	Table 12a 88.97	(250)
Additional standing charges (Tab	12)	(-	,			13.	19](251)
Additional standing charges (rac	nc 12)								120	
			of (233) to	o (235) x)		13.	19	x 0.01 =	0	(252)
Appendix Q items: repeat lines (2	, , ,	as need (247) + (25		_					903.64	(255)
Total energy cost 11a. SAP rating - individual hea		(20	(204)						903.04	J ⁽²⁰⁰⁾
	g - 0 / 0 (0) (1) 0									7
Energy cost deflator (Table 12)	F(0==)	(050)]	(4) . 45.63						0.42	(256)
Energy cost factor (ECF)	[(255) x	(256)] ÷ [(4) + 45.0]	=					1.23	(257)

SAP rating (Section 12) (258)82.87 12a. CO2 emissions – Individual heating systems including micro-CHP **Emission factor Emissions Energy** kWh/year kg CO2/kWh kg CO2/year Space heating (main system 1) (211) x (261)0.216 3120.29 (215) x Space heating (secondary) (263)0.519 0 Water heating (219) x (264)0.216 576.28 (261) + (262) + (263) + (264) =Space and water heating (265)3696.57 (231) x Electricity for pumps, fans and electric keep-hot 0.519 390.01 (267)Electricity for lighting (232) x (268)0.519 350.07 Energy saving/generation technologies Item 1 (269)0.519 -371.01 sum of (265)...(271) = Total CO2, kg/year 4065.63 (272) $(272) \div (4) =$ CO2 emissions per m² (273)15.4 El rating (section 14) (274)82 **Primary** P. Energy **Energy** kWh/year factor kWh/year (211) x Space heating (main system 1) (261) 1.22 17623.87 (215)Space heating (secondary) 3.07 0 (263)Energy for water heating (219) x (264)3254.89 1.22 (261) + (262) + (263) + (264) =Space and water heating (265)20878.76 (231) x Electricity for pumps, fans and electric keep-hot 3.07 2306.98 (267)(232) x Electricity for lighting (268)0 2070.74 Energy saving/generation technologies Item 1 -2194.63 (269)3.07 sum of (265)...(271) = 'Total Primary Energy (272)23061.85 $(272) \div (4) =$

Primary energy kWh/m²/year

87.36

(273)

User Details:	
Assessor Name: Stroma Number: Software Name: Stroma FSAP 2012 Software Version: Version	n: 1.0.4.18
Property Address: LG04	
Address: 39, Fitzjohns Avenue, LONDON, NW3 5JY	
1. Overall dwelling dimensions:	
Area(m²) Av. Height(m)	Volume(m³)
Ground floor	246.4 (3a)
Total floor area TFA = $(1a)+(1b)+(1c)+(1d)+(1e)+(1n)$ 77 (4)	
Dwelling volume $(3a)+(3b)+(3c)+(3d)+(3e)+(3n) = $	246.4 (5)
2. Ventilation rate: main secondary heating heating total	m³ per hour
Number of chimneys $0 + 0 = 0 \times 40 =$	0 (6a)
Number of open flues $0 + 0 + 0 = 0 \times 20 =$	0 (6b)
Number of intermittent fans 0 × 10 =	0 (7a)
Number of passive vents 0 x 10 =	0 (7b)
Number of flueless gas fires 0 x 40 =	0 (7c)
Air cha	ange <mark>s per</mark> hour
Infiltration due to chimneys, flues and fans = $(6a)+(6b)+(7a)+(7b)+(7c) = 0$ $\div (5) = 0$	0 (8)
If a pressurisation test has been carried out or is intended, proceed to (17), otherwise continue from (9) to (16)	100
Number of storeys in the dwelling (ns) Additional infiltration [(9)-1]x0.1 =	0 (9)
Structural infiltration: 0.25 for steel or timber frame or 0.35 for masonry construction	0.35 (11)
if both types of wall are present, use the value corresponding to the greater wall area (after deducting areas of openings); if equal user 0.35	
If suspended wooden floor, enter 0.2 (unsealed) or 0.1 (sealed), else enter 0	0 (12)
If no draught lobby, enter 0.05, else enter 0	0.05 (13)
Percentage of windows and doors draught stripped	100 (14)
Window infiltration $0.25 - [0.2 \times (14) \div 100] =$	0.05 (15)
Infiltration rate $(8) + (10) + (11) + (12) + (13) + (15) =$	0.45 (16)
Air permeability value, q50, expressed in cubic metres per hour per square metre of envelope area	0 (17)
If based on air permeability value, then $(18) = [(17) \div 20] + (8)$, otherwise $(18) = (16)$	0.45 (18)
Air permeability value applies if a pressurisation test has been done or a degree air permeability is being used	
Number of sides sheltered Shelter factor $(20) = 1 - [0.075 \times (19)] =$	2 (19) 0.85 (20)
Infiltration rate incorporating shelter factor (21) = (18) × (20) =	0.38 (21)
Infiltration rate modified for monthly wind speed	(= 1)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	
Monthly average wind speed from Table 7	
(22)m= 5.1 5 4.9 4.4 4.3 3.8 3.8 3.7 4 4.3 4.5 4.7	
Wind Factor (22a)m = (22)m ÷ 4	
(22a)m= 1.27 1.25 1.23 1.1 1.08 0.95 0.95 0.92 1 1.08 1.12 1.18	

				1	i 	` 	(22a)m		1	т	1	
0.49 0.48	0.47	0.42	0.41	0.36	0.36	0.35	0.38	0.41	0.43	0.45		
<i>alculate effective aii</i> If mechanical ventil	_	rate ioi t	пе аррп	Cable Ca	100						0.5	(2
If exhaust air heat pump		endix N, (2	3b) = (23a	a) × Fmv (equation (I	N5)) , othe	rwise (23b) = (23a)			0.5	(2
If balanced with heat red	covery: effic	ciency in %	allowing f	for in-use f	factor (fron	n Table 4h) =				77.35	(2
a) If balanced mech	hanical ve	entilation	with he	at recov	ery (MV	HR) (24a	a)m = (2:	2b)m + (23b) × [1 – (23c)		`
4a)m= 0.6 0.59	0.58	0.53	0.52	0.48	0.48	0.47	0.5	0.52	0.54	0.56]	(2
b) If balanced mech	nanical ve	entilation	without	heat red	covery (l	MV) (24k	m = (22)	2b)m + (23b)		1	
4b)m= 0 0	0	0	0	0	0	0	0	0	0	0]	(2
c) If whole house e			•	•				- (00)	,	•	•	
if (22b)m < 0.5	- 	<u> </u>		i 	· `	r ` ` 	ŕ	<u> </u>	i 	Ι ,	1	(2
4c)m= 0 0	0	0	0	0	0	0	0	0	0	0	J	(2
d) If natural ventilat if (22b)m = 1, tl			•	•				0.51				
4d)m= 0 0	0	0	0	0	0	0	0	0	0	0]	(2
Effective air change	e rate - er	nter (24a) or (24l	o) or (24	c) or (24	ld) in bo	x (25)	!	!	ļ	J	
5)m= 0.6 0.59	0.58	0.53	0.52	0.48	0.48	0.47	0.5	0.52	0.54	0.56		(2
3. Heat losses and h							ı					
indows Type 1					m²	W/m2	-11	(W/	11)	kJ/m²-	1.	kJ/K
/alls Type2 1 /alls Type3 5 /alls Type4 1 otal area of element		7.1 4.85 1.3 2.25		1.3 1.3 1.3 2.25 2.25 2.25 2.25 2.25 2.25 2.25 2.	x1 x	/[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.25 0.25 0.25	0.04] = 0.04]	2.18 2.18 2.18 3.78 3.78 3.78 2.38 3.54 1.05 3.19				(2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (
indows Type 3 indows Type 4 indows Type 5 indows Type 6 alls Type1 falls Type2 falls Type3 falls Type4 falls Type4 for windows and roof windows and roof windows	9 .5 .5 .s, m ² dows, use e	4.85 1.3 2.25	ndow U-va	1.3 1.3 2.25 2.25 2.25 2.25 9.54 14.11 4.2 12.75 56.14 alue calculations and a second a second and a second and a second and a second and a second a second and a	x1 x	/[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.25 0.25 0.25	0.04] = 0.04]	2.18 2.18 2.18 3.78 3.78 3.78 2.38 3.54 1.05 3.19				(2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (
findows Type 3 findows Type 4 findows Type 5 findows Type 6 falls Type1 falls Type2 falls Type3 falls Type4 fotal area of element for windows and roof wind finclude the areas on both	9 5 5 s, m² dows, use 6 th sides of in	4.85 1.3 2.25 effective winternal wall	ndow U-va	1.3 1.3 2.25 2.25 2.25 2.25 9.54 14.11 4.2 12.75 56.14 alue calculations and a second a second and a second and a second and a second and a second a second and a	x1 x	/[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.25 0.25 0.25	0.04] = 0.04] = 0.04] = 0.04] = 0.04] = 0.04] = = = =	2.18 2.18 2.18 3.78 3.78 3.78 2.38 3.54 1.05 3.19				(3)
findows Type 3 findows Type 4 findows Type 5 findows Type 6 falls Type1 falls Type2 falls Type3 falls Type4 for windows and roof windows and r	9 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5	4.85 1.3 2.25 effective winternal wall	ndow U-va	1.3 1.3 2.25 2.25 2.25 2.25 9.54 14.11 4.2 12.75 56.14 alue calculations and a second a second and a second and a second and a second and a second a second and a	x1 x	/[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.25 0.25 0.25	0.04] = 0.04]	2.18 2.18 2.18 3.78 3.78 3.78 2.38 3.54 1.05 3.19		n paragrapi	h 3.2	(3)
findows Type 3 findows Type 4 findows Type 5 findows Type 6 falls Type1 falls Type2 falls Type3 falls Type4 for tal area of element for windows and roof windows and roof windows the areas on both fabric heat loss, W/K teat capacity Cm = \$\frac{1}{2}\$	9 .5 s, m² dows, use eth sides of in $X = S (A \times B(A \times K))$	4.85 1.3 2.25 effective winternal walk	ndow U-va	1.3 1.3 2.25 2.25 2.25 2.25 9.54 14.19 4.2 12.79 56.14 alue calculatitions	x1 x	/[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.25 0.25 0.25	0.04] = 0.04]	2.18 2.18 2.18 3.78 3.78 3.78 2.38 3.54 1.05 3.19	as given in (2) + (32a).	n paragrapi	h 3.2	
findows Type 3 findows Type 4 findows Type 5 findows Type 6 falls Type1 falls Type2 falls Type3 for alls Type4 for windows and roof windows an	9 .5 s, m² dows, use eth sides of in $X = S (A \times K)$ eter (TMR)	4.85 1.3 2.25 effective winternal walk U) P = Cm ÷	ndow U-vals and par	1.3 1.3 2.25 2.25 2.25 2.25 9.54 14.19 4.2 12.79 56.14 alue calculatitions	x1 x	/[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.25 0.25 0.25 0.25 (26)(30	0.04] = 0.04]	2.18 2.18 2.18 3.78 3.78 3.78 2.38 3.54 1.05 3.19 ie)+0.04] & & & & & & & & & & & & & & & & & & &	as given in (2) + (32a).	n paragrapi (32e) =	h 3.2 36.19 7721.6	
/indows Type 3 /indows Type 4 /indows Type 5 /indows Type 6 /alls Type1 16 /alls Type2 1 /alls Type3 5. /alls Type4 1	9 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5	4.85 1.3 2.25 effective winternal walk U) P = Cm - etails of the evaluation.	ndow U-vals and par - TFA) ir	1.3 1.3 2.25 2.25 2.25 9.54 14.19 4.2 12.79 56.14 alue calculatitions	x1 x	/[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ /[1/(1.8)+ 0.25 0.25 0.25 0.25 (26)(30	0.04] = 0.04]	2.18 2.18 2.18 3.78 3.78 3.78 2.38 3.54 1.05 3.19 ie)+0.04] & & & & & & & & & & & & & & & & & & &	as given in (2) + (32a).	n paragrapi (32e) =	h 3.2 36.19 7721.6	(2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (2 (

Ventila	tion hea	at loss ca	alculated	l monthly	У				(38)m	= 0.33 × (25)m x (5))		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(38)m=	48.86	48.09	47.31	43.42	42.64	38.76	38.76	37.98	40.31	42.64	44.2	45.75		(38)
Heat tr	ansfer o	coefficier	nt, W/K					•	(39)m	= (37) + (37)	38)m			
(39)m=	93.47	92.69	91.92	88.03	87.25	83.36	83.36	82.58	84.92	87.25	88.81	90.36		
Heat Ic	ss para	meter (F	HLP), W/	′m²K						Average = = (39)m ÷	Sum(39) ₁ .	12 /12=	87.83	(39)
(40)m=	1.21	1.2	1.19	1.14	1.13	1.08	1.08	1.07	1.1	1.13	1.15	1.17		
Numbe	er of day	s in moi	nth (Tab	le 1a)					,	Average =	Sum(40) ₁	12 /12=	1.14	(40)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(41)m=	31	28	31	30	31	30	31	31	30	31	30	31		(41)
4. Wa	iter heat	ting ener	rgy requi	rement:								kWh/ye	ear:	
Assum	ed occi	ipancy, I	N								2	2.4		(42)
if TF		9, N = 1		[1 - exp	(-0.0003	349 x (TF	FA -13.9)2)] + 0.0	0013 x (ΓFA -13.		4		(42)
								(25 x N)				.28		(43)
			hot water person per				-	to achieve	a water us	se target o	†			
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Hot wate			day for ea						Seh	Oct	INOV			
(44)m=	100.41	96.76	93.11	89.46	85.81	82.15	82.15	85.81	89.46	93.11	96.76	100.41		
						100 - 1/1		T (000)			m(44) ₁₁₂ =		1095.39	(44)
	148.91	130.23	134.39	117.16	112.42	97.01	89.9	0Tm / 3600 103.16	104.39	121.65	132.8	144.21		
(45)m=	140.91	130.23	134.39	117.10	112.42	97.01	09.9	103.16			m(45) ₁₁₂ =	L	1436.23	(45)
If instant	taneous w	ater heatii	ng at point	of use (no	hot water	storage),	enter 0 in	boxes (46		rotal – ou	(10)112	Ĺ	1 100.20	()
(46)m=	22.34	19.54	20.16	17.57	16.86	14.55	13.48	15.47	15.66	18.25	19.92	21.63		(46)
	storage					/\/\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		20.25		!				
•		` ,					•	within sa	ame ves	sei		300		(47)
Otherw	-	stored	nd no ta hot wate		_			mbi boil	ers) ente	er '0' in (47)			
	_		eclared l	oss facto	or is kno	wn (kWh	n/day):				1.	.69		(48)
,			m Table			`	• •					.54		(49)
Energy	lost fro	m water	storage	, kWh/ye	ear			(48) x (49)) =		0.	.91		(50)
			eclared o	-										
			factor fr ee section		e 2 (kW	h/litre/da	ıy)					0		(51)
	-	from Tal		JII 4.3								0		(52)
			m Table	2b								0		(53)
Energy	lost fro	m water	storage	, kWh/ye	ear			(47) x (51)) x (52) x (53) =		0		(54)
•		(54) in (5	-	,					•			.91		(55)
Water	storage	loss cal	culated f	or each	month			((56)m = (55) × (41)ı	m				
(56)m=	28.29	25.55	28.29	27.38	28.29	27.38	28.29	28.29	27.38	28.29	27.38	28.29		(56)

If cylinder contains dedicat	ed solar sto	rage, (57)ı	m = (56)m	x [(50) – (H11)] ÷ (5	0), else (5	7)m = (56)	m where (H11) is fro	m Append	ix H	
(57)m= 28.29 25.55	28.29	27.38	28.29	27.38	28.29	28.29	27.38	28.29	27.38	28.29		(57)
Primary circuit loss (a	nnual) fro	om Table	3		•	•	•	•		0		(58)
Primary circuit loss ca	,			59)m = ((58) ÷ 36	65 × (41)	m				•	
(modified by factor	from Tab	le H5 if t	here is s	solar wat	ter heatii	ng and a	cylinde	r thermo	stat)			
(59)m= 23.26 21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26		(59)
Combi loss calculated	d for each	month ((61)m =	(60) ÷ 36	65 × (41))m						
(61)m = 0 0	0	0	0	0	0	0	0	0	0	0		(61)
Total heat required for	r water h	eating ca	alculated	for eacl	h month	(62)m =	0.85 ×	(45)m +	(46)m +	(57)m +	(59)m + (6°	1)m
(62)m= 200.46 176.8	185.94	167.05	163.98	146.9	141.45	154.71	154.28	173.21	182.69	195.76		(62)
Solar DHW input calculate	d using App	endix G o	Appendix	H (negati	ve quantity	/) (enter '0	' if no sola	r contribut	ion to wate	er heating)		
(add additional lines i	f FGHRS	and/or \	WWHRS	applies	, see Ap	pendix (3)					
(63)m= 0 0	0	0	0	0	0	0	0	0	0	0		(63)
Output from water he	ater											
(64)m= 200.46 176.8	185.94	167.05	163.98	146.9	141.45	154.71	154.28	173.21	182.69	195.76		
	-					Outp	out from w	ater heate	r (annual)	12	2043.22	(64)
Heat gains from water	r heating,	, kWh/m	onth 0.2	5 ´ [0.85	× (45)m	+ (61)m	n] + 0.8 x	κ [(46)m	+ (57)m	+ (59)m]	
(65)m= 90.75 80.55	85.93	78.87	78.62	72.17	71.13	75.54	74.62	81.69	84.07	89.19		(65)
include (57)m in ca	lculation	of (65)m	only if c	ylinder i	s in the	dwelling	or hot w	ate <mark>r is fr</mark>	om com	munity h	eating	
5. Internal gains (se	e Table 5	and 5a):									
5. Internal gains (se):					-				
Metabolic gains (Tab		ts): May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Metabolic gains (Tab	e 5), Wat Mar			Jun 144.21	Jul 144.21	Aug 144.21	Sep 144.21	Oct 144.21	Nov 144.21	Dec 144.21		(66)
Metabolic gains (Tab Jan Feb (66)m= 144.21 144.21	e 5), Wat Mar 144.21	Apr 144.21	May 144.21	144.21	144.21	144.21	144.21					(66)
Metabolic gains (Tab	e 5), Wat Mar 144.21	Apr 144.21	May 144.21	144.21	144.21	144.21	144.21					(66)
Metabolic gains (Tab Jan Feb (66)m= 144.21 144.21 Lighting gains (calcul (67)m= 47.49 42.18	e 5), Wat Mar 144.21 ated in Ap	Apr 144.21 opendix 25.97	May 144.21 L, equati	144.21 ion L9 o 16.39	144.21 r L9a), a 17.71	144.21 Iso see	144.21 Table 5 30.89	39.23	144.21	144.21		` ′
Metabolic gains (Tab Jan Feb (66)m= 144.21 144.21 Lighting gains (calcul	Mar 144.21 ated in Ap 34.3 culated ir	Apr 144.21 opendix 25.97	May 144.21 L, equati	144.21 ion L9 o 16.39	144.21 r L9a), a 17.71	144.21 Iso see	144.21 Table 5 30.89	39.23	144.21	144.21		` ′
Metabolic gains (Tab Jan Feb (66)m= 144.21 144.21 Lighting gains (calcul (67)m= 47.49 42.18 Appliances gains (calcul (68)m= 317.99 321.29	Mar 144.21 ated in Ap 34.3 culated ir 312.98	Apr 144.21 opendix 25.97 Appendix 295.28	May 144.21 L, equati 19.41 dix L, equati 272.93	144.21 ion L9 of 16.39 uation L 251.93	144.21 r L9a), a 17.71 13 or L1 237.9	144.21 Iso see 23.02 3a), also 234.6	Table 5 30.89 see Ta 242.91	39.23 ble 5 260.62	144.21 45.78	144.21 48.81		(67)
Metabolic gains (Tab Jan Feb (66)m= 144.21 144.21 Lighting gains (calcul (67)m= 47.49 42.18 Appliances gains (calcul (68)m= 317.99 321.29 Cooking gains (calcul	Mar 144.21 ated in Ap 34.3 culated ir 312.98 ated in A	Apr 144.21 opendix 25.97 Appendix 295.28	May 144.21 L, equati 19.41 dix L, equati 272.93 L, equati	144.21 ion L9 of 16.39 uation L 251.93 ion L15	144.21 r L9a), a 17.71 13 or L1 237.9	144.21 lso see 23.02 3a), also 234.6	144.21 Table 5 30.89 See Ta 242.91 ee Table	39.23 ble 5 260.62	144.21 45.78 282.96	144.21 48.81 303.96		(67) (68)
Metabolic gains (Tab Jan Feb (66)m= 144.21 144.21 Lighting gains (calcul (67)m= 47.49 42.18 Appliances gains (calcul (68)m= 317.99 321.29 Cooking gains (calcul (69)m= 51.82 51.82	Mar 144.21 ated in Ap 34.3 culated ir 312.98 ated in A 51.82	Apr 144.21 opendix 25.97 Appendix 295.28 ppendix 51.82	May 144.21 L, equati 19.41 dix L, equati 272.93	144.21 ion L9 of 16.39 uation L 251.93	144.21 r L9a), a 17.71 13 or L1 237.9 or L15a)	144.21 Iso see 23.02 3a), also 234.6	Table 5 30.89 see Ta 242.91	39.23 ble 5 260.62	144.21 45.78	144.21 48.81		(67)
Metabolic gains (Tab Jan Feb (66)m= 144.21 144.21 Lighting gains (calcul (67)m= 47.49 42.18 Appliances gains (calcul (68)m= 317.99 321.29 Cooking gains (calcul	Mar 144.21 ated in Ap 34.3 culated ir 312.98 ated in A 51.82	Apr 144.21 opendix 25.97 Appendix 295.28 ppendix 51.82	May 144.21 L, equati 19.41 dix L, equati 272.93 L, equati	144.21 ion L9 of 16.39 uation L 251.93 ion L15	144.21 r L9a), a 17.71 13 or L1 237.9 or L15a)	144.21 lso see 23.02 3a), also 234.6	144.21 Table 5 30.89 See Ta 242.91 ee Table	39.23 ble 5 260.62	144.21 45.78 282.96	144.21 48.81 303.96		(67) (68)
Metabolic gains (Tab Jan Feb (66)m= 144.21 144.21 Lighting gains (calcul (67)m= 47.49 42.18 Appliances gains (calcul (68)m= 317.99 321.29 Cooking gains (calcul (69)m= 51.82 51.82 Pumps and fans gain	Mar 144.21 ated in Ap 34.3 culated ir 312.98 ated in A 51.82 s (Table §	25.97 Appendix 25.97 Appendix 295.28 ppendix 51.82 5a) 3	May 144.21 L, equati 19.41 dix L, equ 272.93 L, equat 51.82	144.21 ion L9 of 16.39 uation L 251.93 ion L15 51.82	144.21 r L9a), a 17.71 13 or L1 237.9 or L15a) 51.82	144.21 lso see 23.02 3a), also 234.6), also se 51.82	144.21 Table 5 30.89 o see Ta 242.91 ee Table 51.82	39.23 ble 5 260.62 5 51.82	144.21 45.78 282.96 51.82	144.21 48.81 303.96 51.82		(67) (68) (69)
Metabolic gains (Tab Jan Feb (66)m= 144.21 144.21 Lighting gains (calcul (67)m= 47.49 42.18 Appliances gains (calcul (68)m= 317.99 321.29 Cooking gains (calcul (69)m= 51.82 51.82 Pumps and fans gain (70)m= 3 3	Mar 144.21 ated in Ap 34.3 culated ir 312.98 ated in A 51.82 s (Table 5 3 on (negar	25.97 Appendix 25.97 Appendix 295.28 ppendix 51.82 5a) 3	May 144.21 L, equati 19.41 dix L, equ 272.93 L, equat 51.82	144.21 ion L9 of 16.39 uation L 251.93 ion L15 51.82	144.21 r L9a), a 17.71 13 or L1 237.9 or L15a) 51.82	144.21 lso see 23.02 3a), also 234.6), also se 51.82	144.21 Table 5 30.89 o see Ta 242.91 ee Table 51.82	39.23 ble 5 260.62 5 51.82	144.21 45.78 282.96 51.82	144.21 48.81 303.96 51.82		(67) (68) (69)
Metabolic gains (Tab Jan Feb (66)m= 144.21 144.21 Lighting gains (calcul (67)m= 47.49 42.18 Appliances gains (calcul (68)m= 317.99 321.29 Cooking gains (calcul (69)m= 51.82 51.82 Pumps and fans gain (70)m= 3 3 Losses e.g. evaporat	e 5), Wat Mar 144.21 ated in Ap 34.3 culated ir 312.98 ated in A 51.82 s (Table 5 3 on (nega	Apr 144.21 opendix 25.97 Appendix 295.28 ppendix 51.82 5a) 3	May 144.21 L, equati 19.41 dix L, equ 272.93 L, equat 51.82 3 es) (Tab	144.21 ion L9 of 16.39 uation L 251.93 ion L15 51.82 3 le 5)	144.21 r L9a), a 17.71 13 or L1 237.9 or L15a) 51.82	144.21 lso see 23.02 3a), also 234.6 , also se 51.82	144.21 Table 5 30.89 See Ta 242.91 ee Table 51.82	39.23 ble 5 260.62 5 51.82	144.21 45.78 282.96 51.82	144.21 48.81 303.96 51.82		(67) (68) (69) (70)
Metabolic gains (Tab Jan Feb (66)m= 144.21 144.21 Lighting gains (calcul (67)m= 47.49 42.18 Appliances gains (calcul (68)m= 317.99 321.29 Cooking gains (calcul (69)m= 51.82 51.82 Pumps and fans gain (70)m= 3 3 Losses e.g. evaporat (71)m= -96.14 -96.14	e 5), Wat Mar 144.21 ated in Ap 34.3 culated ir 312.98 ated in A 51.82 s (Table 5 3 on (negar -96.14 Table 5)	Apr 144.21 opendix 25.97 Appendix 295.28 ppendix 51.82 5a) 3	May 144.21 L, equati 19.41 dix L, equ 272.93 L, equat 51.82 3 es) (Tab	144.21 ion L9 of 16.39 uation L 251.93 ion L15 51.82 3 le 5)	144.21 r L9a), a 17.71 13 or L1 237.9 or L15a) 51.82	144.21 lso see 23.02 3a), also 234.6 , also se 51.82	144.21 Table 5 30.89 See Ta 242.91 ee Table 51.82	39.23 ble 5 260.62 5 51.82	144.21 45.78 282.96 51.82	144.21 48.81 303.96 51.82		(67) (68) (69) (70)
Metabolic gains (Tab Jan Feb (66)m= 144.21 144.21 Lighting gains (calcul (67)m= 47.49 42.18 Appliances gains (calcul (68)m= 317.99 321.29 Cooking gains (calcul (69)m= 51.82 51.82 Pumps and fans gain (70)m= 3 3 Losses e.g. evaporat (71)m= -96.14 -96.14 Water heating gains (Mar 144.21 ated in Ap 34.3 culated ir 312.98 ated in A 51.82 s (Table 5 3 on (negar -96.14 Table 5) 115.49	Apr 144.21 opendix 25.97 Appendix 295.28 ppendix 51.82 5a) 3 tive valu	May 144.21 L, equati 19.41 dix L, equ 272.93 L, equat 51.82 3 es) (Tab	144.21 ion L9 of 16.39 uation L 251.93 ion L15 51.82 3 le 5) -96.14	144.21 r L9a), a 17.71 13 or L1 237.9 or L15a) 51.82 3	144.21 lso see 23.02 3a), also 234.6), also se 51.82 3	144.21 Table 5 30.89 See Ta 242.91 See Table 51.82	39.23 ble 5 260.62 5 51.82 3 -96.14	144.21 45.78 282.96 51.82 3 -96.14	144.21 48.81 303.96 51.82 3 -96.14		(67) (68) (69) (70)
Metabolic gains (Tab Jan Feb (66)m= 144.21 144.21 Lighting gains (calcul (67)m= 47.49 42.18 Appliances gains (calcul (68)m= 317.99 321.29 Cooking gains (calcul (69)m= 51.82 51.82 Pumps and fans gain (70)m= 3 3 Losses e.g. evaporat (71)m= -96.14 -96.14 Water heating gains (72)m= 121.98 119.87	e 5), Wat Mar 144.21 ated in Ap 34.3 culated in A 312.98 ated in A 51.82 s (Table 5 3 on (negar -96.14 Table 5) 115.49	Apr 144.21 opendix 25.97 Appendix 295.28 ppendix 51.82 5a) 3 tive valu	May 144.21 L, equati 19.41 dix L, equ 272.93 L, equat 51.82 3 es) (Tab	144.21 ion L9 of 16.39 uation L 251.93 ion L15 51.82 3 le 5) -96.14	144.21 r L9a), a 17.71 13 or L1 237.9 or L15a) 51.82 3	144.21 lso see 23.02 3a), also 234.6), also se 51.82 3	144.21 Table 5 30.89 See Ta 242.91 See Table 51.82 3	39.23 ble 5 260.62 5 51.82 3 -96.14	144.21 45.78 282.96 51.82 3 -96.14	144.21 48.81 303.96 51.82 3 -96.14		(67) (68) (69) (70)
Metabolic gains (Tab Jan Feb (66)m= 144.21 144.21 Lighting gains (calcul (67)m= 47.49 42.18 Appliances gains (calcul (68)m= 317.99 321.29 Cooking gains (calcul (69)m= 51.82 51.82 Pumps and fans gain (70)m= 3 3 Losses e.g. evaporat (71)m= -96.14 -96.14 Water heating gains (72)m= 121.98 119.87 Total internal gains	e 5), Wat Mar 144.21 ated in Ap 34.3 culated in A 312.98 ated in A 51.82 s (Table 5 3 on (negar -96.14 Table 5) 115.49	Apr 144.21 opendix 25.97 Appendix 295.28 ppendix 51.82 5a) 3 tive valu -96.14	May 144.21 L, equati 19.41 dix L, equati 272.93 L, equati 51.82 3 es) (Tab -96.14	144.21 ion L9 of 16.39 uation L 251.93 ion L15 51.82 3 le 5) -96.14	144.21 r L9a), a 17.71 13 or L1 237.9 or L15a) 51.82 3 -96.14 95.61	144.21 Iso see 23.02 3a), also 234.6), also se 51.82 3 -96.14 101.53 1 + (68)m -	144.21 Table 5 30.89 see Ta 242.91 ee Table 51.82 3 -96.14 103.64 + (69)m +	39.23 ble 5 260.62 5 51.82 3 -96.14 109.8 (70)m + (7	144.21 45.78 282.96 51.82 3 -96.14 116.76 1)m + (72	144.21 48.81 303.96 51.82 3 -96.14		(67) (68) (69) (70) (71)
Metabolic gains (Tab Jan Feb (66)m= 144.21 144.21 Lighting gains (calcul (67)m= 47.49 42.18 Appliances gains (calcul (68)m= 317.99 321.29 Cooking gains (calcul (69)m= 51.82 51.82 Pumps and fans gain (70)m= 3 3 Losses e.g. evaporat (71)m= -96.14 -96.14 Water heating gains (72)m= 121.98 119.87 Total internal gains (73)m= 590.35 586.24	e 5), Wat Mar 144.21 ated in Ap 34.3 culated in A 312.98 ated in A 51.82 s (Table 5 3 on (negar -96.14 Table 5) 115.49 = 5665.67	Apr 144.21 opendix 25.97 Appendix 295.28 ppendix 51.82 5a) 3 tive valu -96.14	May 144.21 L, equati 19.41 dix L, equati 272.93 L, equati 51.82 3 es) (Tab -96.14 105.68	144.21 ion L9 of 16.39 uation L 251.93 ion L15 51.82 3 le 5) -96.14 100.23 (66) 471.44	144.21 r L9a), a 17.71 13 or L1 237.9 or L15a) 51.82 3 -96.14 95.61 m + (67)m 454.11	144.21 lso see 23.02 3a), also 234.6), also se 51.82 3 -96.14 101.53 1+(68)m-462.04	144.21 Table 5 30.89 see Ta 242.91 ee Table 51.82 3 -96.14 103.64 + (69)m + (480.34	39.23 ble 5 260.62 5 51.82 3 -96.14 109.8 (70)m + (7 512.54	144.21 45.78 282.96 51.82 3 -96.14 116.76 1)m + (72) 548.4	144.21 48.81 303.96 51.82 3 -96.14 119.88		(67) (68) (69) (70) (71)

m²

Table 6a

Table 6b

Table 6c

Table 6d

(W)

													_
East	0.9x	1	X	1.3	X	19.64	X	0.5	X	0.9	=	20.68	(76)
East	0.9x	1	X	1.3	X	19.64	X	0.5	X	0.9	=	20.68	(76)
East	0.9x	1	X	2.25	X	19.64	X	0.5	X	0.9	=	35.79	(76)
East	0.9x	1	X	2.25	X	19.64	X	0.5	X	0.9	=	17.9	(76)
East	0.9x	1	X	1.3	X	38.42	X	0.5	X	0.9	=	40.46	(76)
East	0.9x	1	X	1.3	X	38.42	X	0.5	X	0.9	=	40.46	(76)
East	0.9x	1	X	2.25	x	38.42	x	0.5	X	0.9	=	70.02	(76)
East	0.9x	1	X	2.25	x	38.42	X	0.5	X	0.9	=	35.01	(76)
East	0.9x	1	x	1.3	x	63.27	X	0.5	X	0.9	=	66.63	(76)
East	0.9x	1	x	1.3	x	63.27	X	0.5	X	0.9	=	66.63	(76)
East	0.9x	1	x	2.25	х	63.27	X	0.5	X	0.9	=	115.32	(76)
East	0.9x	1	X	2.25	x	63.27	X	0.5	X	0.9	=	57.66	(76)
East	0.9x	1	x	1.3	x	92.28	x	0.5	x	0.9	=	97.17	(76)
East	0.9x	1	x	1.3	x	92.28	x	0.5	x	0.9	=	97.17	(76)
East	0.9x	1	x	2.25	x	92.28	X	0.5	X	0.9	=	168.18	(76)
East	0.9x	1	x	2.25	х	92.28	x	0.5	x	0.9	=	84.09	(76)
East	0.9x	1	x	1.3	x	113.09	X	0.5	X	0.9	=	119.09	(76)
East	0.9x	1	X	1.3	X	113.09	X	0.5	X	0.9	=	119.09	(76)
East	0.9x	1	x	2.25	x	113.09	x	0.5	x	0.9	=	206.11	(76)
East	0.9x	1	x	2.25	х	113.09	x	0.5	x	0.9	=	103.06	(76)
East	0.9x	1	x	1.3	X	115.77	X	0.5	x	0.9	=	121.91	(76)
East	0.9x	1	×	1.3	x	115.77	х	0.5	x	0.9	=	121.91	(76)
East	0.9x	1	x	2.25	x	115.77	X	0.5	x	0.9	=	210.99	(76)
East	0.9x	1	X	2.25	х	115.77	x	0.5	x	0.9	=	105.5	(76)
East	0.9x	1	x	1.3	х	110.22	x	0.5	x	0.9	=	116.06	(76)
East	0.9x	1	x	1.3	x	110.22	X	0.5	X	0.9	=	116.06	(76)
East	0.9x	1	x	2.25	x	110.22	X	0.5	X	0.9	=	200.87	(76)
East	0.9x	1	x	2.25	x	110.22	X	0.5	X	0.9	=	100.44	(76)
East	0.9x	1	X	1.3	х	94.68	X	0.5	X	0.9	=	99.69	(76)
East	0.9x	1	x	1.3	х	94.68	X	0.5	X	0.9	=	99.69	(76)
East	0.9x	1	x	2.25	x	94.68	x	0.5	x	0.9	=	172.55	(76)
East	0.9x	1	x	2.25	x	94.68	x	0.5	x	0.9	=	86.27	(76)
East	0.9x	1	x	1.3	x	73.59	x	0.5	x	0.9	=	77.49	(76)
East	0.9x	1	x	1.3	x	73.59	x	0.5	x	0.9	=	77.49	(76)
East	0.9x	1	x	2.25	x	73.59	x	0.5	x	0.9	=	134.12	(76)
East	0.9x	1	×	2.25	x	73.59	x	0.5	x	0.9	j =	67.06	(76)
East	0.9x	1	×	1.3	x	45.59	x	0.5	x	0.9	j =	48.01	(76)
East	0.9x	1	×	1.3	x	45.59	x	0.5	x	0.9	j =	48.01	(76)
East	0.9x	1	x	2.25	x	45.59	x	0.5	x	0.9	j =	83.09	(76)
East	0.9x	1	x	2.25	x	45.59	x	0.5	x	0.9	=	41.54	(76)
East	0.9x	1	x	1.3	x	24.49	x	0.5	x	0.9	=	25.79	(76)
			•		•		•				•		_

						_										_
East	0.9x	1		X	1.3	X	2	24.49	X	0.5	5	x	0.9	=	25.79	(76)
East	0.9x	1		x	2.25	X	2	4.49	X	0.5	5	x	0.9	=	44.63	(76)
East	0.9x	1		X	2.25	X	2	4.49	X	0.5	5	x	0.9	=	22.32	(76)
East	0.9x	1		x	1.3	X	1	6.15	X	0.5	5	x	0.9	=	17.01	(76)
East	0.9x	1		X	1.3	X	1	6.15	X	0.8	5	x	0.9	=	17.01	(76)
East	0.9x	1		x	2.25	X	1	6.15	X	0.5	5	x [0.9	=	29.44	(76)
East	0.9x	1		x	2.25	X	1	6.15	X	0.5	5	x	0.9	=	14.72	(76)
South	0.9x	1		x	1.3	X	4	6.75	X	0.5	5	x_[0.9	=	24.61	(78)
South	0.9x	1		x	2.25	X	4	6.75	X	0.5	5	x [0.9	=	42.6	(78)
South	0.9x	1		x	1.3	X	7	6.57	X	0.5	5	x	0.9	=	40.31	(78)
South	0.9x	1		X	2.25	X	7	6.57	X	0.5	5	x	0.9	=	69.77	(78)
South	0.9x	1		x	1.3	X	9	7.53	X	0.5	5	x [0.9	=	51.35	(78)
South	0.9x	1		x	2.25	X	9	7.53	X	0.5	5	_ x [0.9	=	88.88	(78)
South	0.9x	1		x	1.3	X	1	10.23	X	0.5	5	x_[0.9	=	58.04	(78)
South	0.9x	1		X	2.25	X	1	10.23	X	0.5	5	x	0.9	=	100.45	(78)
South	0.9x	1		X	1.3	X	1	14.87	X	0.5	5	x	0.9	=	60.48	(78)
South	0.9x	1		X	2.25	X	1	14.87	X	0.5	5	x	0.9	=	104.68	(78)
South	0.9x	1		X	1.3	X	1	10.55	Х	0.5	5	X	0.9	=	58.2	(78)
South	0.9x	1		x	2.25	x	1	10.55] x	0.5	5	x	0.9	=	100.74	(78)
South	0.9x	1		X	1.3	x	1	08.01	x	0.5	5	x	0.9	=	56.87	(78)
South	0.9x	1		X	2.25	X	1	08.01	x	0.5	5	х	0.9	=	98.43	(78)
South	0.9x	1		x	1.3	x	1	04.89	Х	0.5	5	x	0.9	=	55.23	(78)
South	0.9x	1		x	2.25	x	1	04.89	X	0.5	5	x	0.9	=	95.59	(78)
South	0.9x	1		X	1.3	X	1	01.89	X	0.8	5	x	0.9	=	53.64	(78)
South	0.9x	1		X	2.25	X	1	01.89	X	0.5	5	x	0.9	=	92.84	(78)
South	0.9x	1		x	1.3	X	8	2.59	X	0.5	5	x	0.9	=	43.48	(78)
South	0.9x	1		x	2.25	X	8	2.59	X	0.5	5	x	0.9	=	75.26	(78)
South	0.9x	1		X	1.3	X	5	5.42	X	0.5	5	x	0.9	=	29.18	(78)
South	0.9x	1		X	2.25	X	5	5.42	X	0.5	5	x	0.9	=	50.5	(78)
South	0.9x	1		x	1.3	X		40.4	X	0.5	5	x	0.9	=	21.27	(78)
South	0.9x	1		x	2.25	X	,	40.4	X	0.5	5	x_[0.9	=	36.81	(78)
7-				$\overline{}$	for each mor			I	ř	n = Sum(7		• •		l	7	(00)
` '		296.03	446.4		605.1 712.		719.24	688.72	609	.02 502	2.64	339.38	198.2	136.25	_	(83)
					(84)m = (73)				407	06 00	, ₀₀ T	054.04	746.50	744 70	٦	(QA)
` ' L					1138.78 1213.		190.68	1142.83	107	1.00 982	2.98	851.91	746.59	711.79	J	(84)
				· ·	heating seas						٥,					-
•		•		• •	eriods in the	_			ole 9	, Th1 (°	C)				21	(85)
Utilisat F		Ť		-	ving area, h1	Ť					<u> </u>	<u> </u>			٦	
(96)	Jan	Feb	Ma	$\overline{}$	Apr Ma	- +	Jun	Jul	_	-	Sep	Oct	Nov	Dec	4	(86)
(86)m=	0.91	0.87	0.81		0.7 0.57		0.42	0.31	0.3		53	0.75	0.87	0.92	J	(00)
				-	ving area T1			i –					1		7	(OT)
(87)m=	19.01	19.35	19.8	2	20.37 20.7	2	20.92	20.97	20.	96 20	.84	20.37	19.65	19.01]	(87)

Tomr	oraturo	durina h	eating n	oriode ir	n rest of	dwelling	ı from Ta	blo 0 T	h2 (°C)					
(88)m=	19.91	19.92	19.93	19.97	19.97	20.02	20.02	20.02	20	19.97	19.96	19.94		(88)
Utilisa	ation fac	tor for a	ains for	rest of d	wellina.	h2.m (se	ee Table	9a)			I.		l	
(89)m=	0.9	0.86	0.79	0.67	0.52	0.36	0.24	0.27	0.46	0.71	0.85	0.91		(89)
Mean	interna	l temper	ature in	the rest	of dwelli	ina T2 (f	ollow ste	ens 3 to i	7 in Tabl	e 9c)	ı		l	
(90)m=	17.31	17.79	18.46	19.23	19.67	19.94	20	20	19.85	19.25	18.25	17.33		(90)
			<u>I</u>	Į	<u>I</u>	!	<u>!</u>	Į	<u> </u>	LA = Livin	g area ÷ (4	1) =	0.39	(91)
Mean	interna	l temner	ature (fo	or the wh	ole dwe	lling) – f	LA × T1	+ (1 – fl	Δ) v T2					
(92)m=	17.97	18.4	18.99	19.67	20.08	20.32	20.38	20.38	20.23	19.68	18.79	17.98		(92)
	∟—— ⁄ adjustn	nent to t	he mear	interna	l temper	ature fro	m Table	4e, whe	ere appro	priate	<u> </u>			
(93)m=	17.97	18.4	18.99	19.67	20.08	20.32	20.38	20.38	20.23	19.68	18.79	17.98		(93)
8. Sp	ace hea	ting requ	uirement			•								
				•		ned at st	ep 11 of	Table 9l	o, so tha	t Ti,m=(76)m an	d re-calc	ulate	
the u			or gains				Ι				l		1	
Litilia	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(94)m=		0.83	ains, hm	0.65	0.53	0.38	0.27	0.3	0.48	0.7	0.83	0.88		(94)
			W = (9			0.50	0.27	0.5	0.40	0.7	0.00	0.00		(0.1)
(95)m=		731.27	771.27	745.69	640.23	452.22	307.91	319.16	471.31	594.76	618.92	628.44		(95)
			rnal tem											, ,
(96)m=	4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2		(96)
Heat	loss rate	e for mea	an intern	al tempe	erature,	Lm , W :	=[(39)m :	x [(93)m	– (96)m]				
(97)m=	1277.99	1251.5	1147.93	948.46	731.19	477	314.9	328.34	520.71	792.48	1038.37	1245.45		(97)
Spac	e heatin	g require	ement fo	r each n	nonth, k	Wh/mon	th = 0.02	24 x [(97)m – (95)m] x (4	1)m			
(98)m=	462.37	349.59	280.24	145.99	67.67	0	0	0	0	147.1	302.01	459.06		
								Tota	l per year	(kWh/yeaı	r) = Sum(9	8) _{15,912} =	2214.03	(98)
Spac	e heatin	g require	ement in	kWh/m²	² /year								28.75	(99)
9a. En	ergy rec	uiremer	nts – Indi	ividual h	eating s	ystems i	ncluding	micro-C	CHP)					
Spac	e heatir	ng:				Ž	9		,					
Fract	ion of sp	ace hea	at from s	econdar	y/supple	ementary	system						0	(201)
Fract	ion of sp	ace hea	at from m	nain syst	em(s)			(202) = 1	- (201) =				1	(202)
Fract	ion of to	tal heati	ng from	main sys	stem 1			(204) = (2	02) x [1 –	(203)] =			1	(204)
Efficie	ency of r	main spa	ace heat	ing syste	em 1								90.5	(206)
Efficie	ency of s	seconda	ry/suppl	ementar	y heatin	g systen	ո, %						0	(208)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/y	—J ∕ear
Spac			ement (c		<u> </u>	L	<u> </u>	<u> </u>	СОР	000	1101	200	100011111111111111111111111111111111111	oui
- 1	462.37	349.59	280.24	145.99	67.67	0	0	0	0	147.1	302.01	459.06		
(211)m	 n = {[(98)m x (20	(4)] } x 1	00 ÷ (20)6)	•							l	(211)
(= : :)::	510.91	386.29	309.65	161.32	74.77	0	0	0	0	162.54	333.71	507.24		()
			ļ.	!	<u> </u>	!	!	Tota	l (kWh/yea	ar) =Sum(2	211) _{15,1012}		2446.44	(211)
Spac	e heatin	g fuel (s	econdar	y), kWh/	month							ļ		
		•	00 ÷ (20											
(215)m=	0	0	0	0	0	0	0	0	0	0	0	0		
								Tota	I (kWh/yea	ar) = Sum(2)	215),,,,5,10,,,,12	=	0	(215)

Water heating Output from water heater (ca	alculated at	oove)									
200.46 176.8 185.9		163.98	146.9	141.45	154.71	154.28	173.21	182.69	195.76]	
Efficiency of water heater										79.8	(216
(217)m= 86.97 86.6 85.9°	1 84.46	82.65	79.8	79.8	79.8	79.8	84.38	86.15	87.01		(217)
Fuel for water heating, kWh/ (219) m = (64) m x $100 \div (21)$											
(219)m= 230.48 204.16 216.4	<u> </u>	198.39	184.09	177.25	193.87	193.33	205.27	212.06	224.98	1	
				l	Tota	I = Sum(2	19a) ₁₁₂ =			2438.13	(219)
Annual totals							k'	Wh/yea	r	kWh/yea	
Space heating fuel used, ma	in system	1								2446.44	╛
Water heating fuel used										2438.13	
Electricity for pumps, fans ar	nd electric l	keep-hot	t								
mechanical ventilation - bal	anced, ext	act or p	ositive i	nput fron	n outsid	е			176.76]	(230a
central heating pump:									30]	(2300
Total electricity for the above	e, kWh/yea	r			sum	of (230a).	(230g) =			206.76	(231)
Electricity for lighting										335.44	(232)
Electricity generated by PVs										-714.86	(233)
10a. Fuel costs - individual	heating sys	stems:									
				/h/year			Fuel P (Table	12)	004	Fuel Cost £/year	_
Space heating - main system			(21)				3.4		x 0.01 =	85.14	(240)
Space heating - main system	n 2			3) x			0		x 0.01 =	0	(241)
Space heating - secondary			(21	5) x			13.	19	x 0.01 =	0	(242)
Water heating cost (other fue	el)		(21	9)			3.4	8	x 0.01 =	84.85	(247)
Pumps, fans and electric kee	ep-hot		(23	1)			13.	19	x 0.01 =	27.27	(249)
(if off-peak tariff, list each of Energy for lighting	(230a) to (2	230g) se	eparately (23)		licable a	nd apply	fuel pri		rding to x 0.01 =	Table 12a 44.24	(250)
Additional standing charges	(Table 12)									120	ー (251)
Ç Ç	,			of (222) to	~ (22E) v)				v 0.01		_
				of (233) to	J (235) X)		13.	19	x 0.01 =	0	(252)
Appendix Q items: repeat lin	es (253) ar	` ,			_					204.5	(255)
Total energy cost 11a. SAP rating - individual	hoating sy		247) + (23	50)(254)	-					361.5	(255)
Tra. SAF falling - Individual	Heating sy	SIGITIS									
Energy cost deflator (Table 1	12)									0.42	(256)
Energy cost factor (ECF)		[(255) x	(256)] ÷ [(4) + 45.0]	=					1.24	(257)
SAP rating (Section 12)										82.64	(258)
12a. CO2 emissions – Indiv	vidual heati	ng syste	ems incl	uding mi	cro-CHF						
				ergy			Emiss	ion fac	tor	Emissions	

kWh/year

kg CO2/kWh

kg CO2/year

Space heating (main system 1)	(211) x	0.216	=	528.43	(261)
Space heating (secondary)	(215) x	0.519	=	0	(263)
Water heating	(219) x	0.216 =	=	526.64	(264)
Space and water heating	(261) + (262) + (263) + (264) =			1055.07	(265)
Electricity for pumps, fans and electric keep-hot	(231) x	0.519 =	=	107.31	(267)
Electricity for lighting	(232) x	0.519 =	=	174.09	(268)
Energy saving/generation technologies					7
Item 1		0.519	=	-371.01	(269)
Total CO2, kg/year	sun	n of (265)(271) =		965.45	(272)
CO2 emissions per m ²	(27)	2) ÷ (4) =		12.54	(273)
EI rating (section 14)				89	(274)

13a. Primary Energy

	Energy kWh/year	Primary factor	P. Energy kWh/year
Space heating (main system 1)	(211) x	1.22 =	2984.65 (261)
Space heating (secondary)	(215) x	3.07	0 (263)
Energy for water heating	(219) x	1.22 =	2974.52 (264)
Space and water heating	(261) + (262) + (263) + (264) =		5959.17 (265)
Electricity for pumps, fans and electric keep-hot	(231) x	3.07	634.75 (267)
Electricity for lighting	(232) x	0 =	1029.81 (268)
Energy saving/generation technologies			
Item 1		3.07	-2194.63 (269)
'Total Primary Energy	sum	of (265)(271) =	5429.1 (272)
Primary energy kWh/m²/year	(272)) ÷ (4) =	70.51 (273)

User Details:	
Assessor Name: Stroma Number: Software Name: Stroma FSAP 2012 Software Version: Version	on: 1.0.4.18
Property Address: GF03	71. 1.0.4.10
Address: 39, Fitzjohns Avenue, LONDON, NW3 5JY	
1. Overall dwelling dimensions:	
Area(m²) Av. Height(m)	Volume(m³)
Ground floor	387.2 (3a)
Total floor area TFA = $(1a)+(1b)+(1c)+(1d)+(1e)+(1n)$ [121] (4)	
Dwelling volume $(3a)+(3b)+(3c)+(3d)+(3e)+(3n) =$	387.2 (5)
2. Ventilation rate: main secondary other total heating heating	m³ per hour
Number of chimneys $0 + 0 = 0 \times 40 =$	0 (6a)
Number of open flues $0 + 0 + 0 = 0 \times 20 =$	0 (6b)
Number of intermittent fans 0 × 10 =	0 (7a)
Number of passive vents 0 x 10 =	0 (7b)
Number of flueless gas fires 0 x 40 =	0 (7c)
Air ch	nanges <mark>per</mark> hour
Infiltration due to chimneys, flues and fans = $(6a)+(6b)+(7a)+(7b)+(7c) = 0$ $\div (5) = 0$	0 (8)
If a pressurisation test has been carried out or is intended, proceed to (17), otherwise continue from (9) to (16)	
Number of storeys in the dwelling (ns)	1 (9)
Additional infiltration [(9)-1]x0.1 =	0 (10)
Structural infiltration: 0.25 for steel or timber frame or 0.35 for masonry construction if both types of wall are present, use the value corresponding to the greater wall area (after	0.35 (11)
deducting areas of openings); if equal user 0.35	
If suspended wooden floor, enter 0.2 (unsealed) or 0.1 (sealed), else enter 0	0 (12)
If no draught lobby, enter 0.05, else enter 0	0.05 (13)
Percentage of windows and doors draught stripped	100 (14)
Window infiltration $0.25 - [0.2 \times (14) \div 100] =$	0.05 (15)
Infiltration rate $(8) + (10) + (11) + (12) + (13) + (15) =$	0.45 (16)
Air permeability value, q50, expressed in cubic metres per hour per square metre of envelope area	0 (17)
If based on air permeability value, then $(18) = [(17) \div 20] + (8)$, otherwise $(18) = (16)$ Air permeability value applies if a pressurisation test has been done or a degree air permeability is being used	0.45 (18)
Number of sides sheltered	2 (19)
Shelter factor $(20) = 1 - [0.075 \times (19)] =$	0.85 (20)
Infiltration rate incorporating shelter factor (21) = (18) x (20) =	0.38 (21)
Infiltration rate modified for monthly wind speed	
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	
Monthly average wind speed from Table 7	
(22)m= 5.1 5 4.9 4.4 4.3 3.8 3.8 3.7 4 4.3 4.5 4.7	
Wind Factor (22a)m = (22)m ÷ 4	
(22a)m= 1.27 1.25 1.23 1.1 1.08 0.95 0.95 0.92 1 1.08 1.12 1.18	

Adjusted infiltr	ration rat	e (allowi	ng for sh	nelter an	d wind s	peed) =	(21a) x	(22a)m					
0.49 Calculate effe	0.48	0.47	0.42 rate for t	0.41 he appli	0.36	0.36	0.35	0.38	0.41	0.43	0.45		
If mechanic		_	ato 101 t	по арри	oabio oa	00						0.5	(23a
If exhaust air h	eat pump	using Appe	endix N, (2	3b) = (23a	a) × Fmv (e	equation (N	N5)) , othe	rwise (23b) = (23a)			0.5	(23b
If balanced wit	h heat reco	overy: effici	ency in %	allowing f	or in-use f	actor (from	Table 4h) =				77.35	(230
a) If balance	ed mech	anical ve	ntilation	with hea	at recove	ery (MVI	HR) (24a	a)m = (22)	2b)m + (23b) × [1 – (23c)	÷ 100]	
(24a)m= 0.6	0.59	0.58	0.53	0.52	0.48	0.48	0.47	0.5	0.52	0.54	0.56		(24a
b) If balance	ed mech	anical ve	ntilation	without	heat rec	overy (N	/IV) (24b	m = (22)	2b)m + (23b)		_	
(24b)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24
c) If whole h				•	•								
<u> </u>		< (23b), t	,	<u> </u>	<u> </u>	· · ·	<u> </u>	ŕ –	<u> </u>	ŕ	1	I	
(24c)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24
d) If natural if (22b)r		on or whe			•				0.5]				
24d)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24
Effective air	change	rate - en	ter (24a) or (24b	o) or (24	c) or (24	d) in box	(25)				_	
25)m= 0.6	0.59	0.58	0.53	0.52	0.48	0.48	0.47	0.5	0.52	0.54	0.56		(25
3. Heat losse	es and he	eat loss r	paramete	er:							_		
ELEMENT	Gros		Openin		Net Ar	ea	U-val	ue	AXU		k-value)	ΑΧk
	area	(m²)	· m		A ,r	n²	W/m2	:K	(W/I	K)	kJ/m²-l		kJ/K
Win <mark>dows</mark> Type	e 1				2.7	x1,	(1/(1.8)+	0.04] =	4.53				(27
Win <mark>dows</mark> Type	e 2				1.8	x1,	/[1/(1.8)+	0.04] =	3.02				(27
Windows Type	e 3				4.4	X1	/[1/(1.8)+	0.04] =	7.39				(27
Windows Type	e 4				2.16	x1,	/[1/(1.8)+	0.04] =	3.63				(27
Vindows Type	e 5				5.61	x1,	/[1/(1.8)+	0.04] =	9.42				(27
Walls Type1	6		0		6	x	0.25	=	1.5				(29
Nalls Type2	14	<u></u>	2.7		11.3	x	0.25	₹ - i	2.82	T i		7 F	(29
Walls Type3	40.	5	8		32.5	X	0.25		8.12	T i		i iii	(29
Walls Type4	22	2	9.93		12.07	, x	0.25	-	3.02	=		i iii	(29
Fotal area of e	elements	 s, m²			82.5								(31
for windows and	d roof wind	ows, use e			alue calcul	ated using	formula 1	/[(1/U-valu	ıe)+0.04] a	as given in	paragraph	1 3.2	(-
Fabric heat los				o ana pan			(26)(30)) + (32) =				50.11	(33
Heat capacity		•	-,					((28).	(30) + (32	2) + (32a).	(32e) =	11755.3	
hermal mass		` '	? = Cm ÷	- TFA) ir	n kJ/m²K				tive Value		, ,	100	(35
For design assestan be used inste	sments wh	ere the de	tails of the	,			ecisely the				able 1f	100	
Thermal bridg				using Ap	pendix ł	<						12.38	(36
f details of therm Fotal fabric he	al bridging	,			•			(33) +	(36) =				(37
/entilation he		alculated	monthly	,					$= 0.33 \times ($	25)m x (5))	62.48	(37
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	l	
Jan	Ligh	IVIAI	ΑΡΙ	iviay	l Juli	Jui	Aug	l ogb	1 000	1,404		i	

					ı				i				
38)m= 76.79	75.56	74.34	68.23	67.01	60.9	60.9	59.68	63.34	67.01	69.45	71.9		(38
leat transfer co		nt, W/K						(39)m	= (37) + (37)	38)m			
39)m= 139.27	138.05	136.82	130.71	129.49	123.38	123.38	122.16	125.83	129.49	131.94	134.38		٦,,,
leat loss parar	meter (H	ILP), W/	/m²K						Average = = (39)m ÷	Sum(39)₁ · (4)	12 /12=	130.41	(39
40)m= 1.15	1.14	1.13	1.08	1.07	1.02	1.02	1.01	1.04	1.07	1.09	1.11		_
		-41- / T -1-1	l- 4-\					,	Average =	Sum(40) ₁	12 /12=	1.08	(40
lumber of days	Feb	<u> </u>		Mov	lun	Jul	۸۰۰۵	Con	Oct	Nov	Doo		
Jan 41)m= 31	28	Mar 31	Apr 30	May 31	Jun 30	31	Aug 31	Sep 30	Oct 31	Nov 30	Dec 31		(4 ⁻
+1)111= 31	20	31	30	31	30	31	31	30	31	30	31		(.
4. Water heati	ng ener	gy requi	irement:								kWh/ye	ear:	
ssumed occu											.87		(42
if TFA > 13.9		+ 1.76 x	[1 - exp	(-0.0003	849 x (TF	FA -13.9)2)] + 0.0	0013 x (ΓFA -13.	.9)			
if TFA £ 13.9 Innual average	•	iter usac	ne in litre	s ner da	av Vd av	erane –	(25 x N)	+ 36		10	2.29		(4:
Reduce the annual									se target o		2.29		(4.
ot more that 125 l	litres per p	oerson per	day (all w	ater use, l	not and co	ld)							
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
lot w <mark>ater u</mark> sage in	litres per	day for ea	ach month	Vd,m = fa	ctor from T	Table 1c x	(43)						
4)m= 112.52	108.43	104.34	100.25	96.16	92.06	92.06	96.16	100.25	104.34	108.43	112.52		
					400 1/-/		T (000)			m(44) ₁₁₂ =		1227.52	(4
ner <mark>gy con</mark> tent of I													
5)m= 166.87	145.94	150.6	131.3	125.98	108.71	100.74	115.6	116.98	136.33	148.81	161.6		٦
instantaneous wa	ater heatir	ng at point	of use (no	hot water	r storage).	enter 0 in	boxes (46		Total = Su	m(45) ₁₁₂ =	=	1609.48	(4
6)m= 25.03	21.89	22.59	19.69	18.9	16.31	15.11	17.34	17.55	20.45	22.32	24.24		(4
/ater storage		22.59	19.09	10.9	10.51	13.11	17.54	17.55	20.43	22.52	24.24		(.
torage volume	e (litres)	includin	ng any so	olar or W	/WHRS	storage	within sa	ame ves	sel		300		(4
community he	eating a	nd no ta	ınk in dw	elling, e	nter 110	litres in	(47)						
therwise if no	stored	hot wate	er (this in	ıcludes i	nstantar	eous co	mbi boil	ers) ente	er '0' in (47)			
/ater storage I													
i) If manufactu				or is kno	wn (kvvr	n/day):				1.	.69		(4
emperature fa										0.	.54		(4
nergy lost fror) If manufactu		•					(48) x (49)) =		0.	.91		(5
ot water stora			•								0		(5
community he	•			- (, ,	· y /					0		(-
olume factor f	•										0		(5
emperature fa	ctor fro	m Table	2b								0		(5
nergy lost fror	n water	storage	, kWh/ye	ear			(47) x (51)	x (52) x (53) =		0		(5
inter (50) or (5	54) in (5	55)								0.	.91		(5
ater storage l	loss cal	culated f	for each	month			((56)m = (55) × (41)ı	m				
6)m= 28.29	25.55	28.29	27.38	28.29	27.38	28.29	28.29	27.38	28.29	27.38	28.29		(5
cylinder contains	dedicated	d solar sto	rage, (57)ı	m = (56)m	x [(50) – (H11)] ÷ (5	0), else (5	7)m = (56)	m where (H11) is fro	m Append	x H	
7)m= 28.29	25.55	28.29	27.38	28.29	27.38	28.29	28.29	27.38	28.29	27.38	28.29		(5
	ソム ムム									,, .,00	חני טני		

Primary circuit loss (annual) fr	om Table 3					0			(58)				
Primary circuit loss calculated	for each month	(59)m = (58)	÷ 365 × (41)m	_								
(modified by factor from Tal	ole H5 if there is	solar water he	eating and a	a cylinder	thermos	tat)							
(59)m= 23.26 21.01 23.26	22.51 23.26	22.51 23.	26 23.26	22.51	23.26	22.51	23.26		(59)				
Combi loss calculated for each	h month (61)m =	(60) ÷ 365 ×	(41)m										
(61)m= 0 0 0	0 0	0 0	0	0	0	0	0		(61)				
Total heat required for water h	neating calculated	d for each mo	nth (62)m =	= 0.85 × (4	15)m + (4	46)m + (5	57)m +	(59)m + (61)m					
(62)m= 218.42 192.51 202.15	181.19 177.54	158.6 152	.29 167.15	166.87	187.88	198.7	213.16		(62)				
Solar DHW input calculated using Ap	pendix G or Appendix	x H (negative qua	antity) (enter '()' if no solar	contributio	n to water l	heating)						
(add additional lines if FGHRS	and/or WWHRS	applies, see	Appendix (G)									
(63)m= 0 0 0	0 0	0 0	0	0	0	0	0		(63)				
Output from water heater						-							
(64)m= 218.42 192.51 202.15	181.19 177.54	158.6 152	.29 167.15	166.87	187.88	198.7	213.16		_				
			Out	put from wat	ter heater ((annual) ₁₁₂	2	2216.47	(64)				
Heat gains from water heating	, kWh/month 0.2	5 ´ [0.85 × (4	5)m + (61)r	n] + 0.8 x	[(46)m +	- (57)m +	(59)m]					
(65)m= 96.73 85.78 91.32	83.57 83.13	76.06 74.	74 79.68	78.81	86.57	89.39	94.98		(65)				
include (57)m in calculation	of (65)m only if o	ylinder is in t	he dwelling	or hot wa	iter is fro	m comm	unity h	eating					
5. Internal gains (see Table	5 and 5a):												
Metabolic gains (Table 5), Wa	tts												
Jan Feb Mar	Apr May	Jun J	ıl Aug	Sep	Oct	Nov	Dec						
(66)m= 172.03 172.03 172.03	172.03 172.03	172.03 172	.03 172.03	172.03	172.03	172.03	172.03		(66)				
Lighting gains (calculated in A	ppendix L, equat	tion L9 or L9a	ı), also see	Table 5		•	_						
(67)m= 63.86 56.72 46.13	34.92 26.1	22.04 23.	81 30.95	41.54	52.75	61.57	65.63		(67)				
Appliances gains (calculated i	n Appendix L, eq	uation L13 or	L13a), also	o see Tab	le 5	•	_						
(68)m= 427.63 432.06 420.88	397.08 367.03	338.78 319	.91 315.48	326.66	350.46	380.52	408.76		(68)				
Cooking gains (calculated in A	Appendix L, equa	tion L15 or L	15a), also s	ee Table 5	5	•							
(69)m= 55.07 55.07 55.07	55.07 55.07	55.07 55.		55.07	55.07	55.07	55.07		(69)				
Pumps and fans gains (Table	5a)		•		<u> </u>	•							
(70)m= 3 3 3	3 3	3 3	3	3	3	3	3		(70)				
Losses e.g. evaporation (nega	ative values) (Tal	ole 5)	•	•		•							
(71)m= -114.68 -114.68 -114.68	-114.68 -114.68	-114.68 -114	.68 -114.68	-114.68	-114.68	-114.68 -	114.68		(71)				
Water heating gains (Table 5)	1					<u>'</u>							
(72)m= 130.01 127.65 122.74	116.07 111.74	105.64 100	.45 107.1	109.46	116.36	124.16	127.66		(72)				
Total internal gains =		(66)m + (67)m + (68)m	+ (69)m + (7	'0)m + (71))m + (72)m							
(73)m= 736.9 731.84 705.16	663.47 620.28	581.87 559	.59 568.94	593.07	634.99	681.65	717.46		(73)				
6. Solar gains:													
Solar gains are calculated using solar	ar flux from Table 6a	and associated	equations to c	onvert to the	applicable	e orientatio	n.						
Orientation: Access Factor	Area	Flux		g_ -	_	FF		Gains					
Table 6d	m²	Table 6	a T	Table 6b	Tal	ble 6c		(W)					
South 0.9x 1	2.7	x 46.75	x	0.5	x	0.9	_ = [51.12	(78)				
South 0.9x 1	1.8	x 46.75	x	0.5	x	0.9	= [68.16	(78)				

South	0.9x	1	x	4.4	x	46.75	x	0.5	x	0.9	=	83.31	(78)
South	0.9x	1	x	2.7	x	76.57	x	0.5	x	0.9	=	83.73	(78)
South	0.9x	1	x	1.8	x	76.57	x	0.5	x	0.9	=	111.64	(78)
South	0.9x	1	x	4.4	x	76.57	x	0.5	x	0.9	=	136.44	(78)
South	0.9x	1	x	2.7	x	97.53	x	0.5	x	0.9	=	106.65	(78)
South	0.9x	1	x	1.8	x	97.53	x	0.5	x	0.9	=	142.2	(78)
South	0.9x	1	x	4.4	x	97.53	x	0.5	x	0.9	=	173.81	(78)
South	0.9x	1	x	2.7	x	110.23	x	0.5	x	0.9	=	120.54	(78)
South	0.9x	1	X	1.8	X	110.23	x	0.5	X	0.9	=	160.72	(78)
South	0.9x	1	x	4.4	x	110.23	x	0.5	x	0.9	=	196.44	(78)
South	0.9x	1	x	2.7	x	114.87	x	0.5	x	0.9	=	125.61	(78)
South	0.9x	1	X	1.8	X	114.87	x	0.5	X	0.9	=	167.48	(78)
South	0.9x	1	x	4.4	x	114.87	x	0.5	x	0.9	=	204.7	(78)
South	0.9x	1	X	2.7	x	110.55	x	0.5	x	0.9	=	120.88	(78)
South	0.9x	1	x	1.8	x	110.55	x	0.5	x	0.9	=	161.18	(78)
South	0.9x	1	X	4.4	x	110.55	x	0.5	x	0.9	=	197	(78)
South	0.9x	1	x	2.7	x	108.01	x	0.5	x	0.9	=	118.11	(78)
South	0.9x	1	x	1.8	X	108.01	Х	0.5	X	0.9	=	157.48	(78)
South	0.9x	1	x	4.4	х	108.01	x	0.5	x	0.9	=	192.48	(78)
South	0.9x	1	x	2.7	x	104.89	×	0.5	x	0.9	=	114.7	(78)
South	0.9x	1	X	1.8	X	104.89	X	0.5	x	0.9	=	152.94	(78)
South	0.9x	1	x	4.4	x	104.89	Х	0.5	x	0.9	=	186.92	(78)
South	0.9x	1	x	2.7	x	101.89	X	0.5	x	0.9	=	111.41	(78)
South	0.9x	1	X	1.8	х	101.89	X	0.5	x	0.9	=	148.55	(78)
South	0.9x	1	X	4.4	X	101.89	X	0.5	X	0.9	=	181.56	(78)
South	0.9x	1	X	2.7	X	82.59	X	0.5	X	0.9	=	90.31	(78)
South	0.9x	1	X	1.8	x	82.59	X	0.5	X	0.9	=	120.41	(78)
South	0.9x	1	X	4.4	X	82.59	X	0.5	X	0.9	=	147.17	(78)
South	0.9x	1	x	2.7	x	55.42	X	0.5	X	0.9	=	60.6	(78)
South	0.9x	1	x	1.8	x	55.42	X	0.5	X	0.9	=	80.8	(78)
South	0.9x	1	x	4.4	x	55.42	X	0.5	X	0.9	=	98.75	(78)
South	0.9x	1	X	2.7	x	40.4	X	0.5	X	0.9	=	44.18	(78)
South	0.9x	1	x	1.8	x	40.4	X	0.5	X	0.9	=	58.9	(78)
South	0.9x	1	X	4.4	X	40.4	X	0.5	X	0.9	=	71.99	(78)
West	0.9x	1	X	2.16	X	19.64	X	0.5	X	0.9	=	34.36	(80)
West	0.9x	1	x	5.61	x	19.64	x	0.5	x	0.9	=	44.62	(80)
West	0.9x	1	x	2.16	x	38.42	X	0.5	x	0.9	=	67.22	(80)
West	0.9x	1	x	5.61	x	38.42	X	0.5	x	0.9	=	87.29	(80)
West	0.9x	1	x	2.16	x	63.27	x	0.5	X	0.9	=	110.7	(80)
West	0.9x	1	x	5.61	x	63.27	x	0.5	X	0.9	=	143.76	(80)
West	0.9x	1	x	2.16	X	92.28	x	0.5	X	0.9	=	161.45	(80)

West	0.9x	1	X	5.61		x [92.28	X	0.5	X	0.9	=	209.66	(80)
West	0.9x	1	X	2.16		x [113.09	X	0.5	X	0.9	=	197.87	(80)
West	0.9x	1	X	5.61		x [113.09	X	0.5	X	0.9	=	256.95	(80)
West	0.9x	1	X	2.16		x [115.77	X	0.5	X	0.9	=	202.55	(80)
West	0.9x	1	X	5.61		x $lacksquare$	115.77	x	0.5	X	0.9	=	263.04	(80)
West	0.9x	1	X	2.16		x $ar{ar{\Box}}$	110.22	X	0.5	X	0.9		192.84	(80)
West	0.9x	1	X	5.61		× $\overline{ m \Gamma}$	110.22	X	0.5	x	0.9		250.42	(80)
West	0.9x	1	x	2.16		× $ extstyle ext$	94.68	X	0.5	x	0.9		165.64	(80)
West	0.9x	1	X	5.61		x $ar{ar{\Box}}$	94.68	X	0.5	X	0.9		215.11	(80)
West	0.9x	1	X	2.16		x $ar{ar{\ }}$	73.59	X	0.5	x	0.9	=	128.75	(80)
West	0.9x	1	x	5.61		x $ar{ar{ar{ar{ar{ar{ar{ar{ar{ar{$	73.59	X	0.5	X	0.9	=	167.2	(80)
West	0.9x	1	X	2.16		x $lacksquare$	45.59	X	0.5	X	0.9	=	79.76	(80)
West	0.9x	1	x	5.61		x $ar{ar{\ }}$	45.59	X	0.5	X	0.9	=	103.58	(80)
West	0.9x	1	x	2.16		x $ar{ar{ar{ar{ar{ar{ar{ar{ar{ar{$	24.49	X	0.5	X	0.9	=	42.85	(80)
West	0.9x	1	X	5.61		x $ar{ar{\Box}}$	24.49	X	0.5	X	0.9	=	55.64	(80)
West	0.9x	1	x	2.16		x $ar{ar{\ }}$	16.15	X	0.5	X	0.9	=	28.26	(80)
West	0.9x	1	X	5.61		x [16.15	X	0.5	X	0.9	=	36.7	(80)
Solar (gains in wa	tts, calcul	ated	for each	month			(83)m	n = Sum(74)m	(82)m				
(83)m=			'.13		952.61	944		835	.31 737.47	541.23	338.64	240.02		(83)
Total g	gains – inte	rnal and s	solar	(84)m = ((73)m +	- (83)m , watts			_				
(84)m=	1018.49 12	18.16 138	2.28	1512.29 1	1572.89	1526	5.52 1470.92	1404	1.25 1330.54	1176.2	1 1020.29	957.48		(84)
7. Me	an internal	temperat	ure (heating s	eason)									
Temp	erature du	ring heati	ng pe	<mark>eriod</mark> s in t	the livin	ig ar	ea f <mark>rom T</mark> a	ble 9	, Th1 (°C)				21	(85)
Utilis	ation factor	for gains	for li	ving area	ı, h1,m	(see	Table 9a)					_		
	Jan	Feb M	1ar	Apr	May	Jı	ın Jul	A	ug Sep	Oct	Nov	Dec		
(86)m=	0.93	0.89	34	0.75	0.63	0.4	7 0.35	0.3	0.57	0.78	0.9	0.94		(86)
Mear	n internal te	mperatur	e in li	iving area	a T1 (fo	llow	steps 3 to	7 in T	able 9c)					
(87)m=	18.97	9.32 19.	.78	20.32	20.67	20	9 20.97	20.	96 20.82	20.35	19.61	18.97		(87)
Temp	erature du	ring heati	ng pe	eriods in i	rest of o	dwe	ling from Ta	able 9	9, Th2 (°C)			-		
(88)m=		9.97 19.		- 1	20.03	20.		20.	<u> </u>	20.03	20.01	19.99		(88)
l Itilis:	ation factor	for gains	for r	est of dw	ellina h	12 m	(see Table	9a)	!	1			ı	
(89)m=	The state of the s	0.88 0.8	$\overline{}$	0.72	0.58	0.4	<u> </u>	0.3	31 0.51	0.75	0.88	0.93		(89)
				ho root of	الميدة			222	to 7 in Tob	اه ۵۵٪		l	l	
		7.78 18.		-	19.67	19. 19.	'	20.	to 7 in Tab	19.26	18.23	17.29		(90)
(90)m=	1 17 27 1 1		.⊤∪ I	10.2	10.07	10.	20.00	1 20.		ļ	ring area ÷ (ļ	0.29	(91)
(90)m=	17.27 1	7.70									`	<i>'</i>	0.23	(0.)
Mear	internal te	mperature						- `	– fLA) × T2	1	140.04	47.70		(02)
Mear (92)m=	internal te	mperature	.82	19.52	19.96	20.	25 20.32	20.	32 20.16	19.58		17.78		(92)
Mear (92)m= Apply	internal te	mperature 8.24 18. at to the m	.82 nean	19.52 internal t	19.96 empera	20.	25 20.32 from Table	20. e 4e ,	32 20.16 where appr	19.58	!	!		, ,
Mear (92)m= Apply (93)m=	n internal te 17.77 1: v adjustmen 17.77 1:	mperature 8.24 18. at to the m 8.24 18.	.82 nean .82	19.52 internal t	19.96	20.	25 20.32 from Table	20.	32 20.16 where appr	19.58	!	17.78		(92)
Mear (92)m= Apply (93)m= 8. Sp	n internal te 17.77 16 display adjustmen 17.77 16 ace heating	mperature 8.24 18. 1 to the m 8.24 18.	.82 nean .82 nent	19.52 internal t 19.52	19.96 empera 19.96	20. ature 20.	25 20.32 from Table 25 20.32	20. 20. 20.	32 20.16 where appr	19.58 copriate 19.58	18.64	17.78	culate	, ,

Sep

Aug

Oct

Nov

Dec

Apr

Mar

May

Jun

Jul

the utilisation factor for gains using Table 9a

Feb

l Itilisat	tion facto	or for a:	ains, hm	ı .										
(94)m=	0.9	0.85	0.79	0.7	0.58	0.43	0.3	0.33	0.51	0.73	0.85	0.91		(94)
· · · L	gains, h	nmGm ,	W = (94	1)m x (84	4)m				!	<u> </u>	!	<u> </u>		
_			1095.72	1057	913.32	653.06	446.51	463.15	683.56	855.94	872.32	867.62		(95)
Monthl	ly avera	ge exte	rnal tem	perature	from Ta	able 8				ļ.				
(96)m=	4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2		(96)
Heat Ic	oss rate	for mea	an intern	al tempe	erature,	Lm , W =	=[(39)m :	x [(93)m	– (96)m]		•	ı	
(97)m=	1876.1	1840.85	1686.24	1388.82	1070.08	696.88	458.49	478.29	762.33	1162.75	1522.45	1825.4		(97)
· · -	Ť					r	r	24 x [(97)	``	í - `	ŕ		1	
(98)m=	717.16	539.26	439.35	238.91	116.63	0	0	0	0	228.27	468.09	712.59		_
								Tota	l per year	(kWh/yeaı	r) = Sum(9	8) _{15,912} =	3460.25	(98)
Space	heating	require	ement in	kWh/m²	?/year								28.6	(99)
9a. Ene	rgy requ	uiremen	ıts – Indi	vidual h	eating sy	ystems i	ncluding	micro-C	CHP)					
•	heating	_										i		_
Fractio	n of spa	ace hea	t from se	econdar	y/supple	mentary	system						0	(201)
Fractio	n of spa	ace hea	t from m	nain syst	em(s)			(202) = 1 -	- (201) =				1	(202)
Fractio	n of tota	al heatir	ng from	main sys	stem 1			(204) = (2	02) x [1 –	(203)] =			1	(204)
Efficier	ncy of m	ain spa	ce heat	ing syste	em 1								90.5	(206)
Efficier	ncy of se	econda	ry/supple	ementar	y heat <mark>in</mark> g	g system	າ, %						0	(208)
Г	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/yea	- ar
Space	heating	require	ement (c	alculate	d above))								
	7 17.16	539.26	439.35	238.91	116.63	0	0	0	0	228.27	468.09	712.59		
(211 <mark>)m</mark>	= {[(98)r	m x (20	4)] } x 1	00 ÷ (20)6)									(211)
	792.44	595.87	485.47	263.99	128.87	0	0	0	0	252.23	517.22	787.39		_
								Tota	ıl (kWh/yea	ar) =Sum(2	211),15,1012	F	3823.48	(211)
•	_	•		y), kWh/	month									
= {[(98)r														
(215)m=	0	0	0	0	0	0	0	0 Tota	0 II (kWh/yea	0 or) =Sum('	0	0		7(045)
147-41								Tota	ii (KVVII/yea	ai) =5uiii(2	213) _{15,1012}	F	0	(215)
Water h	_	tor hoa	tor (calc	ulated al	hovo)									
-		192.51	202.15	181.19	177.54	158.6	152.29	167.15	166.87	187.88	198.7	213.16		
Efficiend	cy of wa	ter hea	ter			<u> </u>	l	<u>!</u>	!	!	!	<u> </u>	79.8	(216)
(217)m=	87.75	87.42	86.83	85.55	83.72	79.8	79.8	79.8	79.8	85.33	87.02	87.79		(217)
Fuel for	water h	eating,	kWh/mo	onth					ı	ı	ı		l	
` ' -			÷ (217)				<u> </u>						l	
(219)m=	248.9	220.22	232.81	211.79	212.05	198.75	190.84	209.46	209.11	220.17	228.34	242.8		7
.	4-4							ıota	II = Sum(2		A/II. /		2625.25	(219)
Annual Space h		اروا بروم	d main	system	1					K	Wh/year	· 	kWh/year 3823.48	
	•			5,5(5)11										_
Water h	_												2625.25	
Electrici	ity for pu	umps, fa	ans and	electric	keep-ho	t								

mechanical ventilation - balanced, extract or posi	itive input from outside	330.	67 (230a)
central heating pump:	·	30	(230c)
Total electricity for the above, kWh/year	sum of (2	230a)(230g) =	360.67 (231)
Electricity for lighting			451.09 (232)
Electricity generated by PVs			-714.86 (233)
10a. Fuel costs - individual heating systems:			
	Fuel kWh/year	Fuel Price (Table 12)	Fuel Cost £/year
Space heating - main system 1	(211) x	3.48 x 0.0°	133.06 (240)
Space heating - main system 2	(213) x	0 x 0.0	0 (241)
Space heating - secondary	(215) x	13.19 × 0.0	0 (242)
Water heating cost (other fuel)	(219)	3.48 × 0.0°	91.36 (247)
Pumps, fans and electric keep-hot	(231)	13.19 × 0.0°	47.57 (249)
(if off-peak tariff, list each of (230a) to (230g) sepa Energy for lighting	rately as applicable and a		
	(202)	13.19 X 0.0°	39.5
Additional standing charges (Table 12)			120 (251)
	one of (233) to (235) x)	13.19 x 0.0°	0 (252)
Appendix Q items: repeat lines (253) and (254) as Total energy cost (245)(247)	s needed ') + (250),(254) =		451.49 (255)
11a. SAP rating - individual heating systems) 1 (230)(234) =		451.49 (250)
			(050)
Energy cost deflator (Table 12) Energy cost factor (ECF) [(255) x (25	(6)] ÷ [(4) + 45.0] =		0.42 (256) 1.14 (257)
SAP rating (Section 12)	-71-10		84.06 (258)
12a. CO2 emissions – Individual heating systems	s including micro-CHP		C 1.30 (23)
	Energy	Emission factor	Emissions
	kWh/year	kg CO2/kWh	kg CO2/year
Space heating (main system 1)	(211) x	0.216 =	825.87 (261)
Space heating (secondary)	(215) x	0.519 =	0 (263)
Water heating	(219) x	0.216 =	567.05 (264)
Space and water heating	(261) + (262) + (263) + (264)	=	1392.93 (265)
Electricity for pumps, fans and electric keep-hot	(231) x	0.519 =	187.19 (267)
Electricity for lighting	(232) x	0.519 =	234.12 (268)
Energy saving/generation technologies Item 1		0.519 =	-371.01 (269)
Total CO2, kg/year	5	sum of (265)(271) =	1443.22 (272)
CO2 emissions per m²		(272) ÷ (4) =	11.93 (273)

Primary energy kWh/m²/year

SAP WorkSheet: Existing dwelling (SAP)

El rating (section 14)

13a. Primary Energy					
	Energy kWh/year	Primary factor		P. Energy kWh/year	
Space heating (main system 1)	(211) x	1.22	=	4664.65	(261)
Space heating (secondary)	(215) x	3.07	=	0	(263)
Energy for water heating	(219) x	1.22	=	3202.81	(264)
Space and water heating	(261) + (262) + (263) + (264) =			7867.46	(265)
Electricity for pumps, fans and electric keep-hot	(231) x	3.07	=	1107.25	(267)
Electricity for lighting	(232) x	0	=	1384.84	(268)
Energy saving/generation technologies Item 1		3.07	=	-2194.63	(269)
'Total Primary Energy	sum	of (265)(271) =		8164.92	(272)



 $(272) \div (4) =$

(273)

67.48

	Jser Details:								
Assessor Name: Software Name: Stroma FSAP 2012	Stroma Number: Software Version: 1 0 4 18								
	-								
1. Overall dwelling dimensions:									
	Area(m²) Av. Height(m) Volume(m³)								
Ground floor	72 (1a) x 3.2 (2a) = 230.4 (3a)								
Total floor area TFA = $(1a)+(1b)+(1c)+(1d)+(1e)+(1n)$	72 (4)								
Dwelling volume	(3a)+(3b)+(3c)+(3d)+(3e)+(3n) = 230.4 (5)								
2. Ventilation rate: main beating beating beating	other total m³ per hour								
Number of chimneys 0 + 0	$+$ 0 = 0 $\times 40 =$ 0 (6a)								
Number of open flues 0 + 0	$+$ 0 = 0 $\times 20 =$ 0 (6b)								
Number of intermittent fans	0 x 10 = 0 (7a)								
Number of passive vents	0 x 10 = 0 (7b)								
Number of flueless gas fires	0 x 40 = 0 (7c)								
Air changes per hour									
Software Name: Stroma FSAP 2012 Software Version: Version: 1.0.4.18									
if both types of wall are present, use the value corresponding to the									
	(sealed), else enter 0 0 (12)								
If no draught lobby, enter 0.05, else enter 0	0.05 (13)								
Percentage of windows and doors draught stripped	100 (14)								
Window infiltration	$0.25 - [0.2 \times (14) \div 100] = 0.05$ (15)								
Infiltration rate	(8) + (10) + (11) + (12) + (13) + (15) = 0.45								
	(00) 1 10 000 (10)?								
	(04) (40) (00)								
,									
	Jul Aug Sep Oct Nov Dec								
Monthly average wind speed from Table 7									
(22)m= 5.1 5 4.9 4.4 4.3 3.8	3.8 3.7 4 4.3 4.5 4.7								
Wind Factor (22a)m = (22)m ÷ 4									
	0.95 0.92 1 1.08 1.12 1.18								

Adjusted infiltra	ation rat	e (allowi	ng for sl	nelter an	d wind s	peed) =	(21a) x	(22a)m				_	
0.49	0.48	0.47	0.42	0.41	0.36	0.36	0.35	0.38	0.41	0.43	0.45		
Calcul <u>ate effec</u> If mechanica		_	rate for t	he appli	cable ca	se						0.5	(23
If exhaust air he	eat pump i	using Appe	endix N, (2	3b) = (23a	a) × Fmv (e	equation (N	N5)) , othe	rwise (23b) = (23a)			0.5	(23
If balanced with	heat reco	overy: effic	iency in %	allowing f	or in-use f	actor (fron	n Table 4h) =				77.35	5 (23
a) If balance	d mech	anical ve	entilation	with hea	at recove	ery (MVI	HR) (24a	a)m = (22)	2b)m + (23b) × [1	1 – (23c)	÷ 100]	
24a)m= 0.6	0.59	0.58	0.53	0.52	0.48	0.48	0.47	0.5	0.52	0.54	0.56]	(24
b) If balance	d mech	anical ve	entilation	without	heat red	covery (N	ЛV) (24b)m = (22	2b)m + (2	23b)		-	
24b)m= 0	0	0	0	0	0	0	0	0	0	0	0]	(24
c) If whole h				•	-				5 × (23b	o)			
24c)m= 0	0	0	0	0	0	0	0	0	0	0	0]	(24
d) If natural if (22b)m				•	•				0.51			1	
24d)m= 0	0	0	0	0	0	0	0	0	0	0	0]	(24
Effective air	change	rate - er	ter (24a	or (24h	o) or (24)	c) or (24	d) in box	(25)				J	
25)m= 0.6	0.59	0.58	0.53	0.52	0.48	0.48	0.47	0.5	0.52	0.54	0.56		(2
3. Heat losse												_	
ELEMENT	Gros area		Openin m		Net Ar A ,r	n²	U-valı W/m2	:K	A X U (W/I	K)	k-value kJ/m²-	-	A X k kJ/K
Vin <mark>dows</mark> Type	1				1.44	x1.	/[1/(1.8)+	0.04] =	2.42				(27
Vindows Type	2				5.4	x1.	/[1/(1.8)+	0.04] =	9.07				(27
Vindows Type	3				1.8	x1.	/[1/(1.8)+	0.04] =	3.02				(27
Valls Type1	36		5.76		30.24	X	0.25	=	7.56				(29
Valls Type2	30		12.6		17.4	Х	0.25	= [4.35				(29
otal area of e	lements	, m²			66								(3:
for windows and * include the area						ated using	formula 1	/[(1/U-valu	ie)+0.04] a	as given in	paragrapl	1 3.2	
abric heat los	s, W/K	= S (A x	U)				(26)(30)	+ (32) =				42.74	1 (3:
leat capacity	Cm = S((Axk)						((28)	.(30) + (32	2) + (32a).	(32e) =	7842	(3-
hermal mass	parame	ter (TMF	P = Cm +	- TFA) ir	n kJ/m²K			Indica	tive Value	: Low		100	(3
or design assess an be used instea				construct	ion are no	t known pr	ecisely the	e indicative	values of	TMP in Ta	able 1f		
hermal bridge	es : S (L	x Y) cal	culated (using Ap	pendix l	<						9.9	(30
details of therma		are not kn	own (36) =	= 0.05 x (3	1)								
otal fabric he	at loss							(33) +	(36) =			52.64	1 (3
entilation hea	t loss ca		l monthly	/	ı	ı	1	 	= 0.33 × (25)m x (5)) 	1	
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
38)m= 45.69	44.96	44.24	40.6	39.87	36.24	36.24	35.51	37.69	39.87	41.33	42.78		(3
leat transfer o	oefficier	nt, W/K						(39)m	= (37) + (3	38)m		-	
39)m= 98.33	97.6	96.87	93.24	92.51	88.88	88.88	88.15	90.33	92.51	93.97	95.42		
									Average =	Sum(39) ₁	12 /12=	93.06	3 (3

leat loss para	meter (H	HLP), W/	′m²K					(40)m	= (39)m ÷	- (4)			
1.37 1.37	1.36	1.35	1.29	1.28	1.23	1.23	1.22	1.25	1.28	1.31	1.33		
lumber of day	e in moi	oth (Tah	le 1a)			<u>!</u>		,	Average =	Sum(40) ₁ .	12 /12=	1.29	(40)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
11)m= 31	28	31	30	31	30	31	31	30	31	30	31		(41)
						-				-			
4. Water heat	ing ener	rgy requi	rement:								kWh/ye	ear:	
ssumed occu if TFA > 13.9 if TFA £ 13.9	N = 1		[1 - exp	(-0.0003	349 x (TF	FA -13.9)2)] + 0.0	0013 x (⁻	ΓFA -13.		29		(42)
Innual averag Reduce the annua ot more that 125	l average	hot water	usage by	5% if the c	lwelling is	designed t			se target o		.34		(43)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
lot water usage ir	•	day for ea		Vd,m = fa	ctor from	Table 1c x	(43)			1	1		
14)m= 102.68	98.94	95.21	91.48	87.74	84.01	84.01	87.74	91.48	95.21	98.94	102.68	1100.11	(44)
nergy content of	hot water	used - cal	culated mo	onthly $= 4$.	190 x Vd,r	n x nm x E	Tm / 3600			m(44) ₁₁₂ = ables 1b, 1		1120.11	(44)
152.27	133.17	137.42	119.81	114.96	99.2	91.92	105.48	106.74	124.4	135.79	147.46		
			-5	last seeks					Γotal = Su	m(45) ₁₁₂ =		1468.63	(45
instantaneous w						_			40.00	22.27	00.40		(46
Vater storage	19.98 loss:	20.61	17.97	17.24	14.88	13.79	15.82	16.01	18.66	20.37	22.12		(46
Storage volum		includin	ig any so	olar or W	/WHRS	storage	within sa	ame ves	sel		300		(47
community h	-			_			' '						
Otherwise if no Vater storage		hot wate	er (this in	ıcludes i	nstantar	neous co	mbi boil	ers) ente	er '0' in (47)			
a) If manufact		eclared l	oss facto	or is kno	wn (kWł	n/day):				1.	69		(48
emperature fa					,	• ,					54		(49
nergy lost fro	m water	storage	, kWh/ye	ear			(48) x (49)) =		0.	91		(50
o) If manufactlot water stora			-										(54
community h	•			e z (KVV	ii/iiiie/ua	iy <i>)</i>					0		(51
olume factor	_										0		(52
emperature fa	actor fro	m Table	2b								0		(53
nergy lost fro	m water	storage	, kWh/ye	ear			(47) x (51)) x (52) x (53) =		0		(54
Enter (50) or (54) in (5	55)								0.	91		(55
Vater storage	loss cal	culated f	or each	month			((56)m = (55) × (41)ı	m				
56)m= 28.29 cylinder contains	25.55 dedicate	28.29	27.38 rage, (57)	28.29 m = (56)m	27.38 x [(50) – (28.29 H11)] ÷ (5	28.29 0), else (5	27.38 7)m = (56)	28.29 m where (27.38 H11) is fro	28.29 m Appendi	ix H	(56
57)m= 28.29	25.55	28.29	27.38	28.29	27.38	28.29	28.29	27.38	28.29	27.38	28.29		(57
´							20.20	21.00					` (58
rimary circuit rimary circuit	loss cal	culated f	for each	month (•	. ,	, ,				0		(50
(modified by	factor fi	rom Tabl	le H5 if t	here is s	solar wat	ter heatii	ng and a	cylinde	r thermo	stat)			
59)m= 23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26		(59

Combi loss calcul	ated for eac	h month	(61)m =	(60) ÷ 3	65 x (41)m						
(61)m= 0	0 0	0	0	0	0	0	0	0	0	0]	(61)
Total heat require	d for water h	neating c	alculated	l for eac	h month	(62)m	= 0.85 ×	(45)m +	(46)m +	(57)m +	ı (59)m + (61)m	
(62)m= 203.82 17	9.74 188.98	169.7	166.51	149.09	143.48	157.0	1 156.63	175.95	185.68	199.01]	(62)
Solar DHW input calcu	ılated using Ap	pendix G o	r Appendix	H (negati	ve quantity	y) (enter	'0' if no sola	r contribut	tion to wate	er heating)	•	
(add additional lin	es if FGHRS	and/or \	WWHRS	applies	, see Ap	pendix	(G)				_	
(63)m= 0	0 0	0	0	0	0	0	0	0	0	0]	(63)
Output from water	heater										_	
(64)m= 203.82 17	9.74 188.98	169.7	166.51	149.09	143.48	157.0	156.63	175.95	185.68	199.01		_
						0	utput from w	ater heate	r (annual)	112	2075.63	(64)
Heat gains from v	/ater heating	g, kWh/m	onth 0.2	5 ´ [0.85	× (45)m	+ (61)	m] + 0.8	x [(46)m	+ (57)m	+ (59)m	<u>[</u>]	
(65)m= 91.87 8	1.53 86.94	79.75	79.47	72.9	71.81	76.32	75.4	82.61	85.06	90.27		(65)
include (57)m ir	n calculation	of (65)m	only if o	ylinder i	s in the	dwellin	g or hot w	ater is f	rom com	munity h	neating	
5. Internal gains	(see Table	5 and 5a):									
Metabolic gains (Γable 5), Wa	itts									-	
Jan l	eb Mar	Apr	May	Jun	Jul	Aug	Sep Sep	Oct	Nov	Dec		
(66)m= 137.62 13	7.62 137.62	137.62	137.62	137.62	137.62	137.6	137.62	137.62	137.62	137.62		(66)
Ligh <mark>ting gains (ca</mark>	Iculated in A	ppendix	L, equ <mark>at</mark>	ion L9 o	r L9a), <mark>a</mark>	lso se	Table 5					
(67)m= 45 39	9.97 32.51	24.61	18.4	15.53	16.78	21.81	29.28	37.17	43.39	46.25		(67)
App <mark>liance</mark> s gains	(ca <mark>lculat</mark> ed i	n Appen	dix L, eq	uation L	13 or L1	3a), al	so see Ta	ble 5				
(68)m= 301.37 30	04.5 296.62	279.84	258.66	238.76	225.46	222.3	3 230.22	246.99	268.17	288.07		(68)
Cooking gains (ca	alculated in A	A <mark>ppen</mark> dix	L, equat	tion L15	or L15a), also	see Table	5				
(69)m= 51.06 5	51.06	51.06	51.06	51.06	51.06	51.06	51.06	51.06	51.06	51.06		(69)
Pumps and fans	gains (Table	5a)									_	
(70)m= 3	3 3	3	3	3	3	3	3	3	3	3		(70)
Losses e.g. evapo	oration (nega	ative valu	es) (Tab	le 5)	_	_					_	
(71)m= -91.75 -9	1.75 -91.75	-91.75	-91.75	-91.75	-91.75	-91.75	-91.75	-91.75	-91.75	-91.75		(71)
Water heating gai	ns (Table 5)			_	-				•		_	
(72)m= 123.48 12	1.33 116.85	110.76	106.81	101.24	96.51	102.5	3 104.73	111.03	118.14	121.34		(72)
Total internal ga	ins =			(66))m + (67)m	n + (68)r	n + (69)m +	(70)m + (7	71)m + (72))m	_	
(73)m= 569.79 56	5.73 545.9	515.14	483.8	455.46	438.69	446.6	464.15	495.13	529.63	555.59		(73)
6. Solar gains:												
Solar gains are calcu	_					itions to		ne applical		tion.		
Orientation: Acc	ess Factor le 6d	Area m²		Flu Ta	ıx ble 6a		g_ Table 6b	т	FF able 6c		Gains (W)	
			1			, –						7,-0
North 0.9x		1.4		-	10.63]	0.5		0.9	=	24.81	<u></u> (74)
North 0.9x		1.4			20.32] X	0.5		0.9	=	47.4](74)
		1.4			34.53]	0.5		0.9	=	80.55](74)
		1.4			55.46] X	0.5	X	0.9	=	129.39](74)
North 0.9x	1	1.4	44	X 7	74.72	X	0.5	X	0.9	=	174.3	(74)

Morth	Г					_			1		_				7
North	0.9x	1		X	1.44	X		9.99	X	0.5	×	0.9	=	186.59	<u> </u> (74)
North	0.9x	1		X	1.44	×		4.68	X	0.5	X	0.9	= =	174.21	(74)
North	0.9x	1		X	1.44	×		9.25	X	0.5	X	0.9	_ =	138.21	(74)
North	0.9x	1		X	1.44	×		1.52	X	0.5	X	0.9	=	96.85	(74)
North	0.9x	1		X	1.44	X	2	4.19	X	0.5	X	0.9	=	56.43	(74)
North	0.9x	1		X	1.44	X	1	3.12	X	0.5	X	0.9	=	30.6	(74)
North	0.9x	1		X	1.44	X		8.86	X	0.5	X	0.9	=	20.68	(74)
West	0.9x	1		X	5.4	X	1	9.64	X	0.5	X	0.9	=	85.91	(80)
West	0.9x	1		X	1.8	X	1	9.64	X	0.5	X	0.9	=	14.32	(80)
West	0.9x	1		X	5.4	X	3	8.42	X	0.5	X	0.9	=	168.05	(80)
West	0.9x	1		X	1.8	X	3	8.42	X	0.5	X	0.9	=	28.01	(80)
West	0.9x	1		X	5.4	X	6	3.27	X	0.5	X	0.9	=	276.76	(80)
West	0.9x	1		X	1.8	X	6	3.27	X	0.5	X	0.9	=	46.13	(80)
West	0.9x	1		X	5.4	X	9	2.28	X	0.5	X	0.9	=	403.63	(80)
West	0.9x	1		X	1.8	X	9	2.28	X	0.5	X	0.9	=	67.27	(80)
West	0.9x	1		x	5.4	X	1	13.09	X	0.5	X	0.9	=	494.67	(80)
West	0.9x	1		X	1.8	X	1	13.09	X	0.5	X	0.9	=	82.44	(80)
West	0.9x	1		X	5.4	X	1	15.77	X	0.5	X	0.9	=	506.38	(80)
West	0.9x	1		x	1.8	х	1	15.77] x	0.5	x	0.9		84.4	(80)
West	0.9x	1		x	5.4	х	1	10.22	x	0.5	X	0.9	=	482.09	(80)
West	0.9x	1		x	1.8	X	1	10.22] x	0.5	X	0.9	=	80.35	(80)
West	0.9x	1		x	5.4	X	9	4.68	Х	0.5	X	0.9	=	414.11	(80)
West	0.9x	1		x	1.8	x	9	4.68	X	0.5	Х	0.9	=	69.02	(80)
West	0.9x	1		x	5.4	X		3.59	x	0.5	X	0.9	=	321.88	(80)
West	0.9x	1		x	1.8	X	7	3.59	X	0.5	X	0.9	=	53.65	(80)
West	0.9x	1		x	5.4	X		5.59	x	0.5	X	0.9	=	199.41	(80)
West	0.9x	1		x	1.8	X		5.59	x	0.5	X	0.9	=	33.23	(80)
West	0.9x	1		x	5.4	X	2	4.49	x	0.5	X	0.9	=	107.12	(80)
West	0.9x	1		x	1.8	X	2	4.49	x	0.5	X	0.9	=	17.85	(80)
West	0.9x	1		x	5.4	X	1	6.15	x	0.5	X	0.9	=	70.65	(80)
West	0.9x	1		x	1.8	X	1	6.15	X	0.5	X	0.9	=	11.77	(80)
T	ains in		alcula	ted	for each mo				(83)m	= Sum(74)m	(82)m			1	
(83)m=	125.03	243.46	403.		600.29 751		777.37	736.65	621	.34 472.38	289.0	7 155.57	103.1		(83)
Ī					(84)m = (73)		` ,							1	
(84)m=	694.82	809.19	949.	34	1115.43 1235	5.21 1	232.83	1175.34	1067	7.99 936.53	784.2	685.2	658.69		(84)
7. Mea	an inter	nal temp	peratu	ıre (heating sea	son)									
Tempe	erature	during h	neatin	g pe	eriods in the	living	area	from Tab	ole 9,	Th1 (°C)				21	(85)
Utilisa	tion fac		ains f	or li	ving area, h	1,m (s	see Ta	ble 9a)					1	1	
,	Jan	Feb	Ma	\rightarrow		ay	Jun	Jul	_	ug Sep	Oct	+	Dec		
(86)m=	0.92	0.89	0.8	3	0.71 0.5	57	0.42	0.32	0.3	0.56	0.78	0.89	0.93		(86)
Mean	interna	temper	ature	in li	ving area T	1 (follo	ow ste	ps 3 to 7	in T	able 9c)				-	
(87)m=	18.68	19.02	19.5	56 T	20.21 20.	64	20.89	20.96	20.	94 20.76	20.17	19.36	18.68		(87)

Temperature during heating periods in rest of dwelling from Table 9, Th2 (°C)	1 (00)
(88)m= 19.79 19.8 19.81 19.84 19.85 19.89 19.89 19.9 19.88 19.85 19.84 19.82	(88)
Utilisation factor for gains for rest of dwelling, h2,m (see Table 9a)	7 (90)
(89)m= 0.91 0.87 0.8 0.68 0.52 0.36 0.24 0.28 0.49 0.74 0.87 0.92	(89)
Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c)	7 (00)
(90)m= 16.77 17.26 18.01 18.92 19.48 19.8 19.87 19.87 19.66 18.89 17.76 16.78 fLA = Living area ÷ (4) =	(90)
TEA = Living alea ÷ (4) =	0.35 (91)
Mean internal temperature (for the whole dwelling) = fLA × T1 + (1 – fLA) × T2	1 (02)
(92)m= 17.44 17.87 18.55 19.37 19.88 20.17 20.25 20.24 20.04 19.34 18.32 17.44	(92)
Apply adjustment to the mean internal temperature from Table 4e, where appropriate (93)m= 17.44 17.87 18.55 19.37 19.88 20.17 20.25 20.24 20.04 19.34 18.32 17.44	(93)
8. Space heating requirement	(00)
Set Ti to the mean internal temperature obtained at step 11 of Table 9b, so that Ti,m=(76)m and re-cal-	culate
the utilisation factor for gains using Table 9a	-
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec]
Utilisation factor for gains, hm:	1
(94)m= 0.88 0.84 0.77 0.66 0.52 0.38 0.27 0.3 0.5 0.72 0.84 0.89	(94)
Useful gains, hmGm , W = (94)m x (84)m	1 (05)
(95)m= 609.69 679.08 733.35 736.13 648.07 463.84 314.66 325.41 469.14 564.63 575.42 584.4	(95)
Monthly average external temperature from Table 8 (96)m= 4.3 4.9 6.5 8.9 11.7 14.6 16.6 16.4 14.1 10.6 7.1 4.2	7 (96)
Heat loss rate for mean internal temperature, Lm , W =[(39)m x [(93)m– (96)m]	
(97)m= 1291.64 1265.87 1167.09 976.33 756.92 495.48 324.14 338.54 536.57 808.19 1054.05 1263.34] (97)
Space heating requirement for each month, kWh/month = 0.024 x [(97)m - (95)m] x (41)m	1
(98)m= 507.37 394.32 322.7 172.94 80.98 0 0 0 181.2 344.61 505.13	1
Total per year (kWh/year) = Sum(98) _{15,912} =	2509.27 (98)
Space heating requirement in kWh/m²/year	34.85 (99)
9a. Energy requirements – Individual heating systems including micro-CHP)	
Space heating:	
Fraction of space heat from secondary/supplementary system	0 (201)
Fraction of space heat from main system(s) (202) = 1 - (201) =	1 (202)
Fraction of total heating from main system 1 (204) = (202) × [1 - (203)] =	1 (204)
Efficiency of main space heating system 1	90.5 (206)
Efficiency of secondary/supplementary heating system, %	0 (208)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	kWh/year
Space heating requirement (calculated above)	,
507.37 394.32 322.7 172.94 80.98 0 0 0 0 181.2 344.61 505.13]
(211)m = {[(98)m x (204)] } x 100 ÷ (206)	(211)
560.63 435.72 356.58 191.1 89.48 0 0 0 0 200.22 380.78 558.16]
Total (kWh/year) =Sum(211) _{15,1012} =	2772.67 (211)
Space heating fuel (secondary), kWh/month	
= {[(98)m x (201)] } x 100 ÷ (208)	7
(215)m= 0 0 0 0 0 0 0 0 0 0 0 0 0	
Total (kWh/year) =Sum(215) _{15,1012} =	0 (215)

Water heating Output from water heater (cal	culated abo	ove)									
203.82 179.74 188.98	1	166.51	149.09	143.48	157.04	156.63	175.95	185.68	199.01]	
Efficiency of water heater	•			•		•	•		•	79.8	(216)
(217)m= 87.15 86.85 86.23	84.86	83.01	79.8	79.8	79.8	79.8	84.89	86.44	87.2		(217)
Fuel for water heating, kWh/m											
$(219)m = (64)m \times 100 \div (217)$ (219)m = 233.87 (206.94) (219.15)	$\overline{}$	200.59	186.83	179.8	196.79	196.28	207.27	214.81	228.24	1	
	-11				Tota	I = Sum(2	19a) ₁₁₂ =			2470.53	(219)
Annual totals							k\	Wh/yeaı	r	kWh/yea	<u>-</u>
Space heating fuel used, main	n system 1									2772.67	╣
Water heating fuel used										2470.53	
Electricity for pumps, fans and	d electric k	eep-ho	t							_	
mechanical ventilation - bala	nced, extra	act or p	ositive ir	nput fron	n outside	е			165.28		(230a
central heating pump:									30]	(2300
Total electricity for the above,	kWh/year				sum	of (230a).	(230g) =			195.28	(231)
Electricity for lighting										317.91	(232)
Electricity generated by PVs										-714.86	(233)
10a. Fuel costs - individual h	eating sys	tems:									
			Fu kW	el /h/y <mark>ear</mark>			Fuel P (Table			Fuel Cost £/year	
Space heating - main system	1		(211	1) x			3.4	8	x 0.01 =	96.49	(240)
Space heating - main system	2		(213	3) x			0		x 0.01 =	0	(241)
Space heating - secondary			(215	5) x			13.	19	x 0.01 =	0	(242)
Water heating cost (other fuel)		(219	9)			3.4	8	x 0.01 =	85.97	(247)
Pumps, fans and electric keep	o-hot		(231	1)			13.	19	x 0.01 =	25.76	(249)
(if off-peak tariff, list each of (2 Energy for lighting	230a) to (2	30g) se	eparately (232		licable a	nd apply	fuel pri		rding to x 0.01 =	Table 12a 41.93	(250)
Additional standing charges (Tahla 12)		•	,			13.	19			=
Additional standing charges (Table 12)									120	(251)
			one	of (233) to	o (235) x)		13.	19	x 0.01 =	0	(252)
Appendix Q items: repeat line	s (253) and	` ,									_
Total energy cost		. , ,	247) + (25	50)(254)	=					370.15	(255)
11a. SAP rating - individual l	neating sys	stems									
Energy cost deflator (Table 12	2)									0.42	(256)
Energy cost factor (ECF)		[(255) x	(256)] ÷ [((4) + 45.0]	=					1.33	(257)
SAP rating (Section 12)										81.46	(258)
12a. CO2 emissions – Indivi	dual heatin	g syste	ms inclu	uding mi	cro-CHF						
				ergy			Emiss	ion fac	tor	Emissions	

kWh/year

kg CO2/kWh

kg CO2/year

Space heating (main system 1)	(211) x	0.216 =	598.9 (261)
Space heating (secondary)	(215) x	0.519	0 (263)
Water heating	(219) x	0.216	533.63 (264)
Space and water heating	(261) + (262) + (263) + (264) =		1132.53 (265)
Electricity for pumps, fans and electric keep-hot	(231) x	0.519 =	101.35 (267)
Electricity for lighting	(232) x	0.519 =	164.99 (268)
Energy saving/generation technologies			[
Item 1		0.519	-371.01 (269)
Total CO2, kg/year	sum	of (265)(271) =	1027.86 (272)
CO2 emissions per m ²	(272	2) ÷ (4) =	14.28 (273)
EI rating (section 14)			88 (274)

13a. Primary Energy

	Energy kWh/year	Primary factor	P. Energy kWh/year
Space heating (main system 1)	(211) x	1.22	3382.66 (261)
Space heating (secondary)	(215) x	3.07	0 (263)
Energy for water heating	(219) x	1.22	3014.04 (264)
Space and water heating	(261) + (262) + (263) + (264) =		6396.7 (265)
Electricity for pumps, fans and electric keep-hot	(231) x	3.07	599.51 (267)
Electricity for lighting	(232) x	0 =	975.98 (268)
Energy saving/generation technologies			
Item 1		3.07	-2194.63 (269)
'Total Primary Energy	sum	of (265)(271) =	5777.56 (272)
Primary energy kWh/m²/year	(272	() ÷ (4) =	80.24 (273)

	User Details:
Assessor Name: Software Name: Stroma FSAP 2012	Stroma Number: Software Version: Version: 1.0.4.18
	Property Address: SF03
Address: 39, Fitzjohns Avenue, LON 1. Overall dwelling dimensions:	DON, NW3 5JY
1. Overall dwelling differisions.	Area(m²) Av. Height(m) Volume(m³)
Ground floor	156 (1a) x 3.2 (2a) = 499.2 (3a)
Total floor area TFA = $(1a)+(1b)+(1c)+(1d)+(1e)+(1e)$	
Dwelling volume	(3a)+(3b)+(3c)+(3d)+(3e)+(3n) = 499.2 (5)
2. Ventilation rate: main heating heating	ry other total m³ per hour
Number of chimneys heating heating heating + 0	$+$ 0 = 0 $\times 40 =$ 0 (6a)
Number of open flues 0 + 0	$+$ 0 = 0 $\times 20 =$ 0 (6b)
Number of intermittent fans	0 x 10 = 0 (7a)
Number of passive vents	0 x 10 = 0 (7b)
Number of flueless gas fires	0 x 40 = 0 (7c)
	Air changes per hour
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(
If a pressurisation test has been carried out or is intended, proceed	
Number of storeys in the dwelling (ns) Additional infiltration	$[(9)-1]\times 0.1 = \begin{bmatrix} 1 & (9) \\ 0 & (10) \end{bmatrix}$
Structural infiltration: 0.25 for steel or timber frame o	
if both types of wall are present, use the value corresponding t deducting areas of openings); if equal user 0.35	to the greater wall area (after
If suspended wooden floor, enter 0.2 (unsealed) or 0	0.1 (sealed), else enter 0
If no draught lobby, enter 0.05, else enter 0	0.05 (13)
Percentage of windows and doors draught stripped	100 (14)
Window infiltration	$0.25 - [0.2 \times (14) \div 100] = 0.05 $ (15)
Infiltration rate	(8) + (10) + (11) + (12) + (13) + (15) = 0.45 (16)
Air permeability value, q50, expressed in cubic metro	
If based on air permeability value, then $(18) = [(17) \div 20] +$	
Air permeability value applies if a pressurisation test has been do Number of sides sheltered	
Shelter factor	$(20) = 1 - [0.075 \times (19)] = $ $(20) = 0.85$ (20)
Infiltration rate incorporating shelter factor	(21) = (18) x (20) = 0.38 (21)
Infiltration rate modified for monthly wind speed	
Jan Feb Mar Apr May Jun	Jul Aug Sep Oct Nov Dec
Monthly average wind speed from Table 7	
(22)m= 5.1 5 4.9 4.4 4.3 3.8	3.8 3.7 4 4.3 4.5 4.7
Wind Factor (22a)m = $(22)m \div 4$	
(22a)m= 1.27 1.25 1.23 1.1 1.08 0.95	0.95 0.92 1 1.08 1.12 1.18

Adjusted infiltr	ation rat	e (allowi	ng for sh	nelter an	d wind s	peed) =	(21a) x	(22a)m					
0.49 Calculate effe	0.48	0.47	0.42	0.41 he appli	0.36	0.36	0.35	0.38	0.41	0.43	0.45]	
If mechanic		_	410 707 1	по арри	ouble ou							0.5	(23a
If exhaust air h	eat pump	using Appe	endix N, (2	3b) = (23a	a) × Fmv (e	equation (N	N5)) , othe	rwise (23b) = (23a)			0.5	(23b
If balanced wit	h heat reco	overy: effic	iency in %	allowing f	or in-use f	actor (from	Table 4h) =				75.65	(230
a) If balance	ed mech	anical ve	ntilation	with he	at recove	ery (MVI	HR) (24a	a)m = (22)	2b)m + (23b) × [1 – (23c)	÷ 100]	
(24a)m= 0.61	0.6	0.59	0.54	0.53	0.49	0.49	0.48	0.5	0.53	0.55	0.57]	(24a
b) If balance	ed mech	anical ve	ntilation	without	heat rec	overy (N	/IV) (24b)m = (22	2b)m + (23b)		_	
(24b)m= 0	0	0	0	0	0	0	0	0	0	0	0		(24b
c) If whole h				•	•								
	1	< (23b), t		<u> </u>	<u> </u>	· · ·	<u> </u>	ŕ –	· ` `	ŕ	ı	1	
(24c)m= 0	0	0	0	0	0	0	0	0	0	0	0	J	(240
d) If natural if (22b)r		on or wh en (24d)			•				0.5]			_	
(24d)m= 0	0	0	0	0	0	0	0	0	0	0	0]	(240
Effective air	change	rate - er	iter (24a) or (24b	o) or (24	c) or (24	d) in box	(25)				_	
(25)m= 0.61	0.6	0.59	0.54	0.53	0.49	0.49	0.48	0.5	0.53	0.55	0.57		(25)
3. Heat losse	s and he	eat loss r	paramete	er:									
ELEMENT	Gros		Openin		Net Ar	ea	U-val	ue	AXU		k-value	Э	ΑΧk
	area	(m ²)	· m		A ,r	n²	W/m2	!K	(W/I	K)	kJ/m²-	K	kJ/K
Windows Type	e 1				3.04	x1,	(1/(1.8)+	0.04] =	5.1				(27)
Win <mark>dows</mark> Type	e 2				3.23	x1,	/[1/(1.8)+	0.04] =	5.42				(27)
Windows Type	e 3				3.52	x1	/[1/(1.8)+	0.04] =	5.91				(27)
Windows Type	e 4				3.36	x1,	/[1/(1.8)+	0.04] =	5.64				(27)
Windows Type	e 5				3.52	x1,	/[1/(1.8)+	0.04] =	5.91				(27)
Walls Type1	15	5	3.04		11.96	x	0.25	 	2.99				(29)
Walls Type2	21		3.23		17.77	, x	0.25	<u> </u>	4.44			$\exists \ $	(29)
Walls Type3	27.	5	6.88		20.62	2 x	0.25	= i	5.16	T i		7 <u> </u>	(29)
Walls Type4	22.	5	3.52		18.98	x	0.25	<u> </u>	4.75	=		i i	(29)
Total area of e	elements	 s, m²			86								(31)
* for windows and ** include the are						ated using	formula 1	/[(1/U-valu	re)+0.04] a	as given in	paragrapl	1 3.2	` '
Fabric heat los				- a.ia paii			(26)(30)) + (32) =				45.32	(33)
Heat capacity		,	•,						.(30) + (32	2) + (32a).	(32e) =	13172.7	
Thermal mass		` ,	P = Cm ÷	- TFA) ir	n kJ/m²K				tive Value		` '	100	(35)
For design asses	sments wh	nere the de	tails of the	,			ecisely the				able 1f		
Thermal bridg				usina An	pendix k	<						12.9	(36)
if details of therma Total fabric he	al bridging	,			•			(33) ±	(36) =				
Ventilation he		alculated	l monthly	,						(25)m x (5)	1	58.22	(37)
	Feb	Mar			lun	lul	۸۰۰۰				1	1	
Jan	Len	iviai	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	J	

38)m= 100.4	98.82	97.25	89.37	87.79	79.92	79.92	78.34	83.07	87.79	90.94	94.1		(38)
leat transfer	coefficier	nt, W/K						(39)m	= (37) + (38)m			
39)m= 158.62	157.04	155.47	147.59	146.02	138.14	138.14	136.57	141.29	146.02	149.17	152.32		_
Heat loss para	ameter (ł	HLP). W	′m²K						Average = = (39)m ÷		12 /12=	147.2	(39)
40)m= 1.02	1.01	1	0.95	0.94	0.89	0.89	0.88	0.91	0.94	0.96	0.98		
		•	l			Į.			Average =	Sum(40) ₁	12 /12=	0.94	(40)
Number of day	<u></u>	' ` 	le 1a)			.	l .		T _	1		l	
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		(44
41)m= 31	28	31	30	31	30	31	31	30	31	30	31	I	(41
4. Water hea	ting ene	rgy requi	irement:								kWh/ye	ear:	
Assumed occu											.94		(42
if TFA > 13.		+ 1.76 x	[1 - exp	(-0.0003	349 x (TF	FA -13.9)2)] + 0.0	0013 x (TFA -13.	.9)			
Annual averag	•	ater usad	ae in litre	es per da	av Vd.av	erage =	(25 x N)	+ 36		10	9.58		(43
Reduce the annua	al average	hot water	usage by	5% if the c	lwelling is	designed i			se target o		0.00		•
not more that 125	litres per	person per	r day (all w	ater use, i	hot and co	ia)		-					
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
lot water usage i	_										1	1	
14)m= 120.54	116.15	111.77	107.39	103.01	98.62	98.62	103.01	107.39	111.77	116.15	120.54		¬
nergy content of	f hot water	· used - cal	culated m	onth $lv = 4$.	190 x Vd.r	n x nm x E))Tm / 3600		Total = Su oth (see Ta	1 1		1314.96	(44
45)m= 178.75	156.34	161.33	140.65	134.96	116.46	107.92	123.83	125.31	146.04	159.41	173.11		
170.75	100.04	101.55	140.03	134.50	110.40	107.52	120.00		Total = Su			1724.12	(45
instantaneous v	vater heati	ing at point	of use (no	hot wate	r storage),	enter 0 in	boxes (46		· otal	() 112			`
46)m= 26.81	23.45	24.2	21.1	20.24	17.47	16.19	18.58	18.8	21.91	23.91	25.97		(46
Vater storage			<u> </u>			<u> </u>		<u>. </u>				•	
Storage volum	, ,		•			•		ame ves	sel		300	I	(47
f community h	-			-			` '	ara) ant	or 'O' in /	(47)			
Otherwise if no Vater storage		not wate	er (unis ir	iciudes i	nstantar	ieous cc	ווטט וטווונ	ers) ente	er o in ((47)			
a) If manufact		eclared I	oss facto	or is kno	wn (kWł	n/day):				1	.69		(48
emperature f	actor fro	m Table	2b							0	.54		(49
Energy lost fro	om water	r storage	, kWh/ye	ear			(48) x (49)) =		0	.91		(50
b) If manufact			•										
lot water stor	-			e 2 (kW	h/litre/da	ıy)					0	l	(51
[:] community h olume factor	•		on 4.3								0		(52
emperature f			2b							-	0		(5)
Energy lost fro				ear			(47) x (51)) x (52) x (53) =		0		(54
Enter (50) or		•	,y				(· · / / (v ·)	, (-) ^ (/		.91		(55
Vater storage			for each	month			((56)m = (55) × (41)	m				•
56)m= 28.29	25.55	28.29	27.38	28.29	27.38	28.29	28.29	27.38	28.29	27.38	28.29		(56
cylinder contain												ix H	•
57)m= 28.29	25.55	28.29	27.38	28.29	27.38	28.29	28.29	27.38	28.29	27.38	28.29		(57
, 20.23		20.28	27.50	20.23		20.23		27.50	20.23	27.50	20.23	i	(5)

Primary circuit loss (annual) from Table 3	(58)
Primary circuit loss calculated for each month (59)m = (58) ÷ 365 × (41)m	
(modified by factor from Table H5 if there is solar water heating and a cylinder thermostat)	
(59)m= 23.26 21.01 23.26 22.51 23.26 22.51 23.26 22.51 23.26 22.51 23.26	(59)
Combi loss calculated for each month $(61)m = (60) \div 365 \times (41)m$	
(61)m= 0 0 0 0 0 0 0 0 0 0 0 0	(61)
Total heat required for water heating calculated for each month $(62)m = 0.85 \times (45)m + (46)m + (57)m + (59)m + (61)$	m
(62)m= 230.31 202.9 212.88 190.54 186.51 166.35 159.47 175.39 175.2 197.59 209.3 224.67	(62)
Solar DHW input calculated using Appendix G or Appendix H (negative quantity) (enter '0' if no solar contribution to water heating)	
(add additional lines if FGHRS and/or WWHRS applies, see Appendix G)	
(63)m= 0 0 0 0 0 0 0 0 0 0 0	(63)
Output from water heater	
(64)m= 230.31 202.9 212.88 190.54 186.51 166.35 159.47 175.39 175.2 197.59 209.3 224.67	
Output from water heater (annual) ₁₁₂ 2331.11	(64)
Heat gains from water heating, kWh/month $0.25 (0.85 \times (45)m + (61)m] + 0.8 \times [(46)m + (57)m + (59)m]$	
(65)m= 100.68 89.23 94.88 86.68 86.12 78.63 77.12 82.42 81.58 89.8 92.92 98.8	(65)
include (57)m in calculation of (65)m only if cylinder is in the dwelling or hot water is from community heating	
5. Internal gains (see Table 5 and 5a):	
Metabolic gains (Table 5), Watts	
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec	
(66)m= 176.59 176.59 176.59 176.59 176.59 176.59 176.59 176.59 176.59 176.59 176.59 176.59	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	
(67)m= 75.53 67.09 54.56 41.3 30.88 26.07 28.17 36.61 49.14 62.39 72.82 77.63	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	
(68)m= 488.02 493.09 480.33 453.16 418.86 386.63 365.1 360.04 372.8 399.96 434.26 466.49	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	
(69)m= 55.6 55.6 55.6 55.6 55.6 55.6 55.6 55.	(69)
Pumps and fans gains (Table 5a)	
(70)m= 3 3 3 3 3 3 3 3 3 3 3 3 3	(70)
Losses e.g. evaporation (negative values) (Table 5)	
(71)m= -117.73 -117.73 -117.73 -117.73 -117.73 -117.73 -117.73 -117.73 -117.73 -117.73 -117.73 -117.73 -117.73	(71)
Water heating gains (Table 5)	
(72)m= 135.32 132.79 127.53 120.39 115.75 109.21 103.66 110.78 113.3 120.7 129.05 132.8	(72)
Total internal gains = $(66)m + (67)m + (68)m + (69)m + (70)m + (71)m + (72)m$	
(73)m= 816.34 810.43 779.88 732.32 682.95 639.38 614.39 624.89 652.71 700.52 753.6 794.39	(73)
6. Solar gains:	
Solar gains are calculated using solar flux from Table 6a and associated equations to convert to the applicable orientation.	
Orientation: Access Factor Area Flux g_ FF Gains Table 6d m² Table 6a Table 6b Table 6c (W)	
East 0.9x 1 x 3.04 x 19.64 x 0.5 x 0.9 = 24.18	(76)
East 0.9x 1 x 3.23 x 19.64 x 0.5 x 0.9 = 25.69	(76)

			ı		ı		ı						_
East	0.9x	1	Х	3.04	X	38.42	X	0.5	X	0.9	=	47.3	(76)
East	0.9x	1	X	3.23	X	38.42	X	0.5	X	0.9	=	50.26	(76)
East	0.9x	1	х	3.04	X	63.27	X	0.5	X	0.9	=	77.9	(76)
East	0.9x	1	х	3.23	X	63.27	X	0.5	X	0.9	=	82.77	(76)
East	0.9x	1	X	3.04	X	92.28	X	0.5	X	0.9	=	113.62	(76)
East	0.9x	1	x	3.23	x	92.28	X	0.5	X	0.9	=	120.72	(76)
East	0.9x	1	X	3.04	x	113.09	X	0.5	X	0.9	=	139.24	(76)
East	0.9x	1	x	3.23	x	113.09	x	0.5	x	0.9	=	147.94	(76)
East	0.9x	1	x	3.04	x	115.77	x	0.5	x	0.9	=	142.54	(76)
East	0.9x	1	x	3.23	x	115.77	x	0.5	x	0.9] =	151.45	(76)
East	0.9x	1	x	3.04	x	110.22	x	0.5	x	0.9	=	135.7	(76)
East	0.9x	1	х	3.23	x	110.22	x	0.5	x	0.9	=	144.18	(76)
East	0.9x	1	x	3.04	x	94.68	x	0.5	x	0.9	=	116.56	(76)
East	0.9x	1	х	3.23	x	94.68	x	0.5	x	0.9	=	123.85	(76)
East	0.9x	1	х	3.04	x	73.59	x	0.5	x	0.9	=	90.6	(76)
East	0.9x	1	х	3.23	х	73.59	x	0.5	x	0.9	=	96.27	(76)
East	0.9x	1	х	3.04	х	45.59	x	0.5	x	0.9	=	56.13	(76)
East	0.9x	1	x	3.23	X	45.59	Х	0.5	X	0.9	=	59.64	(76)
East	0.9x	1	х	3.04	х	24.49	x	0.5	x	0.9	=	30.15	(76)
East	0.9x	1	х	3.23	х	24.49	x	0.5	x	0.9	=	32.04	(76)
East	0.9x	1	х	3.04	X	16.15	x	0.5	x	0.9	=	19.89	(76)
East	0.9x	1	x	3.23	x	16.15	Х	0.5	x	0.9] =	21.13	(76)
South	0.9x	1	x	3.52	x	46.75	X	0.5	x	0.9] =	66.65	(78)
South	0.9x	1	х	3.36	х	46.75	x	0.5	x	0.9	=	63.62	(78)
South	0.9x	1	х	3.52	x	46.75	x	0.5	x	0.9	=	66.65	(78)
South	0.9x	1	х	3.52	x	76.57	x	0.5	x	0.9	=	109.16	(78)
South	0.9x	1	х	3.36	х	76.57	x	0.5	x	0.9	=	104.19	(78)
South	0.9x	1	х	3.52	x	76.57	x	0.5	x	0.9] =	109.16	(78)
South	0.9x	1	х	3.52	x	97.53	x	0.5	x	0.9] =	139.04	(78)
South	0.9x	1	х	3.36	х	97.53	x	0.5	x	0.9	=	132.72	(78)
South	0.9x	1	х	3.52	х	97.53	x	0.5	x	0.9	=	139.04	(78)
South	0.9x	1	х	3.52	x	110.23	x	0.5	x	0.9	=	157.15	(78)
South	0.9x	1	х	3.36	х	110.23	x	0.5	x	0.9	=	150.01	(78)
South	0.9x	1	х	3.52	х	110.23	x	0.5	x	0.9	=	157.15	(78)
South	0.9x	1	х	3.52	x	114.87	x	0.5	x	0.9	j =	163.76	(78)
South	0.9x	1	х	3.36	x	114.87	x	0.5	x	0.9	j =	156.32	(78)
South	0.9x	1	х	3.52	x	114.87	x	0.5	x	0.9	=	163.76	(78)
South	0.9x	1	x	3.52	x	110.55	x	0.5	x	0.9] =	157.6	(78)
South	0.9x	1	х	3.36	x	110.55	x	0.5	x	0.9	j =	150.43	(78)
South	0.9x	1	х	3.52	x	110.55	x	0.5	x	0.9	=	157.6	(78)
South	0.9x	1	х	3.52	x	108.01	x	0.5	x	0.9	j =	153.98	(78)
	_		•		•		•				•		_

South	0.9x 1	X	3.36	X	10	08.01	x	0.5	x	0.9	= [146.98	(78)
South	0.9x 1	x	3.52	X	10	08.01	x	0.5	x	0.9	<u> </u>	153.98	(78)
South	0.9x 1	x	3.52	×	10)4.89	x	0.5	x	0.9	- = [149.54	(78)
South	0.9x 1	x	3.36	×	10)4.89	х	0.5	x	0.9	-	142.74	(78)
South	0.9x 1	x	3.52	x	10)4.89	x	0.5	x	0.9	<u> </u>	149.54	(78)
South	0.9x 1	x	3.52	x	10)1.89	X	0.5	x	0.9	=	145.25	(78)
South	0.9x 1	x	3.36	X	10	1.89	X	0.5	x	0.9	=	138.65	(78)
South	0.9x 1	x	3.52	X	10)1.89	x	0.5	×	0.9	=	145.25	(78)
South	0.9x 1	x	3.52	×	8:	2.59	x	0.5	x	0.9	=	117.73	(78)
South	0.9x 1	x	3.36	x	8:	2.59	x	0.5	x	0.9	<u> </u>	112.38	(78)
South	0.9x 1	x	3.52	x	8:	2.59	х	0.5	x	0.9	=	117.73	(78)
South	0.9x 1	x	3.52	x	5:	5.42	X	0.5	x	0.9	=	79	(78)
South	0.9x 1	x	3.36	x	5:	5.42	x	0.5	T x	0.9	=	75.41	(78)
South	0.9x 1	x	3.52	×	5:	5.42	x	0.5	x	0.9	=	79	(78)
South	0.9x 1	x	3.52	x	4	0.4	x	0.5	x	0.9	- = [57.59	(78)
South	0.9x 1	x	3.36	x	4	0.4	x	0.5	x	0.9	<u> </u>	54.97	(78)
South	0.9x 1	x	3.52	×	4	0.4	x	0.5	x	0.9	<u> </u>	57.59	(78)
		_											
Solar g	ains in watts, calc	ulated	for each mo	nth			(83)m	= Sum(74)m .	(82)m				
(83)m=	246.79 420.07 5	71.49	698.64 771	.02 7	′5 9.61	734.83	682	616.01	463.62	295.6	211.17		(83)
Total g	ains – internal and	solar	(84)m = (73))m + (83)m ,	watts							
(0.4)	4000 44 4000 5 46												
(84)m=	1063.14 1230.5 13	351.37	1430.95 1453	.97 1	398.99	1349.22	1307	7.12 1268.72	1164.1	4 1049.2	10 <mark>05.56</mark>		(84)
` ′	an internal temper				398.99	1349.22	1307	7.12 1268.72	1164.1	4 1049.2	1005.56	_	(84)
7. Me		ature (heating sea	son)					1164.1	4 1049.2	1005.56	21	(84)
7. Mea	an internal temper	ature (heating sea eriods in the	son) living	area f	rom Tat			1164.1	4 1049.2	1005.56	21	
7. Mea	an internal temper erature during hea tion factor for gain	ature (heating sea eriods in the ving area, h	son) living	area f	rom Tat	ole 9,		1164.1 Oct		1005.56 Dec	21	
7. Mea	an internal temper erature during hea ution factor for gain Jan Feb	ature (ating pe	heating sea eriods in the ving area, h	son) living 1,m (s	area f	rom Tab	ole 9,	Th1 (°C)				21	
7. Met Temp Utilisa (86)m=	erature during heation factor for gain Jan Feb 0.95 0.93	ature (ating pens for li Mar 0.89	heating sea eriods in the ving area, h Apr M	living 1,m (say	area f see Ta Jun 0.57	rom Tab ble 9a) Jul 0.43	ole 9,	Th1 (°C) ug Sep 5 0.65	Oct	Nov	Dec	21	(85)
7. Met Temp Utilisa (86)m=	erature during heation factor for gain Jan Feb 0.95 0.93 internal temperature	ature (ating pens for li Mar 0.89	heating sea eriods in the ving area, h Apr M	living 1,m (s ay	area f see Ta Jun 0.57	rom Tab ble 9a) Jul 0.43	ole 9,	Th1 (°C) ug Sep 5 0.65 able 9c)	Oct	Nov 0.93	Dec	21	(85)
7. Mer Temp Utilisa (86)m= Mean (87)m=	erature during heation factor for gain Jan Feb 0.95 0.93 internal temperature during heation factor for gain 19.04 19.33 1	ature (ating pens for lime Mar 0.89 ure in lime 19.73	heating sea eriods in the ving area, h Apr M 0.82 0.7 iving area T	living 1,m (say 2 1 (follo	area f see Ta Jun 0.57 ow step 20.88	rom Tab ble 9a) Jul 0.43 os 3 to 7 20.96	ole 9, Au 0.4 7 in T 20.9	Th1 (°C) ug Sep 5 0.65 able 9c) 96 20.81	Oct 0.84	Nov 0.93	Dec 0.96	21	(85)
7. Meta Temp Utilisa (86)m= Mean (87)m= Temp	an internal temper erature during heattion factor for gain Jan Feb 0.95 0.93 internal temperature 19.04 19.33 11 erature during heat	ature (ating pens for li Mar 0.89 ure in li 19.73	heating sea eriods in the ving area, h Apr M 0.82 0.7 iving area T 20.25 20.	son) living 1,m (s ay 2 I (follo	area for see Ta Jun 0.57 Dw step 20.88	rom Tab ble 9a) Jul 0.43 os 3 to 7 20.96 from Ta	Ole 9, O.4 7 in T 20.9 able 9	Th1 (°C) ug Sep 5 0.65 able 9c) 96 20.81 9, Th2 (°C)	Oct 0.84	Nov 0.93	Dec 0.96	21	(85)
7. Meta Temp Utilisa (86)m= Mean (87)m= Temp (88)m=	an internal temper erature during heation factor for gain Jan Feb 0.95 0.93 internal temperature during heat 20.07 20.08 2	ature (ating pens for li Mar 0.89 ure in li 19.73 ating pe	heating sea eriods in the ving area, h Apr M 0.82 0.7 iving area T 20.25 20. eriods in res 20.13 20.	living 1,m (say 2 1 (follo	area for see Ta Jun 0.57 Dw step 20.88 velling 20.18	rom Tab ble 9a) Jul 0.43 os 3 to 7 20.96 from Ta	Ole 9, O.4 7 in T 20.9 able 9	Th1 (°C) ug Sep 5 0.65 able 9c) 96 20.81 9, Th2 (°C)	Oct 0.84	Nov 0.93	Dec 0.96	21	(85)
7. Me Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa	erature during heation factor for gain Jan Feb 0.95 0.93 internal temperature during heating during heating heating heating heating heating heating heating factor for gain	ature (ating pens for limited Mar 0.89 ure in limited	heating sea eriods in the ving area, h Apr M 0.82 0.7 iving area T 20.25 20. eriods in res 20.13 20.	living 1,m (say 2 1 (follo 62 : t of dv 14 :	area for see Ta Jun 0.57 Dw step 20.88 velling 20.18	rom Tak ble 9a) Jul 0.43 os 3 to 7 20.96 from Ta 20.18 e Table	Ole 9, Th1 (°C) ug Sep 5 0.65 able 9c) 96 20.81 9, Th2 (°C) 19 20.16	Oct 0.84 20.33	Nov 0.93 19.65	Dec 0.96 19.06 20.1	21	(85) (86) (87) (88)	
7. Me Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m=	erature during head tion factor for gain Jan Feb 0.95 0.93 internal temperature during head 20.07 20.08 2 stion factor for gain 0.95 0.92	ature (ating pens for limited	heating sea eriods in the ving area, h Apr M 0.82 0.7 iving area T 20.25 20. eriods in res 20.13 20. est of dwelling 0.8	living 1,m (say 2 1 (follo 62 : t of dv 14 :	area for see Ta Jun 0.57 Dw step 20.88 velling 20.18 c,m (se 0.51	rom Table 9a) Jul 0.43 0.5 3 to 7 20.96 from Ta 20.18 e Table 0.36	Ole 9, Th1 (°C) ug Sep 5 0.65 able 9c) 96 20.81 9, Th2 (°C) 19 20.16	Oct 0.84 20.33 20.14	Nov 0.93	Dec 0.96	21	(85)	
7. Meta Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m= Mean	an internal temper erature during heation factor for gain Jan Feb 0.95 0.93 internal temperature during heat 20.07 20.08 2 atton factor for gain 0.95 0.92 internal temperature during heat 20.07 20.08 2 atton factor for gain 0.95 0.92 internal temperature	ature (ating pens for li Mar 0.89 ure in li 19.73 ating pens for re 0.88 ure in t	heating sea eriods in the ving area, h Apr M 0.82 0.7 iving area T 20.25 20. eriods in res 20.13 20. est of dwelling 0.8 0.6	living 1,m (say 2 1 (follo	area for see Ta Jun 0.57 Dw step 20.88 velling 20.18 c,m (see 0.51	rom Table 9a) Jul 0.43 0.5 3 to 7 20.96 from Ta 20.18 e Table 0.36 bllow ste	Ole 9, Th1 (°C) ug Sep 5 0.65 able 9c) 96 20.81 9, Th2 (°C) 19 20.16 8 0.59 to 7 in Table	Oct 0.84 20.33 20.14 0.81 e 9c)	Nov 0.93 19.65 20.12	Dec 0.96 19.06 20.1 0.95	21	(85) (86) (87) (88) (89)	
7. Me Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m=	an internal temper erature during heation factor for gain Jan Feb 0.95 0.93 internal temperature during heat 20.07 20.08 2 atton factor for gain 0.95 0.92 internal temperature during heat 20.07 20.08 2 atton factor for gain 0.95 0.92 internal temperature	ature (ating pens for limited	heating sea eriods in the ving area, h Apr M 0.82 0.7 iving area T 20.25 20. eriods in res 20.13 20. est of dwelling 0.8	living 1,m (say 2 1 (follo	area for see Ta Jun 0.57 Dw step 20.88 velling 20.18 c,m (se 0.51	rom Table 9a) Jul 0.43 0.5 3 to 7 20.96 from Ta 20.18 e Table 0.36	Ole 9, Th1 (°C) ug Sep 5 0.65 able 9c) 96 20.81 0, Th2 (°C) 19 20.16 8 0.59 to 7 in Table 16 19.97	Oct 0.84 20.33 20.14 0.81 e 9c) 19.33	Nov 0.93 19.65 20.12 0.92	Dec 0.96 19.06 20.1 0.95		(85) (86) (87) (88) (89)	
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7. Me Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m= Mean (90)m= Mean (92)m= Apply (93)m=	erature during head tion factor for gain Jan Feb 0.95 0.93 internal temperature during head 20.07 20.08 20.07 20.08 20.07 20.08 20.07 20.08 20.07 20.08 20.07 20.08 20.07 20.08 20.07 20.08 20.07 20.08 20.095 0.92 internal temperature during head 20.095 0.92 internal temperature during head 20.095 0.92 internal temperature during head 20.095 0.93 1.005 0.95 0.92 internal temperature during head 20.095 0.92 internal temperature during head 20.095 0.92 internal temperature during head 20.095 0.93 1.005 0.93	ature (ating pens for limited	heating sea eriods in the ving area, h Apr M 0.82 0.7 iving area T 20.25 20. eriods in res 20.13 20. est of dwelling 0.8 0.6 he rest of dwelling 19.2 19.	living 1,m (s ay 2 I (follo 52 t of dv 14 mg, h2 welling 71 lwelling perati	area f see Ta Jun 0.57 ow ster 20.88 velling 20.18 d.,m (se 0.51 g T2 (fo 20.07	rom Table 9a) Jul 0.43 0.5 3 to 7 20.96 from Ta 20.18 e Table 0.36 bllow ste 20.15 A × T1 20.36	ole 9, Au 0.4 7 in T 20.9 able 9 0.3 eps 3 20. + (1 20.6)	Th1 (°C) ug Sep 5 0.65 able 9c) 96 20.81 9, Th2 (°C) 19 20.16 8 0.59 to 7 in Table 16 19.97 f - fLA) x T2 36 20.18 where approximates a series of the content of th	Oct 0.84 20.33 20.14 0.81 e 9c) 19.33 LA = Liv	Nov 0.93 19.65 20.12 0.92 18.36 ring area ÷ (4	Dec 0.96 19.06 20.1 0.95 17.49 4) =		(85) (86) (87) (88) (89) (90) (91)
7. Me Temp Utilisa (86)m= Mean (87)m= Temp (88)m= Utilisa (89)m= Mean (90)m= Mean (92)m= Apply (93)m= 8. Spa	erature during head ation factor for gain Jan Feb 0.95 0.93 internal temperature during head 20.07 20.08 20.07 20.08 20.095 0.92 internal temperature during head 20.07 20.08 20.095 0.92 internal temperature during head 20.095 0.992 internal temperature during head 20.095 0.992 internal temperature during head 20.095 0.992 internal temperature during head 20.095 0.993 during head 20.095 0.992 internal temperature during head 20.095 0.993 during head 20.095 during head 20.09	ature (ating pens for line) Mar	heating sea eriods in the ving area, h Apr M 0.82 0.7 iving area T 20.25 20. eriods in res 20.13 20. est of dwellin 0.8 0.6 he rest of dw 19.2 19. the whole of 19.46 19. internal tem 19.46 19.	living 1,m (s ay 2 I (follo 52 t of dv 14 mg, h2 8 I welling 71 I welling 71 peratu 93	area for see Ta Jun 0.57 Dw step 20.88 velling 20.18 dr T2 (for 20.07) mg) = fL 20.27 ure from 20.27	rom Take ble 9a) Jul 0.43 0s 3 to 7 20.96 from Ta 20.18 e Table 0.36 bllow ste 20.15 A × T1 20.36 m Table 20.36	Ole 9, Ol	Th1 (°C) ug Sep 5 0.65 able 9c) 96 20.81 0, Th2 (°C) 19 20.16 8 0.59 to 7 in Table 16 19.97 f - fLA) × T2 36 20.18 where approx 36 20.18	Oct 0.84 20.33 20.14 0.81 e 9c) 19.33 LA = Liv 19.58 ppriate 19.58	Nov 0.93 19.65 20.12 0.92 18.36 ing area ÷ (4) 18.68	Dec 0.96 19.06 20.1 0.95 17.49 17.88	0.25	(85) (86) (87) (88) (89) (90) (91) (92)

Apr

Mar

May

Jul

Jun

Sep

Aug

Oct

Nov

Dec

the utilisation factor for gains using Table 9a

Feb

Jan

l Itilisatio	on factor for	naine hm	٠.										
	0.93 0.9	0.85	0.78	0.67	0.51	0.37	0.4	0.59	0.79	0.89	0.93		(94)
` ′	ains, hmGm		ļ	ļ									, ,
		1151.28		979.63	720.22	501.84	519.44	752.25	921	938.39	938.61		(95)
	average ext	ernal ten	nperature	from Ta	able 8	<u> </u>		<u> </u>					
(96)m=	4.3 4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2		(96)
Heat los	s rate for me	ean interr	nal tempe	erature,	Lm , W =	=[(39)m	x [(93)m	– (96)m]				
(97)m= 21	47.58 2093.99	1907.14	1559.16	1202.37	783.59	518.82	540.18	858.82	1310.64	1727.56	2083.89		(97)
	eating requi	1	T T	r	T T	th = 0.02	24 x [(97)m – (95	í - `	ŕ			
(98)m= 86	65.79 666.86	562.36	320.61	165.72	0	0	0	0	289.89	568.2	852.09		_
							Tota	l per year	(kWh/year	r) = Sum(9	8) _{15,912} =	4291.52	(98)
Space h	eating requi	rement ir	kWh/m²	² /year								27.51	(99)
9a. Energ	gy requireme	nts – Ind	ividual h	eating sy	ystems i	ncluding	micro-C	CHP)					
Space h	_										,		_
Fraction	of space he	at from s	econdar	y/supple	mentary	system						0	(201)
Fraction	of space he	at from n	nain syst	em(s)			(202) = 1	- (201) =				1	(202)
Fraction	of total hea	ing from	main sys	stem 1			(204) = (2	02) x [1 –	(203)] =			1	(204)
Efficienc	cy of main sp	ace heat	ing syste	em 1								90.5	(206)
Efficienc	y of second	ary/suppl	ementar	y heat <mark>in</mark>	g system	າ, %						0	(208)
	Jan Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/ye	– ar
Space h	eating requi	rement (d	alculate	d above)								
86	65.79 666.86	562.36	320.61	165.72	0	0	0	0	289.89	568.2	852.09		
(211)m =	{[(98)m x (2	04)] } x 1	100 ÷ (20	06)									(211)
95	56.67 736.87	621.39	354.26	183.11	0	0	0	0	320.32	627.85	941.54		
							Tota	ıl (kWh/yea	ar) =Sum(2	211) _{15,1012}	=	4742.01	(211)
•	eating fuel (• /	month									
	x (201)] } x						ī						
(215)m=	0 0	0	0	0	0	0	0 	0	0	0	0		7
							Tota	ıı (KVVN/yea	ar) =Sum(2	215) _{15,1012}	=	0	(215)
Water he	_	otor (oola	ulatad a	hovo)									
	om water he	212.88	190.54	186.51	166.35	159.47	175.39	175.2	197.59	209.3	224.67		
	of water he	_t ater			<u> </u>	!	l	ļ	ļ	<u> </u>	ļ	79.8	(216)
(217)m= 8	8.02 87.76	87.29	86.19	84.5	79.8	79.8	79.8	79.8	85.83	87.35	88.04		(217)
Fuel for w	vater heating	ı, kWh/m	onth	ļ	<u> </u>	<u> </u>	l	<u> </u>	<u> </u>	<u> </u>	<u> </u>		
(219)m <u>=</u>	(64)m x 10	0 ÷ (217)m								1		
(219)m= 26	61.65 231.22	243.89	221.07	220.72	208.46	199.83	219.78	219.55	230.2	239.62	255.2		_
	_						lota	I = Sum(2				2751.19	(219)
Annual to	otals eating fuel us	ed main	evetam	1					k'	Wh/year		kWh/year	
•	_		System	1								4742.01	
	ating fuel us											2751.19	
Electricity	for pumps,	fans and	electric	keep-ho	t								

mechanical ventilation - balanced, extract or posi	itive input from outside	520.1	1 (230a)
central heating pump:	·	30	(230c)
Total electricity for the above, kWh/year	sum of (2	230a)(230g) =	550.11 (231)
Electricity for lighting			533.57 (232)
Electricity generated by PVs			-714.86 (233)
10a. Fuel costs - individual heating systems:			
	Fuel kWh/year	Fuel Price (Table 12)	Fuel Cost £/year
Space heating - main system 1	(211) x	3.48 × 0.01	= 165.02 (240)
Space heating - main system 2	(213) x	0 x 0.01	= 0 (241)
Space heating - secondary	(215) x	13.19 x 0.01	= 0 (242)
Water heating cost (other fuel)	(219)	3.48 x 0.01	95.74 (247)
Pumps, fans and electric keep-hot	(231)	13.19 × 0.01	= 72.56 (249)
(if off-peak tariff, list each of (230a) to (230g) sepa Energy for lighting	rately as applicable and a		
Additional standing charges (Table 12)	(202)	13.19 X 0.01	70.50
Additional standing charges (Table 12)			120 (251)
	one of (233) to (235) x)	13.19 × 0.01	= 0 (252)
Appendix Q items: repeat lines (253) and (254) as	s needed ') + (250),(254) =		523.7 (255)
Total energy cost (245)(247) 11a. SAP rating - individual heating systems) + (230)(234) =		523.7 (255)
Energy cost deflator (Table 12) Energy cost factor (ECF) [(255) x (25	(6)] ÷ [(4) + 45.0] =		0.42 (256)
SAP rating (Section 12)	0)] : [(4) + 40.0] =		1.09 (257) 84.73 (258)
12a. CO2 emissions – Individual heating systems	s including micro-CHP		84.73
<u> </u>	<u> </u>	Emission factor	Emissions
	Energy kWh/year	kg CO2/kWh	kg CO2/year
Space heating (main system 1)	(211) x	0.216 =	1024.27 (261)
Space heating (secondary)	(215) x	0.519 =	0 (263)
Water heating	(219) x	0.216	594.26 (264)
Space and water heating	(261) + (262) + (263) + (264)	=	1618.53 (265)
Electricity for pumps, fans and electric keep-hot	(231) x	0.519 =	285.51 (267)
Electricity for lighting	(232) x	0.519 =	276.92 (268)
Energy saving/generation technologies Item 1		0.519 =	-371.01 (269)
Total CO2, kg/year	:	sum of (265)(271) =	1809.94 (272)
CO2 emissions per m²		(272) ÷ (4) =	11.6 (273)

Primary energy kWh/m²/year

SAP WorkSheet: Existing dwelling (SAP)

El rating (section 14)

13a. Primary Energy **Energy Primary** P. Energy kWh/year factor kWh/year Space heating (main system 1) (211) x (261)1.22 5785.25 (215) x Space heating (secondary) 3.07 0 (263)(219) x Energy for water heating 3356.46 (264) 1.22 (261) + (262) + (263) + (264) =Space and water heating (265)9141.71 Electricity for pumps, fans and electric keep-hot (231) x (267)3.07 1688.83 Electricity for lighting (232) x (268)1638.06 0 Energy saving/generation technologies Item 1 (269)3.07 -2194.63 'Total Primary Energy sum of (265)...(271) = 10273.96 (272)



 $(272) \div (4) =$

65.86

(273)



9.5. Appendix 5 – Existing Baseline EPC Report

Energy Performance Certificate



Page 1 of 4

39 Fitzjohns Avenue, LONDON, NW3 5JT

Detached house 2878-7084-7224-3355-5920 **Dwelling type:** Reference number: Date of assessment: 23 April 2015 Type of assessment: RdSAP, existing dwelling

Date of certificate: 28 April 2015 2232 m² **Total floor area:**

Use this document to:

- Compare current ratings of properties to see which properties are more energy efficient
- Find out how you can save energy and money by installing improvement measures

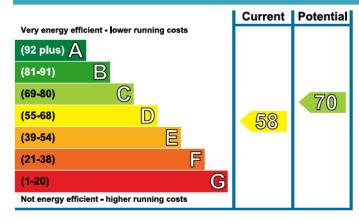
Estimated energy costs of dwelling for 3 years:	£ 52,578
Over 3 years you could save	£ 15,249

Estimated energy costs of this home

	Current costs	Potential costs	Potential future savings
Lighting	£ 1,911 over 3 years	£ 1,938 over 3 years	
Heating	£ 50,082 over 3 years	£ 34,806 over 3 years	You could
Hot Water	£ 585 over 3 years	£ 585 over 3 years	save £ 15,249
Totals	£ 52,578	£ 37,329	over 3 years

These figures show how much the average household would spend in this property for heating, lighting and hot water. This excludes energy use for running appliances like TVs, computers and cookers, and any electricity generated by microgeneration.

Energy Efficiency Rating



The graph shows the current energy efficiency of your

The higher the rating the lower your fuel bills are likely

The potential rating shows the effect of undertaking the recommendations on page 3.

The average energy efficiency rating for a dwelling in England and Wales is band D (rating 60).

Top actions you can take to save money and make your home more efficient

Recommended measures	Indicative cost	Typical savings over 3 years	Available with Green Deal
1 Internal or external wall insulation	£4,000 - £14,000	£ 9,795	②
2 Heating controls (time and temperature zone control)	£350 - £450	£ 4,410	
3 Replace single glazed windows with low-E double glazed windows	£3,300 - £6,500	£ 1,038	②

To find out more about the recommended measures and other actions you could take today to save money, visit www.direct.gov.uk/savingenergy or call 0300 123 1234 (standard national rate). The Green Deal may allow you to make your home warmer and cheaper to run at no up-front cost.

39 Fitzjohns Avenue, LONDON, NW3 5JT 28 April 2015 RRN: 2878-7084-7224-3355-5920

Energy Performance Certificate

Summary of this home's energy performance related features

Element	Description	Energy Efficiency
Walls	Solid brick, as built, no insulation (assumed)	* ~ ~ ~ ~
Roof	Roof room(s), no insulation (assumed)	* * * * *
	Flat, no insulation (assumed)	* * * * * *
Floor	To unheated space, no insulation (assumed)	-
	Solid, no insulation (assumed)	_
	Suspended, no insulation (assumed)	_
Windows	Partial double glazing	***
Main heating	Boiler and radiators, mains gas	****☆
Main heating controls	Programmer and at least two room thermostats	****
Secondary heating	None	_
Hot water	From main system	****
Lighting	Low energy lighting in 54% of fixed outlets	****

Current primary energy use per square metre of floor area: 225 kWh/m² per year

The assessment does not take into consideration the physical condition of any element. 'Assumed' means that the insulation could not be inspected and an assumption has been made in the methodology based on age and type of construction.

Low and zero carbon energy sources

Low and zero carbon energy sources are sources of energy that release either very little or no carbon dioxide into the atmosphere when they are used. Installing these sources may help reduce energy bills as well as cutting carbon. There are none provided for this home.

Opportunity to benefit from a Green Deal on this property

The Green Deal may enable owners and occupiers to make improvements to their property to make it more energy efficient. Under a Green Deal, the cost of the improvements is repaid over time via a credit agreement. Repayments are made through a charge added to the electricity bill for the property. To see which improvements are recommended for this property, please turn to page 3. You can choose which improvements you want to install and ask for a quote from an authorised Green Deal provider. They will organise installation by an authorised Green Deal installer. If you move home, the responsibility for paying the Green Deal charge under the credit agreement passes to the new electricity bill payer.

For householders in receipt of income-related benefits, additional help may be available.

To find out more, visit www.direct.gov.uk/savingenergy or call 0300 123 1234.

Repayments **Authorised** Finance at **Choose from** May be paid stay with the home energy no upfront authorised from savings in electricity assessment installers energy bills cost bill payer

eTech SMART EPC engine 1.0.0 (SAP 9.92) Page 2 of 4

39 Fitzjohns Avenue, LONDON, NW3 5JT 28 April 2015 RRN: 2878-7084-7224-3355-5920

Energy Performance Certificate

Recommendations

The measures below will improve the energy performance of your dwelling. The performance ratings after improvements listed below are cumulative; that is, they assume the improvements have been installed in the order that they appear in the table. Further information about the recommended measures and other simple actions you could take today to save money is available at **www.direct.gov.uk/savingenergy**. Before installing measures, you should make sure you have secured the appropriate permissions, where necessary. Such permissions might include permission from your landlord (if you are a tenant) or approval under Building Regulations for certain types of work.

Recommended measures	Indicative cost	Typical savings per year	Rating after improvement	Green Deal finance
Internal or external wall insulation	£4,000 - £14,000	£ 3,265	D65	•
Heating controls (time and temperature zone control)	£350 - £450	£ 1,470	C 69	0
Replace single glazed windows with low- E double glazed windows	£3,300 - £6,500	£ 346	C70	0

Choosing the right package

Visit www.epcadviser.direct.gov.uk, our online tool which uses information from this EPC to show you how to save money on your fuel bills. You can use this tool to personalise your Green Deal package.

DirectgovPublic services all in one place

Green Deal packageTypical annual savingsInternal or external wall insulationTotal savings of £4736Heating controls£0 / £4736 / £0

You could finance this package of measures under the Green Deal. It could **save you £4736 a year** in energy costs, based on typical energy use. Some or all of this saving would be recouped through the charge on your bill.

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Energy Performance Certificate

About this document

The Energy Performance Certificate for this dwelling was produced following an energy assessment undertaken by a qualified assessor, accredited by ECMK. You can get contact details of the accreditation scheme at www.ecmk.co.uk, together with details of their procedures for confirming authenticity of a certificate and for making a complaint. A copy of this EPC has been lodged on a national register. It will be publicly available and some of the underlying data may be shared with others for compliance and marketing of relevant energy efficiency information. The Government may use some of this data for research or statistical purposes. Green Deal financial details that are obtained by the Government for these purposes will not be disclosed to non-authorised recipients. The current property owner and/or tenant may opt out of having their information shared for marketing purposes.

Assessor's accreditation number: ECMK201493
Assessor's name: Mr Paul Fearon

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Related party disclosure: No related party

Further information about Energy Performance Certificates can be found under Frequently Asked Questions at www.epcregister.com.

About the impact of buildings on the environment

One of the biggest contributors to global warming is carbon dioxide. The energy we use for heating, lighting and power in homes produces over a quarter of the UK's carbon dioxide emissions.

The average household causes about 6 tonnes of carbon dioxide every year. Based on this assessment, your home currently produces approximately 89 tonnes of carbon dioxide every year. Adopting the recommendations in this report can reduce emissions and protect the environment. If you were to install these recommendations you could reduce this amount by 27.0 tonnes per year. You could reduce emissions even more by switching to renewable energy sources.

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.



Your home's heat demand

For most homes, the vast majority of energy costs derive from heating the home. Where applicable, this table shows the energy that could be saved in this property by insulating the loft and walls, based on typical energy use (shown within brackets as it is a reduction in energy use).

Heat demand	Existing dwelling	Impact of loft insulation	Impact of cavity wall insulation	Impact of solid wall insulation	
Space heating (kWh per year)	357,220	(1,723)	N/A	(70,546)	_
Water heating (kWh per year)	4,042				

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9.6. Appendix 6 – Water Calculation Sheets

Project Details								
	39 Fitzjohns	Avenue NW3			Case Reference	LG01		
Number of Bedrooms	3				Occupancy for Calculation	n Purposes		
Appliance/Useage D	etails							
Taps (Excluding Kito					Showers			
	Flow Rate	Quantity	Total per		Shower fitting	Flow Rate	Quantity	Total per
Basin Type 1	Litres/Min 5.60	(No.)	Fitting type		Type Bath 1	Litres/Min 6.50	(No.)	Fitting typ
	0.00		0.00		Bath 2	6.50		6.5
			0.00					0.0
			0.00					0.0
			0.00					0.0
Гotal No. of Fittings (No. Гotal Flow (I/s)	.)	2	11.20		Total No. of Fittings (No Total Flow (I/s)	.)	2	: 13.0
Maximum Flow (I/s)			5.60		Maximum Flow (I/s)			6.5
Average Flow (I/s)	(1/0)		5.60 3.92		Average Flow (I/s)	(1/0)		6.5
Weighted Average Flow Flow for Calculation (I/s)			5.60		Weighted Average Flow Flow for Calculation (I/s)			4.5 6.5
Baths					WCs			
	Capacity to	Quantity	Total per			Full Flush	Part Flush	Quantity
	Overflow	(No.)	Fitting type		WC Type	Volume	Volume	(No)
Bath 1	180.00	1	180.00		Standard Dual	4.50	3.00)
			0.00 0.00					
			0.00					
Γotal No. of Fittings (No. Γotal Capacity (I)	.)	1	180.00		Total number of fittings			
Maximum Capacity (I)			180.00		Average effective flushings	ng volume		3.5
Average Capacity (I)	-i4 (1)		180.00					
Weighted Average Capad Capacity for Calculation			126.00 180.00					
Dishwashers	`'				Washing Machines			
	I Di	0	T. 1 . 1			1	0	T
	L per Place Setting	(No.)	Total per Fitting type		Washing Machine Type	L per Kg Dry Load	Quantity (No.)	Total per Fitting typ
ГВС	0.80	1	0.80		TBC	6.00		6.0
Total No. of Fittings (No.)	1	0.00		Total No. of Fittings (No)	1	0.0
Total Consumption (I)	.,		0.80		Total Consumption (I)	•,	'	6.0
Maximum Consumption			0.80		Maximum Consumption	(1)		6.0
Average Consumption (I								
Weighted Average Cons			0.80 0.56		Average Consumption (I	l/s)		6.0
	umption (I)		0.80 0.56 0.80			l/s) umption (I)		6.0
Consumption for Calcula	umption (I)		0.56		Average Consumption (I Weighted Average Cons	l/s) umption (I)		6.0 4.2 6.0
Consumption for Calcula Kitchen Taps	umption (I) ation (I/s)	Quantity	0.56 0.80		Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings	l/s) umption (I)	0	6.0
	umption (I) ation (I/s) Flow Rate Litres/Min	Quantity (No.)	0.56 0.80 Total per Fitting type		Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner	ol's) umption (I) ation (I/s)		6.0 4.2 6.0
Consumption for Calcula Kitchen Taps Tap Fitting Type Main Sink Cold	rumption (I) ation (I/s) Flow Rate Litres/Min	(No.)	0.56 0.80 Total per Fitting type 8.00		Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N	ol's) umption (I) ation (I/s)	0.00	6.0 4.2 6.0
Consumption for Calcula Kitchen Taps Tap Fitting Type Main Sink Cold	umption (I) ation (I/s) Flow Rate Litres/Min	(No.)	0.56 0.80 Total per Fitting type		Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner	umption (I) ation (I/s)	0.00	6.0 4.2 6. 0
Consumption for Calcula Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No.	Flow Rate Litres/Min 8.00 6.00	(No.)	0.56 0.80 Total per Fitting type 8.00 6.00 0.00		Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water ar	umption (I) ation (I/s) // I/p/d	0.00	6.0 4.2 6.0
Consumption for Calcula Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No. Total Flow (I/s)	Flow Rate Litres/Min 8.00 6.00	(No.)	0.56 0.80 Total per Fitting type 8.00 6.00 0.00		Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 45 Use of grey water ar Total Grey water from W	with the state of	0.00 d rainwate	6.0 4.2 6.0
Consumption for Calcula Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot	Flow Rate Litres/Min 8.00 6.00	(No.)	0.56 0.80 Total per Fitting type 8.00 6.00 0.00		Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water ar	with the state of	0.00	6.0 4.2 6.0
Consumption for Calcula Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No. Fotal Flow (I/s) Average Flow (I/s) Weighted Average Flow	Flow Rate Litres/Min 8.00 6.00	(No.)	0.56 0.80 Total per Fitting type 8.00 0.00 14.00 8.00 7.00 5.60		Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 45 Use of grey water an Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Capa	with the state of	0.00 d rainwate 0 192.82 112.28 0.00	6.0 4.2 6.0
Consumption for Calcula Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No. Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s)	Flow Rate Litres/Min 8.00 6.00	(No.)	0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00		Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 45 Use of grey water ar Total Grey water from W Total Availble Grey Wate Possible Demand (I)	with the state of	0.00 d rainwate	6.0 4.2 6.0
Consumption for Calcula Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No. Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s)	Flow Rate Litres/Min 8.00 6.00	(No.)	0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00		Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 45 Use of grey water an Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Capa	with the state of	0.00 d rainwate 0 192.82 112.28 0.00	6.0 4.2 6.0
Consumption for Calcula Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No. Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm	Flow Rate Litres/Min 8.00 6.00	(No.) 1 1 2 Capacity/	0.56 0.80 Total per Fitting type 8.00 0.00 14.00 8.00 7.00 5.60	Fixed use	Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water an Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit	with the state of	0.00 d rainwate 0 192.82 112.28 0.00	6.0 4.2 6.0
Consumption for Calcula Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No. Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessmentallation Type	Flow Rate Litres/Min 8.00 6.00 (I/s)	(No.) 1 1 1 2 2	0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00		Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water ar Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit	with the state of	0.00 d rainwate 0 192.82 112.28 0.00	6.0 4.2 6.0
Consumption for Calcula Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No. Total Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessmentallation Type WC Single Flush WC Dual Flush	Flow Rate Litres/Min 8.00 6.00 (I/s) (I/s)) ent Unit Volume (I) Full Flush (I)	(No.) 1 1 1 2 2 Capacity/ Flow Rate 0.00 0.00	0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.46	Fixed use (l/p/day) 0.00 0.00	Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 45 Use of grey water ar Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 0.00	with the state of	0.00 d rainwate 0 192.82 112.28 0.00	6.0 4.2 6.0
Consumption for Calcula Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No. Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessmenstallation Type NC Single Flush NC Dual Flush	Flow Rate Litres/Min 8.00 6.00 (I/s) (I/s) Unit Volume (I) Full Flush (I) Pt Flush (I)	Capacity/ Flow Rate 0.00 0.00	0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.46 2.96	Fixed use (//p/day) 0.00 0.00 0.00	Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 45 Use of grey water ar Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 0.00 0.00	with the state of	0.00 d rainwate 0 192.82 112.28 0.00	6.0 4.2 6.0
Consumption for Calcula Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No. Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessmenstallation Type NC Single Flush NC Dual Flush NC's (Multiple)	Flow Rate Litres/Min 8.00 6.00 (I/s) (I/s)) ent Unit Volume (I) Full Flush (I)	Capacity/ Flow Rate 0.00 0.00 3.50 5.60	0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.46	Fixed use (l/p/day) 0.00 0.00	Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 45 Use of grey water ar Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 0.00	with the state of	0.00 d rainwate 0 192.82 112.28 0.00	6.0 4.2 6.0
Consumption for Calcula Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No. Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessmentallation Type NC Single Flush NC Dual Flush NC's (Multiple) Faps Exc. Kitchen Bath (shower present)	Flow Rate Litres/Min 8.00 6.00 L) (I/s) Unit Volume (I) Full Flush (I) Volume (I) Fow Rate (I/s)	Capacity/ Flow Rate 0.00 0.00 3.50 5.60 180.00	0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.58 0.11	Fixed use (I/p/day) 0.00 0.00 0.00 0.00 1.58	Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 45 Use of grey water ar Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Cap; Figure for Calculation lit Total Use (I/p/day) 0.00 0.00 15.47 10.43 19.80	with the state of	0.00 d rainwate 0 192.82 112.28 0.00	6.0 4.2 6.0
Consumption for Calcula Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No. Fotal Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessmentallation Type WC Single Flush WC Dual Flush WC's (Multiple) Faps Exc. Kitchen Bath (shower present) Shower (bath present)	Flow Rate Litres/Min 8.00 6.00 (I/s) (I/s) (I/s) (I/s) (I/s) (I/s) Full Flush (I) Volume (I) Flow Rate (I/s) (I/s) (I/s) (I/s)	Capacity/ Flow Rate 0.00 0.00 3.50 5.60 180.00 6.50	0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.46 2.96 4.42 1.58 0.11	Fixed use (I/p/day) 0.00 0.00 0.00 0.00 1.58 0.00 0.00	Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 46 Use of grey water ar Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 0.00 15.47 10.43 19.80 28.41	with the state of	0.00 d rainwate 0 192.82 112.28 0.00	6.0 4.2 6.0
Consumption for Calcula Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No. Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessmentallation Type WC Single Flush WC Dual Flush WC Dual Flush WC's (Multiple) Faps Exc. Kitchen Bath (shower present) Shower (bath present) Sath Only Shower Only	Flow Rate Litres/Min 8.00 6.00 L) (I/s) ent Unit Volume (I) Pt Flush (I) Volume (I) Flow Rate (I/s) (I/s) (I/s) (I/s) (I/s) (I/s) (I/s)	Capacity/ Flow Rate 0.00 0.00 3.50 5.60 180.00 6.50 0.00	0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.46 2.96 4.42 1.58 0.11 4.37 0.50 5.60	Fixed use (l/p/day) 0.00 0.00 0.00 0.00 1.58 0.00 0.00 0.00	Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4s Use of grey water ar Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Cap; Figure for Calculation lit Total Use (I/p/day) 0.00 0.00 15.47 10.43 19.80 28.41 0.00 0.00	with the state of	0.00 d rainwate 0 192.82 112.28 0.00	6.0 4.2 6.0
Consumption for Calcula Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No. Fotal Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessmentallation Type WC Single Flush WC Dual Flush WC's (Multiple) Faps Exc. Kitchen Bath (shower present) Shower (bath present) Sath Only Shower Only Kitchen Taps	Flow Rate Litres/Min 8.00 6.00 (I/s) ent Unit Volume (I) Full Flush (I) Volume (I) Flow Rate (I/s)	Capacity/ Flow Rate 0.00 0.00 3.50 5.60 180.00 6.50 0.00 0.00	0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.58 0.11 4.37 0.50 5.60 0.44	Fixed use (l/p/day) 0.00 0.00 0.00 0.00 1.58 0.00 0.00 0.00 10.36	Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4s Use of grey water ar Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Cap; Figure for Calculation lit Total Use (I/p/day) 0.00 0.00 15.47 10.43 19.80 28.41 0.00 0.00 13.44	with the state of	0.00 d rainwate 0 192.82 112.28 0.00	6.0 4.2 6.0
Consumption for Calcula Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No. Fotal Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessmentallation Type WC Single Flush WC Dual Flush WC's (Multiple) Faps Exc. Kitchen Bath (shower present) Shower (bath present) Bath Only Shower Only Kitchen Taps Washing Machines	Flow Rate Litres/Min 8.00 6.00 L) (I/s) ent Unit Volume (I) Pt Flush (I) Volume (I) Flow Rate (I/s) (I/s) (I/s) (I/s) (I/s) (I/s) (I/s)	Capacity/ Flow Rate 0.00 0.00 3.50 5.60 180.00 6.50 0.00	0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.46 2.96 4.42 1.58 0.11 4.37 0.50 5.60	Fixed use (l/p/day) 0.00 0.00 0.00 0.00 1.58 0.00 0.00 0.00	Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4s Use of grey water ar Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Cap; Figure for Calculation lit Total Use (I/p/day) 0.00 0.00 15.47 10.43 19.80 28.41 0.00 0.00	with the state of	0.00 d rainwate 0 192.82 112.28 0.00	6.0 4.2 6.0
Consumption for Calcula Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No. Fotal Flow (I/s) Maximum Flow (I/s) Meighted Average Flow (I/s) Water Use Assessmenstallation Type NC Single Flush NC Dual Flush NC Dual Flush Shower (bath present) Shower (bath present) Shower Only Kitchen Taps Washing Machines Dishwashers Waste Disposal	Flow Rate Litres/Min 8.00 6.00 (I/s) (I/s) ent Unit Volume (I) Flush (I) Volume (I) Flow Rate (I/s)	Capacity/ Flow Rate 0.00 0.00 0.00 0.560 180.00 0.00 0.00 0.00 0.00 0.00 0.00 0	0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.58 0.11 4.37 0.50 5.60 0.44 2.10 3.60 3.08	Fixed use (l/p/day) 0.00 0.00 0.00 0.00 1.58 0.00 0.00 0.00 10.36 0.00 0.00 0.00	Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4s Use of grey water ar Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Cap Figure for Calculation lit Total Use (I/p/day) 0.00 0.00 15.47 10.43 19.80 28.41 0.00 0.00 13.44 12.60 2.88 0.00	with the state of	0.00 d rainwate 0 192.82 112.28 0.00	6.0 4.2 6.0
Consumption for Calcula Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No. Total Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Meighted Average Flow Flow for Calculation (I/s) Water Use Assessmentallation Type NC Single Flush NC Dual Flush NC's (Multiple) Faps Exc. Kitchen Bath (shower present) Shower (bath present) Sath Only Shower Only Kitchen Taps Nashing Machines Dishwashers Naste Disposal Nater Softner	Flow Rate Litres/Min 8.00 6.00 (I/s) ent Unit Volume (I) Full Flush (I) Volume (I) Flow Rate (I/s)	Capacity/ Flow Rate 0.00 0.00 3.50 5.60 180.00 0.00 7.00 0.00 6.00 0.80	0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.58 0.11 4.37 0.50 5.60 0.44 2.10 3.60	Fixed use (l/p/day) 0.00 0.00 0.00 1.58 0.00 0.00 0.00 10.36 0.00 0.00	Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4s Use of grey water ar Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Cap Figure for Calculation lit Total Use (I/p/day) 0.00 0.00 15.47 10.43 19.80 28.41 0.00 0.00 13.44 12.60 2.88 0.00 0.00	with the state of	0.00 d rainwate 0 192.82 112.28 0.00	6.0 4.2 6.0
Consumption for Calculat Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No. Fotal Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Meighted Average Flow Flow for Calculation (I/s) Water Use Assessminstallation Type NC Single Flush NC Dual Flush NC's (Multiple) Faps Exc. Kitchen Bath (shower present) Shower (bath present) Bath Only Shower Only Kitchen Taps Washing Machines Dishwashers Waste Disposal Water Softner Fotal Calculated Water Let	Flow Rate Litres/Min 8.00 6.00 (I/s)	Capacity/ Flow Rate 0.00 0.00 0.00 0.560 0.00 0.00 0.00 0.0	0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.58 0.11 4.37 0.50 5.60 0.44 2.10 3.60 3.08	Fixed use (l/p/day) 0.00 0.00 0.00 0.00 1.58 0.00 0.00 0.00 10.36 0.00 0.00 0.00	Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4s Use of grey water ar Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Cap Figure for Calculation lit Total Use (I/p/day) 0.00 0.00 15.47 10.43 19.80 28.41 0.00 0.00 13.44 12.60 2.88 0.00	with the state of	0.00 d rainwate 0 192.82 112.28 0.00	6.0 4.2 6.0
Consumption for Calcula Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No. Total Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Weighted Average Flow (I/s) Weighted Average Flow (I/s) Water Use Assessments (I/s) Water Use Assessments (I/s) Water Use Assessments (I/s) Water Use Assessments (I/s) WC Single Flush WC Single Flush WC Dual Flush WC's (Multiple) Taps Exc. Kitchen Bath (shower present) Shower (Dath present) Both (I/s) Water Taps Washing Machines Dishwashers Waste Disposal Water Softner Total Calculated Water U Grey/RainWater Reused (Normalisation Factor	Flow Rate Litres/Min 8.00 6.00 (I/s)	Capacity/ Flow Rate 0.00 0.00 0.00 0.560 0.00 0.00 0.00 0.0	0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.58 0.11 4.37 0.50 5.60 0.44 2.10 3.60 3.08	Fixed use (l/p/day) 0.00 0.00 0.00 0.00 1.58 0.00 0.00 0.00 10.36 0.00 0.00 0.00	Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4s Use of grey water ar Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Cap Figure for Calculation lit Total Use (I/p/day) 0.00 0.00 15.47 10.43 19.80 28.41 0.00 0.00 13.44 12.60 2.88 0.00 0.00 103.02 0.00 0.00 0.00 0.00 0.00 0.00 0.00	with the state of	0.00 d rainwate 0 192.82 112.28 0.00	6.0 4.2 6.0
Consumption for Calcula Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No. Total Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Meighted Average Flow Flow for Calculation (I/s) Water Use Assessmentallation Type NC Single Flush NC Dual Flush NC Dual Flush NC's (Multiple) Faps Exc. Kitchen Bath (shower present) Shower (bath present) Sath Only Shower Only Kitchen Taps Washing Machines Dishwashers Naste Disposal Nater Softner Total Calculated Water Use Grey/RainWater Reused Normalisation Factor Total Consumption CSH	Flow Rate Litres/Min 8.00 6.00 L) (I/s) ent Unit Volume (I) Full Flush (I) Yolume (I) Flow Rate (I/s)	Capacity/ Flow Rate 0.00 0.00 0.00 0.560 0.00 0.00 0.00 0.0	0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.58 0.11 4.37 0.50 5.60 0.44 2.10 3.60 3.08	Fixed use (l/p/day) 0.00 0.00 0.00 0.00 1.58 0.00 0.00 0.00 10.36 0.00 0.00 0.00	Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4s Use of grey water ar Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Cap; Figure for Calculation lit Total Use (I/p/day) 0.00 0.00 0.00 15.47 10.43 19.80 28.41 0.00 0.00 13.44 12.60 2.88 0.00 0.00 103.02 0.00 0.00 0.00 0.00 0.00 0.00 0.00	with the state of	0.00 d rainwate 0 192.82 112.28 0.00	6.0 4.2 6.0
Consumption for Calcula Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No. Fotal Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Meighted Average Flow Flow for Calculation (I/s) Water Use Assessminstallation Type MC Single Flush MC Dual Flush MC's (Multiple) Faps Exc. Kitchen Bath (shower present) Bothower (bath present) Bothower Only Kitchen Taps Washing Machines Dishwashers Waste Disposal Water Softner Fotal Calculated Water L Grey/RainWater Reused (rumption (I) ation (I/s) Flow Rate Litres/Min 8.00 6.00 L) (I/s) Pent Unit Volume (I) Full Flush (I) Volume (I) Flow Rate (I/s) (I/	Capacity/ Flow Rate 0.00 0.00 0.00 0.560 0.00 0.00 0.00 0.0	0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.58 0.11 4.37 0.50 5.60 0.44 2.10 3.60 3.08	Fixed use (l/p/day) 0.00 0.00 0.00 0.00 1.58 0.00 0.00 0.00 10.36 0.00 0.00 0.00	Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4s Use of grey water ar Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Cap Figure for Calculation lit Total Use (I/p/day) 0.00 0.00 15.47 10.43 19.80 28.41 0.00 0.00 13.44 12.60 2.88 0.00 0.00 103.02 0.00 0.00 0.00 0.00 0.00 0.00 0.00	with the state of	0.00 d rainwate 0 192.82 112.28 0.00	6.0 4.2 6.0

Water Efficiency Cal	culator for	New Dwel	llings (V1f -	Aug 201	0)			
Project Details								
Adress/Reference Number of Bedrooms	39 Fitzjohns	Avenue NW3			Case Reference Occupancy for Calculation	LG02 Purposes		
Appliance/Useage D Taps (Excluding Kite Tap Fitting Type	etails chen Taps) Flow Rate		Total per		Showers Shower fitting	Flow Rate	Quantity	Total per
Basin Type 1	Litres/Min 5.60	(No.)	Fitting type 16.80		Type Bath 1	Litres/Min 6.50	(No.)	Fitting type 13.0
			0.00		Bath 2	6.50		6.5
			0.00					0.0 0.0
			0.00 0.00					0.0
Total No. of Fittings (No	.)	3			Total No. of Fittings (No.	.)	3	•
Total Flow (I/s) Maximum Flow (I/s)			16.80 5.60		Total Flow (I/s) Maximum Flow (I/s)			19.5 6.5
Average Flow (I/s) Weighted Average Flow	(I/s)		5.60 3.92		Average Flow (I/s) Weighted Average Flow	(I/s)		6.5 4.5
Flow for Calculation (I/s)			5.60		Flow for Calculation (I/s)			6.5
Baths					WCs			
Bath Type	Capacity to Overflow	Quantity (No.)	Total per Fitting type		WC Type	Full Flush Volume	Part Flush Volume	Quantity (No)
Bath 1	180.00	2	360.00		Standard Dual	4.50		(110)
			0.00					
Total No. of Fittings (No.	\	2	0.00					
Total No. of Fittings (No Total Capacity (I)	·-)	2	360.00		Total number of fittings			
Maximum Capacity (I) Average Capacity (I)			180.00 180.00		Average effective flushing	ng volume		3.5
Weighted Average Capa			126.00					
Capacity for Calculation Dishwashers	1 (1)		180.00		Washing Machines			
Dishwasher Type	L per Place	Quantity	Total per		Washing Machine	L per Kg	Quantity	Total per
TBC	Setting 0.80	(No.)	Fitting type 0.80		Type TBC	Dry Load 6.00	(No.)	Fitting typ 6.0
			0.00					0.0
Total No. of Fittings (No Total Consumption (I) Maximum Consumption Average Consumption (I Weighted Average Cons Consumption for Calcul	(I) I/s) sumption (I)	1	0.80 0.80 0.80 0.56		Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Average Consumption (I) Weighted Average Consumption for Calculation (I)	(I) /s) umption (I)	1	6.0 6.0 6.0 4.2 6.0
Kitchen Taps	ation (1/3)		0.00		Other Fittings	ation (1/3)		0.0
Tap Fitting Type	Flow Rate	Quantity	Total per		Waste Disposal Y/N		0]
Main Sink Cold	Litres/Min 8.00	(No.)	Fitting type 8.00		Water softner Consumption beyond 49	% l/p/d	0.00	
Main Sink Hot	6.00		6.00					
Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s)	.)	2	14.00		Total Grey water from W Total Availble Grey Water	HB taps (I)	0 192.82]
Average Flow (I/s) Weighted Average Flow	(1/e)		7.00 5.60		Possible Demand (I) Grey/Rain Installed Capa	,	112.28	
Flow for Calculation (I/s			7.00		Figure for Calculation lit		0.00	
Water Use Assessm	ent							
Installation Type	Unit	Capacity/	Use Factor		Total Use			
WC Single Flush	Volume (I)	Flow Rate 0.00		(l/p/day) 0.00				
WC Dual Flush	Full Flush (I) Pt Flush (I)	0.00		0.00	0.00			
WC's (Multiple)	Volume (I)	3.50	4.42	0.00	15.47			
Taps Exc. Kitchen Bath (shower present)	Flow Rate (I/s)	5.60 180.00		1.58 0.00	10.43 19.80			
Shower (bath present) Bath Only	(l/s) (l)	6.50 0.00		0.00	28.41 0.00			
Shower Only	(l/s)	0.00	5.60	0.00	0.00			
Kitchen Taps Washing Machines	(l/s) (l/kgdry)	7.00 6.00	2.10	10.36 0.00	13.44 12.60			
Dishwashers Waste Disposal	(l/place) (l/s)	0.80		0.00	2.88 0.00			
Water Softner	(l/s)	0.00		0.00	0.00			
Total Calculated Water I Grey/RainWater Reused					103.02 0.00			
Normalisation Factor Total Consumption CSH	(Factor)				0.91 93.75			
External Water Use Allow Total Comsumption Par	ance (I)				5.00 98.75			
	t a (i/p/day)							
Assesment Result					PASS			

Acress/Reference LG03 Appliance/Useage Details	Project Details								
Appliance/Useage Details Taps (Excluding Kitchen Taps) Taps (Exclu	.	39 Fitzjohns	Avenue NW3			Case Reference	LG03		
Table Capacity C	Number of Bedrooms	2				Occupancy for Calculation	n Purposes		
Tape (Excluding Kirchen Tapes Flow Rate Country Total per Lifers Min (No.) Fitting type Sain Type 5.50 2 0.000	Appliance/Useage D)etails							
Litres-Min Mo.) Fitting type Mo.) Fitting type Litres-Min Mo.) Fitting type Litres-Min Mo.) Fitting type Litres-Min Mo.) Fitting type Mo.) Fitting type Litres-Min Mo.) Fitting type Mo						Showers			
Sash Type 1 5.60 2	Tap Fitting Type		•						
Same Section	Basin Type 1								
Cotal No. of Fittings (No.) 2		0.00	_					+	6.5
Cotal No. of Fittings (No.) 2 2 Total Ro. of Fittings (No.) 2 3 3 3 3 3 3 3 3 3									0.0
Total No. of Fittings (No.) 2 11.20 11									0.0
Total Flow (Is) Ausimum Flow (Is) Seepage Flow (I		<u> </u>					<u> </u>		0.0
Maximum Flow (I/s) 5.50).)	2				.)	2	
Weighted Average Flow (Its)									6.5
Saith Sait		(1/a)					(1/0)		6.5
Sath Type									4.5 6. 5
Seth Type	· ·	<i>'</i>					,		
Novering 180.00		Canacity to	Quantity	Total per		1103	Full Fluch	Dart Eluch	Quantity
Standard Dual						WC Type			•
Total No. of Fittings (No.)	Bath 1	1	1	180.00					
Total No. of Fittings (No.)									
Total Again									
Maximum Capacity (f) 180.00 20 20 20 20 20 20 20		0.)	1	400.00		Total musch as a f Con-			
Marage Capacity (f)							ng volume		3.5
Dishwashers	Average Capacity (I)			180.00					
Dishwasher Type									
Dishwasher Type		1 (1)		100.00					
Type									
Total No. of Fittings (No.) Total Consumption (I) String Fitting Type Flow Rate Litres Min Maximum Consumption (I) String Fitting Type Flow Rate Litres Min Maximum Consumption (I) String Fitting Type Flow Rate Litres Min Maximum Consumption (I) String Fitting Type Flow Rate Litres Min Maximum Consumption (I) String Fitting Type Flow Rate Litres Min Maximum Consumption (I) String Fitting Type Flow Rate Litres Min Maximum Consumption (I) String Fitting Type Flow Rate Litres Min Maximum Consumption (I) String Fitting Type String Type Type Type Type Type Type Type Type	Dishwasher Type								
Total No. of Fittings (No.) Total Consumption (I) Maximum Maximum Consumption (I) Maximum Maximum Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Maximum Cosumption (I) Maximum Consumption (I) Maxi	TBC								
Total Consumption (f)		1	1						
Maximum Consumption (I)				0.00					0.0
Weighted Average Consumption (I)).)	1					1	-
Consumption for Calculation (I/s)	Total Consumption (I)		1	0.80		Total Consumption (I)	.)	1	6.0
Consumption	Total Consumption (I) Maximum Consumption Average Consumption (ı (I) I/s)	1	0.80 0.80 0.80		Total Consumption (I) Maximum Consumption Average Consumption (I)	(I) (I/s)	1	6.0 6.0 6.0
Total printing Type	Total Consumption (I) Maximum Consumption Average Consumption (Weighted Average Cons	(I) I/s) sumption (I)	1	0.80 0.80 0.80 0.56		Total Consumption (I) Maximum Consumption Average Consumption (I) Weighted Average Cons	(I) (I/s) sumption (I)	1	6.0 6.0 6.0 4.2
Main Sink Cold 8.00 1 8.00 1 6.00 1 6.00 1 6.00 6.00 1 6.00	Total Consumption (i) Maximum Consumption Average Consumption (Weighted Average Cons Consumption for Calcul	(I) I/s) sumption (I)	1	0.80 0.80 0.80 0.56		Total Consumption (i) Maximum Consumption Average Consumption (i) Weighted Average Cons Consumption for Calcul	(I) (I/s) sumption (I)	1	6.0 6.0 6.0 4.2 6.0
Main Sink Cold 8.00	Total Consumption (i) Maximum Consumption Average Consumption (Weighted Average Cons Consumption for Calcul Kitchen Taps	i (I) I/s) sumption (I) lation (I/s)	1	0.80 0.80 0.80 0.56 0.80		Total Consumption (I) Maximum Consumption Average Consumption (Weighted Average Consumption for Calcul Other Fittings	(I) (I/s) sumption (I)	1	6.0 6.0 6.0 4.2
Section Sect	Total Consumption (i) Maximum Consumption Average Consumption (Weighted Average Cons Consumption for Calcul Kitchen Taps	I (I) I/s) sumption (I) lation (I/s)	•	0.80 0.80 0.80 0.56 0.80		Total Consumption (I) Maximum Consumption Average Consumption (I) Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N	(I) (I/s) sumption (I)	1	6.0 6.0 6.0 4.2
Total No. of Fittings (No.) 2	Fotal Consumption (I) Maximum Consumption Average Consumption (Weighted Average Cons Consumption for Calcul Kitchen Taps Tap Fitting Type	(I) I/s) sumption (I) lation (I/s) Flow Rate Litres/Min	(No.)	0.80 0.80 0.80 0.56 0.80 Total per Fitting type		Total Consumption (I) Maximum Consumption Average Consumption (I) Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner	.) (I) I/s) sumption (I) ation (I/s)	0	6.0 6.0 6.0 4.2 6. 0
Total Flow (I/s)	Total Consumption (i) Maximum Consumption Maximum Consumption Weighted Average Cons Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold	(I) I/s) sumption (I) lation (I/s) Flow Rate Litres/Min 8.00	(No.)	0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00		Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Weighted Average Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49	(l) (l/s) sumption (l) lation (l/s)	0 0.000	6.0 6.0 6.0 4.2 6.0
Average Flow (I/s)	Total Consumption (i) Maximum Consumption (i) Maximum Consumption (i) Weighted Average Consignation for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot	I (I) I/s) Sumption (I) lation (I/s) Flow Rate Litres/Min 8.00 6.00	(No.)	0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00		Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Weighted Average Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49	(l) (l/s) sumption (l) lation (l/s)	0 0.000	6.0 6.0 6.0 4.2 6.0
Neighted Average Flow (I/s) 5.60 7.00 Figure for Calculation (It/person/day 0.00	Fotal Consumption (i) Maximum Consumption (i) Maximum Consumption Average Consumption (Neighted Average Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No	I (I) I/s) Sumption (I) lation (I/s) Flow Rate Litres/Min 8.00 6.00	(No.)	0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00		Total Consumption (I) Maximum Consumption Average Consumption (I) Weighted Average Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 44 Use of grey water an	(I) (Is) (Is) (Is) (Is) (Is) (Is) (Is) (0 0.000	6.0 6.0 4.2 6.0
Value Use Capacity Use Figure Figure Figure Figure Total Use Figure F	Total Consumption (I) Maximum Consumption (I) Maximum Consumption (Weighted Average Consumption (Total No. of Fittings (No Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s)	I (I) I/s) Sumption (I) lation (I/s) Flow Rate Litres/Min 8.00 6.00	(No.)	0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00		Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Average Consumption (I) Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4' Use of grey water an Total Grey water from W Total Availble Grey Water	(I) (I) (I/s) sumption (I) ation (I/s) % I/p/d and harveste (/HB taps (I)	0 0.00 d rainwate	6.0 6.0 6.0 6.0
No. Capacity Use Factor Fixed use (Vp/day) (Vp/day) (Vp/day)	Total Consumption (I) Maximum Consumption (I) Maximum Consumption (Weighted Average Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Average Flow (I/s)	I (I) I/s) Sumption (I) Idation (I/s) Flow Rate Litres/Min 8.00 6.00	(No.)	0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00		Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Average Consumption (I) Weighted Average Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 40 Use of grey water an Total Grey water from W Total Availble Grey Water Possible Demand (I)	(I) (I) (Isumption (I)	0 0.00 d rainwate	6.0 6.0 4.2 6.0
Flow Rate (l/p/day) (l/p	Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (Average Consumption (Peighted Average Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow	I (I) II/s) sumption (I) lation (I/s) Flow Rate Litres/Min 8.00 6.00	(No.)	0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00		Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Average Consumption (I) Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4s Use of grey water an Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Caps	(I) (Is) (Is) (I) (Is) (Is) (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	0 0.000 d rainwate 144.62 84.21 0.00	6.0 6.0 4.2 6.0
Flow Rate (l/p/day) (l/p	Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption Average Consumption (Weighted Average Cons Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s)	I (I) I/s) Sumption (I) Islation (I/s) Flow Rate Litres/Min 8.00 6.00 L)	(No.)	0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60		Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Average Consumption (I) Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4s Use of grey water an Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Caps	(I) (Is) (Is) (I) (Is) (Is) (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	0 0.000 d rainwate 144.62 84.21 0.00	6.0 6.0 4.2 6.0
WC Dual Flush Full Flush (I) 0.00 1.46 0.00 0.00 WC's (Multiple) Volume (I) 3.50 4.42 0.00 15.47 Faps Exc. Kitchen Flow Rate 5.60 1.58 10.43 Bath (shower present) (I/s) 180.00 0.11 0.00 19.80 Shower (bath present) (I/s) 6.50 4.37 0.00 28.41 Bath Only (I) 0.00 0.50 0.00 0.00 Shower Only (I/s) 0.00 5.60 0.00 0.00 Kitchen Taps (I/s) 7.00 0.44 10.36 13.44 Washing Machines (I/kgdry) 6.00 2.10 0.00 12.60 Dishwashers (I/place) 0.80 3.60 0.00 2.88 Waster Disposal (I/s) 0.00 3.08 0.00 0.00 Mater Softner (I/s) 0.00 1.00 0.00 Fotal Calculated Water Use (I/p/day) 0.00 0.00 <td>Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption (I) Meighted Average Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Meighted Average Flow Flow for Calculation (I/s) Water Use Assessm</td> <td>(l) (l/s) sumption (l) lation (l/s) Flow Rate Litres/Min 8.00 6.00 c.) (l/s)</td> <td>(No.) 1 1 1 2</td> <td>0.80 0.80 0.80 0.56 0.80 Total per Fitting type 6.00 0.00 14.00 8.00 7.00 5.60 7.00</td> <td></td> <td>Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Weighted Average Consumption (I) Weighted Average Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4' Use of grey water an Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Capifigure for Calculation life</td> <td>(I) (Is) (Is) (I) (Is) (Is) (I) (I) (I) (I) (I) (I) (I) (I) (I) (I</td> <td>0 0.000 d rainwate 144.62 84.21 0.00</td> <td>6.0 6.0 4.2 6.0</td>	Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption (I) Meighted Average Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Meighted Average Flow Flow for Calculation (I/s) Water Use Assessm	(l) (l/s) sumption (l) lation (l/s) Flow Rate Litres/Min 8.00 6.00 c.) (l/s)	(No.) 1 1 1 2	0.80 0.80 0.80 0.56 0.80 Total per Fitting type 6.00 0.00 14.00 8.00 7.00 5.60 7.00		Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Weighted Average Consumption (I) Weighted Average Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4' Use of grey water an Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Capifigure for Calculation life	(I) (Is) (Is) (I) (Is) (Is) (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	0 0.000 d rainwate 144.62 84.21 0.00	6.0 6.0 4.2 6.0
Pt Flush (I) 0.00 2.96 0.00	Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (Average Consumption (Meighted Average Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type	I (I) I/s) Sumption (I) Islation (I/s) Flow Rate Litres/Min 8.00 6.00 (I/s) I (I/s)	(No.) 1 1 2 Capacity/ Flow Rate	0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor	Fixed use (l/p/day)	Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Average Consumption (I) Weighted Average Consider (I) Consumption for Calculation Other Fittings Waste Disposal Y/N Water softner Consumption beyond 40 Use of grey water and Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capifigure for Calculation lift Total Use (I/p/day)	(I) (I) (Is) (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	0 0.000 d rainwate 144.62 84.21 0.00	6.0 6.0 4.2 6.0
WC's (Multiple) Volume (I) 3.50 4.42 0.00 15.47 Faps Exc. Kitchen Flow Rate 5.60 1.58 1.58 10.43 Bath (shower present) (I/s) 180.00 0.11 0.00 19.80 Schower (bath present) (I/s) 6.50 4.37 0.00 28.41 Bath Only (I) 0.00 0.50 0.00 0.00 Schower Only (I/s) 0.00 5.60 0.00 0.00 Schower Only (I/s) 0.00 5.60 0.00 0.00 Schower Only (I/s) 0.00 5.60 0.00 0.00 Schower Only (I/s) 0.00 0.00 0.00 Schower Only <td>Total Consumption (I) Maximum Consumption (I) Maximum Consumption (Average Consumption (Meighted Average Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type WC Single Flush</td> <td>I (I) II/s) sumption (I) lation (I/s) Flow Rate Litres/Min 8.00 6.00 (I/s) c) I (I/s) c) tent Unit Volume (I)</td> <td>(No.) 1 1 2 Capacity/ Flow Rate 0.00</td> <td>0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor</td> <td>Fixed use (l/p/day) 0.00</td> <td>Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Average Consumption (I) Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4s Use of grey water an Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Cap Figure for Calculation lift Total Use (I/p/day)</td> <td>(I) (I) (Is) (Ivs) (Ir) (Ivs) (I/p/d (Ir) (Ivs) (I/p/d (Ivs) (Iv</td> <td>0 0.000 d rainwate 144.62 84.21 0.00</td> <td>6.0 6.0 4.2 6.0</td>	Total Consumption (I) Maximum Consumption (I) Maximum Consumption (Average Consumption (Meighted Average Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type WC Single Flush	I (I) II/s) sumption (I) lation (I/s) Flow Rate Litres/Min 8.00 6.00 (I/s) c) I (I/s) c) tent Unit Volume (I)	(No.) 1 1 2 Capacity/ Flow Rate 0.00	0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor	Fixed use (l/p/day) 0.00	Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Average Consumption (I) Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4s Use of grey water an Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Cap Figure for Calculation lift Total Use (I/p/day)	(I) (I) (Is) (Ivs) (Ir) (Ivs) (I/p/d (Ir) (Ivs) (I/p/d (Ivs) (Iv	0 0.000 d rainwate 144.62 84.21 0.00	6.0 6.0 4.2 6.0
Bath (shower present) (l/s)	Total Consumption (I) Maximum Consumption (I) Maximum Consumption (Average Consumption (Meighted Average Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type WC Single Flush	I (I) II/s) Sumption (I) Iation (I/s) Flow Rate Litres/Min 8.00 6.00 II/s) II/s Unit Volume (I) Full Flush (I)	(No.) 1 1 1 2 2 Capacity/ Flow Rate 0.00 0.00	0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.46	Fixed use (l/p/day) 0.00 0.00	Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption (I) Weighted Average Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4' Use of grey water an Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Cap. Figure for Calculation lift Total Use (I/p/day) 0.00 0.00	(I) (I) (I)s (I)s (I)s (I)s (I)p/d (I)person/day	0 0.000 d rainwate 144.62 84.21 0.00	6.0 6.0 4.2 6.0
Shower (bath present) (I/s) 6.50 4.37 0.00 28.41	Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption Average Consumption (I) Meighted Average Consumption (I) Meighted Average Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type NC Single Flush NC Dual Flush NC's (Multiple)	I (I) I/s) Sumption (I) Islation (I/s) Flow Rate Litres/Min 8.00 6.00 (I/s) I (I/s) I (I/s) Full Flush (I) Full Flush (I) Volume (I) Volume (I) Volume (I)	Capacity/ Flow Rate 0.00 0.00 3.50	0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.46 2.96 4.42	Fixed use (I/p/day) 0.00 0.00 0.00 0.00	Total Consumption (I) Maximum Consumption (I) Maximum Consumption Average Consumption (I) Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4' Use of grey water an Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lift Total Use (I/p/day) 0.00 0.00 0.00 15.47	(I) (I) (Is) (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	0 0.000 d rainwate 144.62 84.21 0.00	6.0 6.0 4.2 6.0
Bath Only (I) 0.00 0.50 0.00 0.00 Shower Only (Vs) 0.00 5.60 0.00 0.00 (Itchen Taps (Vs) 7.00 0.44 10.36 13.44 Mashing Machines (Vkgdry) 6.00 2.10 0.00 12.60 (Dishwashers (Vplace) 0.80 3.60 0.00 2.88 Maste Disposal (Vs) 0.00 3.08 0.00 0.00 Mater Softner (Vs) 0.00 1.00 0.00 0.00 (Vs) 0.00 1.00 0.00 (Vs) 0.00 1.00 0.00 (Vs) 0.00 1.00 0.00 (Vs) 0.00 0.00 (Vs) 0.00 0.00 (Vs) 0.00 (Vs) 0.00 0.00 (Vs) 0.00 (V	Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (Average Consumption (Neighted Average Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type NC Single Flush NC Dual Flush NC's (Multiple) Faps Exc. Kitchen	(I/s) sumption (I) lation (I/s) Flow Rate Litres/Min 8.00 6.00 (I/s) Unit Volume (I) Full Flush (I) Volume (I) Flow Rate	Capacity/ Flow Rate 0.00 0.00 3.50 5.60	0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.46 2.96 4.42 1.58	Fixed use (l/p/day) 0.00 0.00 0.00 0.00 1.58	Total Consumption (I) Maximum Consumption (I) Maximum Consumption Average Consumption (I) Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4s Use of grey water an Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capifigure for Calculation lift Total Use (I/p/day) 0.00 0.00 15.47 10.43	(I) (Is) sumption (I) lation (I/s) % I/p/d and harvester //HB taps (I) er Supply (I) acity (I) t/person/day	0 0.000 d rainwate 144.62 84.21 0.00	6.0 6.0 4.2 6.0
Kitchen Taps (Vs) 7.00 0.44 10.36 13.44 Washing Machines (l/kgdry) 6.00 2.10 0.00 12.60 Dishwashers (l/place) 0.80 3.60 0.00 2.88 Waste Disposal (l/s) 0.00 0.00 0.00 Water Softner (l/s) 0.00 1.00 0.00 Fotal Calculated Water Use (l/p/day) 103.02 103.02 3.75<	Total Consumption (I) Maximum Consumption (I) Maximum Consumption (Average Consumption (Average Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type MC Single Flush MC Dual Flush MC's (Multiple) Taps Exc. Kitchen Bath (shower present)	I (I) II/s) Sumption (I) Iation (I/s) Flow Rate Litres/Min 8.00 6.00 I (I/s)	Capacity/ Flow Rate 0.00 0.00 0.00 3.50 180.00	0.80 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.58 0.11	Fixed use (l/p/day) 0.00 0.00 0.00 1.58 0.00	Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Weighted Average Consumption (I) Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4' Use of grey water an Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Cap. Figure for Calculation lift Total Use (I/p/day) 0.00 0.00 15.47 10.43 19.80	(I) (Is) sumption (I) lation (I/s) % I/p/d and harvester //HB taps (I) er Supply (I) acity (I) t/person/day	0 0.000 d rainwate 144.62 84.21 0.00	6.0 6.0 4.2 6.0
Washing Machines (l/kgdry) 6.00 2.10 0.00 12.60 Dishwashers (l/place) 0.80 3.60 0.00 2.88 Waste Disposal (l/s) 0.00 3.08 0.00 0.00 Water Softner (l/s) 0.00 0.00 0.00 Fotal Calculated Water Use (l/p/day) 103.02 103.02 Grey/RainWater Reused (l) 0.00 0.91 Fotal Consumption CSH (l/p/day) 93.75 93.75 External Water Use Allowance (l) 5.00	Total Consumption (I) Maximum Consumption (I) Maximum Consumption (Average Consumption (Neighted Average Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type NC Single Flush NC Dual Flush NC's (Multiple) Taps Exc. Kitchen Bath (shower present) Shower (bath present) Bath Only	I (I) I/s) Sumption (I) Islation (I/s) Flow Rate Litres/Min 8.00 6.00 Islation (I/s) Islation (I	Capacity/ Flow Rate 0.00 0.00 0.00 180.00 6.50 0.00	0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.46 2.96 4.42 1.58 0.11 4.37 0.50	Fixed use (I/p/day) 0.00 0.00 0.00 1.58 0.00 0.00 0.00	Total Consumption (I) Maximum Consumption (I) Maximum Consumption Average Consumption (I) Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4' Use of grey water an Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capifigure for Calculation life Total Use (I/p/day) 0.00 0.00 0.00 15.47 10.43 19.80 28.41	(I) (I) (Is) (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	0 0.000 d rainwate 144.62 84.21 0.00	6.0 6.0 4.2 6.0
Waste Disposal (I/s) 0.00 3.08 0.00 0.00 Nater Softner (I/s) 0.00 1.00 0.00 0.00 Fotal Calculated Water Use (I/p/day) 103.02 103.02 0.00 0.00 Normalisation Factor (Factor) 0.91 0.01 0.01 0.00 <	Total Consumption (i) Maximum Consumption (i) Maximum Consumption Average Consumption (i) Meighted Average Consider (i) Meighted Average Consider (i) Consumption for Calculation Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (i/s) Maximum Flow (i/s) Maximum Flow (i/s) Maximum Flow (i/s) Meighted Average Flow Flow for Calculation (i/s) Water Use Assessm Installation Type NC Single Flush NC Dual Flush NC's (Multiple) Faps Exc. Kitchen Bath (shower present) Shower (bath present) Bath Only Shower Only	(l/s) sumption (l) lation (l/s) Flow Rate Litres/Min 8.00 6.00 (l/s)) tunit Volume (l) Full Flush (l) Volume (l) Flow Rate (l/s) (l/s) (l/s) (l/s) (l/s) (l/s)	Capacity/ Flow Rate 0.00 0.00 3.50 5.60 180.00 6.50 0.00	0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.58 0.11 4.37 0.50 5.60	Fixed use (l/p/day) 0.00 0.00 0.00 1.58 0.00 0.00 0.00	Total Consumption (I) Maximum Consumption (I) Maximum Consumption Average Consumption (I) Weighted Average Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4' Use of grey water an Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capifigure for Calculation life Total Use (I/p/day) 0.00 0.00 15.47 10.43 19.80 28.41 0.00 0.00 0.00	(I) (I) (Is) (Implies the sumption (I)	0 0.000 d rainwate 144.62 84.21 0.00	6.0 6.0 4.2 6.0
Water Softner (I/s) 0.00 1.00 0.00 Fotal Calculated Water Use (I/p/day) 103.02 Grey/RainWater Reused (I) 0.00 Normalisation Factor (Factor) 0.91 Fotal Consumption CSH (I/p/day) 93.75 External Water Use Allowance (I) 5.00	Total Consumption (I) Maximum Consumption (I) Maximum Consumption (Average Consumption (Neighted Average Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Water Use Assessm Installation Type WC Single Flush WC Dual Flush WC's (Multiple) Taps Exc. Kitchen Bath (shower present) Shower (Dath present) Sath Only Shower Only Kitchen Taps	(l/s) sumption (l) lation (l/s) Flow Rate Litres/Min 8.00 6.00 (l/s) column (l) Full Flush (l) Pt Flush (l) Pt Flow Rate (l/s) (l/s) (l/s) (l/s) (l/s) (l/s)	Capacity/ Flow Rate 0.00 0.00 3.50 5.60 180.00 6.50 0.00 0.00	0.80 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.58 0.11 4.37 0.50 5.60 0.44	Fixed use (//p/day) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.	Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Weighted Average Consumption (I) Weighted Average Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4s Use of grey water an Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capifigure for Calculation life Total Use (I/p/day) 0.00 0.00 0.00 15.47 10.43 19.80 28.41 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0	(I) (I) (I/s) sumption (I) ation (I/s) % I/p/d and harvester (HB taps (I) er Supply (I) acity (I) t/person/day	0 0.000 d rainwate 144.62 84.21 0.00	6.0 6.0 4.2 6.0
Fotal Calculated Water Use (I/p/day) 103.02 Grey/RainWater Reused (I) 0.00 Normalisation Factor (Factor) 0.91 Fotal Consumption CSH (I/p/day) 93.75 External Water Use Allowance (I) 5.00	Total Consumption (i) Maximum Consumption (i) Maximum Consumption Average Consumption (Average Consumption (Average Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type NC Single Flush NC Dual Flush NC's (Multiple) Taps Exc. Kitchen Bath (shower present) Bothower (bath present) Bothower Only Kitchen Taps Washing Machines Dishwashers	I (I) I/s) Sumption (I) Islation (I/s) Flow Rate Litres/Min 8.00 6.00 Inlation (I/s) (I/s) Inlation (I/s) Inlation (I/s) I	Capacity/ Flow Rate 0.00 0.00 3.50 5.60 0.00 0.00 7.00 0.00 6.00 0.80	Use Factor Use Factor 4.42 1.58 0.11 4.37 0.50 5.60 0.44 2.10 3.60	Fixed use (//p/day) 0.00 0.00 0.00 1.58 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0	Total Consumption (I) Maximum Consumption (I) Maximum Consumption Average Consumption (I) Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4' Use of grey water ar Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Cap: Figure for Calculation life Total Use (I/p/day) 0.00 0.00 0.00 15.47 10.43 19.80 28.41 0.00 0.00 13.44 12.60 2.88	(I)	0 0.000 d rainwate 144.62 84.21 0.00	6.0 6.0 4.2 6.0
Normalisation Factor (Factor) 0.91 Fotal Consumption CSH (I/p/day) 93.75 External Water Use Allowance (I) 5.00	Total Consumption (i) Maximum Consumption (i) Maximum Consumption Average Consumption (i) Weighted Average Consider (i) Consumption for Calculation Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type WC Single Flush WC Dual Flush WC's (Multiple) Taps Exc. Kitchen Bath (shower present) Shower (bath present) Shower Only Kitchen Taps Washing Machines Dishwashers Waste Disposal	(l/s) sumption (l) lation (l/s) Flow Rate Litres/Min 8.00 6.00 (l/s)) Interpolation (l/s) Unit Volume (l) Full Flush (l) Volume (l/s)	Capacity/ Flow Rate 0.00 0.00 0.00 180.00 6.50 0.00 7.00 0.00 0.00 0.00	0.80 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.58 0.11 4.37 0.50 5.60 0.44 2.10 3.60 3.08	Fixed use (l/p/day) 0.00 0.00 0.00 1.58 0.00 0.00 10.36 0.00 0.00 0.00 0.00	Total Consumption (I) Maximum Consumption (I) Maximum Consumption Average Consumption (I) Weighted Average Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4* Use of grey water an Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Cape Figure for Calculation life Total Use (I/p/day) 0.00 0.00 15.47 10.43 19.80 28.41 0.00 0.00 13.44 12.60 2.88	(I) (I) (I/s) sumption (I) (ation (I/s) % I/p/d and harveste (HB taps (I) (HB tap	0 0.000 d rainwate 144.62 84.21 0.00	6.0 6.0 4.2 6.0
Fotal Consumption CSH (I/p/day) 93.75 External Water Use Allowance (I) 5.00	Total Consumption (I) Maximum Consumption (I) Maximum Consumption Average Consumption (I) Weighted Average Consigner (I) Consumption for Calculation Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Weighted Average Flow Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type WC Single Flush WC Dual Flush WC's (Multiple) Taps Exc. Kitchen Bath (shower present) Shower (bath present) Bath Only Shower Only Kitchen Taps Washing Machines Dishwashers Waste Disposal Water Softner Total Calculated Water I Total Calculated Water	(I) (I/s)	Capacity/ Flow Rate 0.00 0.00 0.00 180.00 6.50 0.00 7.00 0.00 0.00 0.00	0.80 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.58 0.11 4.37 0.50 5.60 0.44 2.10 3.60 3.08	Fixed use (l/p/day) 0.00 0.00 0.00 1.58 0.00 0.00 10.36 0.00 0.00 0.00 0.00	Total Consumption (I) Maximum Consumption (I) Maximum Consumption Average Consumption (I) Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4' Use of grey water an Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Cap. Figure for Calculation life Total Use (I/p/day) 0.00 0.00 15.47 10.43 19.80 28.41 0.00 0.00 13.44 12.60 2.88 0.000 0.000 0.000 0.000 13.44	(I) (I) (Is) (I) (Is) (Implies the sumption (I) (Is) (Is) (Is) (Is) (Is) (Is) (Is) (0 0.000 d rainwate 144.62 84.21 0.00	6.0 6.0 4.2 6.0
External Water Use Allowance (I) 5.00	Total Consumption (i) Maximum Consumption (i) Maximum Consumption Average Consumption (average Consumption (average Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Average Flow (I/s) Water Use Assessm Installation Type WC Single Flush WC Dual Flush WC's (Multiple) Taps Exc. Kitchen Bath (shower present) Bothower (bath present) Bothower (bath present) Bothower Only Kitchen Taps Washing Machines Dishwashers Waste Disposal Water Softner Total Calculated Water I Grey/RainWater Reused	(I) I/s) Sumption (I) I/s) Sumption (I) Idion (I/s) Idion (I/s) Sumption (I) Sumption (I/s) Sumption (I/s	Capacity/ Flow Rate 0.00 0.00 0.00 180.00 6.50 0.00 7.00 0.00 0.00 0.00	0.80 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.58 0.11 4.37 0.50 5.60 0.44 2.10 3.60 3.08	Fixed use (l/p/day) 0.00 0.00 0.00 1.58 0.00 0.00 10.36 0.00 0.00 0.00 0.00	Total Consumption (I) Maximum Consumption (I) Maximum Consumption Average Consumption (I) Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4' Use of grey water ar Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Cap: Figure for Calculation life Total Use (I/p/day) 0.00 0.00 0.00 15.47 10.43 19.80 28.41 0.00 0.00 13.44 12.60 2.88 0.00 0.00 103.02 0.00	(I) (I) (Is) (I) (Is) (Implies the sumption (I) (Is) (Is) (Is) (Is) (Is) (Is) (Is) (0 0.000 d rainwate 144.62 84.21 0.00	6.0 6.0 4.2 6.0
Total Comsumption Part G (I/p/day) 98.75	Total Consumption (i) Maximum Consumption (i) Maximum Consumption Average Consumption (i) Meighted Average Consumption (or Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Meighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type NC Single Flush NC Dual Flush NC's (Multiple) Flaps Exc. Kitchen Bath (shower present) Shower (bath present) Bath Only Shower Only Kitchen Taps Washing Machines Dishwashers Waste Disposal Nater Softner Total Calculated Water R Grey/Rain/Water Reused Normalisation Factor	(l/s) sumption (l) lation (l/s) Flow Rate Litres/Min 8.00 6.00 (l/s)) Interpolation (l/s) (l/s)	Capacity/ Flow Rate 0.00 0.00 0.00 180.00 6.50 0.00 7.00 0.00 0.00 0.00	0.80 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.58 0.11 4.37 0.50 5.60 0.44 2.10 3.60 3.08	Fixed use (l/p/day) 0.00 0.00 0.00 1.58 0.00 0.00 10.36 0.00 0.00 0.00 0.00	Total Consumption (I) Maximum Consumption (I) Maximum Consumption Average Consumption (I) Weighted Average Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4' Use of grey water an Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Cap- Figure for Calculation life Total Use (I/p/day) 0.00 0.00 15.47 10.43 19.80 28.41 0.00 0.00 13.44 12.60 2.88 0.00 0.00 0.00 103.02 0.00 0.00 0.00 0.00 0.00 0.00 0.00	(I) (Is) sumption (I) lation (I/s) % I/p/d and harvester //HB taps (I) er Supply (I) acity (I) t/person/day	0 0.000 d rainwate 144.62 84.21 0.00	6.0 6.0 4.2 6.0
	Total Consumption (i) Maximum Consumption (i) Maximum Consumption Average Consumption (i) Meighted Average Consigned in the consumption for Calculation Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Cold Main Sink Hot Total No. of Fittings (No Fotal Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Meighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type WC Single Flush WC Single Flush WC Single Flush WC's (Multiple) Faps Exc. Kitchen Bath (shower present) Shower (bath present) Bath Only Shower Only Kitchen Taps Washing Machines Dishwashers Waste Disposal Water Softner Fotal Calculated Water of Calculation Factor Fotal Consumption CSE External Water Use Allow	I (I) I/s) Sumption (I) Issumption (Capacity/ Flow Rate 0.00 0.00 0.00 180.00 6.50 0.00 7.00 0.00 0.00 0.00	0.80 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.58 0.11 4.37 0.50 5.60 0.44 2.10 3.60 3.08	Fixed use (l/p/day) 0.00 0.00 0.00 1.58 0.00 0.00 10.36 0.00 0.00 0.00 0.00	Total Consumption (I) Maximum Consumption (I) Maximum Consumption Average Consumption (I) Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4' Use of grey water an Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Cap- Figure for Calculation life Total Use (I/p/day) 0.00 0.00 15.47 10.43 19.80 28.41 0.00 0.00 13.44 12.60 2.88 0.000 0.00 103.02 0.00 0.91 103.02 0.00 0.91 93.75	(I) (I) (Is) (I) (Is) (I) (Is) (I) (I) (Is) (I) (I) (I) (Is) (I) (I) (Is) (Is	0 0.000 d rainwate 144.62 84.21 0.00	6.0 6.0 4.2 6.0

Project Details	las e							
Adress/Reference Number of Bedrooms	39 Fitzjohns	Avenue NW3			Case Reference Occupancy for Calculation	LG04 Purposes		
Appliance/Useage D)etails							
Taps (Excluding Kit)			Showers			
Tap Fitting Type	Flow Rate	Quantity	Total per		Shower fitting	Flow Rate	Quantity	Total per
Pagin Type 1	Litres/Min 5.60	(No.)	Fitting type 5.60		Type Bath 1	Litres/Min	(No.)	Fitting typ 6.
Basin Type 1	5.60	1	0.00		Dalii i	6.50	1	0.
			0.00					0
			0.00					0
			0.00					0
Total No. of Fittings (No	0.)	1	•		Total No. of Fittings (No.	.)	1	•
Total Flow (I/s) Maximum Flow (I/s)			5.60 5.60		Total Flow (I/s) Maximum Flow (I/s)			6
Average Flow (I/s)			5.60		Average Flow (I/s)			6
Weighted Average Flow			3.92		Weighted Average Flow			4
Flow for Calculation (I/s	5)		5.60		Flow for Calculation (I/s))		6
Baths					WCs			
Bath Type	Capacity to		Total per		WC Tune	Full Flush Volume	Part Flush	Quantity
Bath 1	Overflow 180.00	(No.)	Fitting type 180.00		WC Type Standard Dual	4.50	Volume 3.00	(No)
			0.00				-	
			0.00					
Total No. of Fittings (No	0.)	1	0.00					
Total Capacity (I)	,		180.00		Total number of fittings			
Maximum Capacity (I)			180.00 180.00		Average effective flushing	ng volume		
Average Capacity (I) Weighted Average Capa	acity (I)		126.00					
Capacity for Calculation			180.00					
Dishwashers					Washing Machines			
Dishwasher Type	L per Place		Total per		Washing Machine	L per Kg	Quantity	Total per
ГВС	Setting 0.80	(No.)	Fitting type 0.80		Type TBC	Dry Load 6.00	(No.)	Fitting ty
			0.00				<u> </u>	
Fotal No. of Fittings (No Fotal Consumption (I)	0.)	1	0.80		Total No. of Fittings (No. Total Consumption (I)	.)	1	6
			0.00					C
	n (I)		0.80			(1)		6
Maximum Consumption Average Consumption ((I/s)		0.80		Maximum Consumption Average Consumption (I	//s)		6
Maximum Consumption Average Consumption (Weighted Average Cons	(I/s) sumption (I)		0.80 0.56		Maximum Consumption Average Consumption (I Weighted Average Cons	/s) umption (I)		6
Maximum Consumption Average Consumption (Weighted Average Cons Consumption for Calcul	(I/s) sumption (I)		0.80		Maximum Consumption Average Consumption (I Weighted Average Cons Consumption for Calcul	/s) umption (I)		6
Maximum Consumption Average Consumption (Weighted Average Cons Consumption for Calcul Kitchen Taps	(I/s) sumption (I) lation (I/s)	Quantity	0.80 0.56 0.80		Maximum Consumption Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings	/s) umption (I)	0	6
Maximum Consumption Average Consumption (Weighted Average Cons Consumption for Calcul	(I/s) sumption (I)	Quantity (No.)	0.80 0.56		Maximum Consumption Average Consumption (I Weighted Average Cons Consumption for Calcul	/s) umption (I)	0	6 4 6
Maximum Consumption Average Consumption (Weighted Average Cons Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold	(I/s) sumption (I) lation (I/s) Flow Rate Litres/Min 8.00	(No.)	0.80 0.56 0.80 Total per Fitting type 8.00		Maximum Consumption Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N	/s) umption (I) ation (I/s)	0 0.00	6 4 6
Maximum Consumption Average Consumption (Weighted Average Cons Consumption for Calcul Kitchen Taps Tap Fitting Type	(I/s) sumption (I) lation (I/s) Flow Rate Litres/Min	(No.)	0.80 0.56 0.80 Total per Fitting type 8.00 6.00		Maximum Consumption Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49	umption (I) ation (I/s)	0.00	6 4 6
Maximum Consumption Average Consumption (Weighted Average Cons Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold	(I/s) sumption (I) lation (I/s) Flow Rate Litres/Min 8.00 6.00	(No.)	0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00		Maximum Consumption Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner	umption (I) ation (I/s)	0.00	6 4 6
Maximum Consumption Average Consumption (Weighted Average Cons Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s)	(I/s) sumption (I) lation (I/s) Flow Rate Litres/Min 8.00 6.00	(No.)	0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00		Maximum Consumption Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water ar	wmption (I) ation (I/s) % I/p/d and harvestee (HB taps (I)	0.00 d rainwater	
Maximum Consumption Average Consumption (Weighted Average Cons Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s)	(I/s) sumption (I) lation (I/s) Flow Rate Litres/Min 8.00 6.00	(No.)	0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00		Maximum Consumption (I Weighted Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water ar Total Grey water from W Total Availble Grey Wate	wmption (I) ation (I/s) % I/p/d and harvestee (HB taps (I)	0.00 d rainwater	
Maximum Consumption Average Consumption (Weighted Average Cons Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s)	(l/s) sumption (l) lation (l/s) Flow Rate Litres/Min 8.00 6.00	(No.)	0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00		Maximum Consumption Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water ar	wmption (I) ation (I/s) % I/p/d and harvested WHB taps (I) er Supply (I)	0.00 d rainwater	
Maximum Consumption Average Consumption (Weighted Average Cons Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Average Flow (I/s)	(l/s) sumption (l) lation (l/s) Flow Rate Litres/Min 8.00 6.00	(No.)	0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00		Maximum Consumption Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water ar Total Grey water from W Total Availble Grey Wate Possible Demand (I)	wmption (I) ation (I/s) % I/p/d and harvested HB taps (I) er Supply (I) acity (I)	0.00 d rainwater 0 96.41 56.10	
Maximum Consumption Average Consumption (Neighted Average Cons Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Fotal Flow (I/s) Average Flow (I/s) Neighted Average Flow Flow for Calculation (I/s)	(l/s) sumption (l) lation (l/s) Flow Rate Litres/Min 8.00 6.00 D.)	(No.)	0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60		Maximum Consumption Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 45 Use of grey water ar Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Capa	wmption (I) ation (I/s) % I/p/d and harvested HB taps (I) er Supply (I) acity (I)	0.00 d rainwater 0 96.41 56.10 0.00	
Maximum Consumption Average Consumption (Weighted Average Cons Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Average Flow (I/s) Weighted Average Flow	(l/s) sumption (l) lation (l/s) Flow Rate Litres/Min 8.00 6.00 D.)	(No.)	0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60		Maximum Consumption Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 45 Use of grey water ar Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Capa	wmption (I) ation (I/s) % I/p/d and harvested HB taps (I) er Supply (I) acity (I)	0.00 d rainwater 0 96.41 56.10 0.00]
Maximum Consumption Average Consumption (Weighted Average Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Average Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type WC Single Flush	Flow Rate Litres/Min 8.00 6.00 c.) c (I/s) unit Volume (I)	(No.) 1 1 2 Capacity/ Flow Rate 0.00	0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00	Fixed use (//p/day) 0.00	Maximum Consumption Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 45 Use of grey water ar Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00	wmption (I) ation (I/s) % I/p/d and harvested HB taps (I) er Supply (I) acity (I)	0.00 d rainwater 0 96.41 56.10 0.00]
Maximum Consumption Average Consumption (Weighted Average Cons Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm	Flow Rate Litres/Min 8.00 6.00 b.) r (I/s) ment Unit Volume (I) Full Flush (I)	(No.) 1 1 1 2 2 Capacity/ Flow Rate 0.00 4.50	0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00	Fixed use (l/p/day) 0.00 0.00	Maximum Consumption Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water ar Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Cap Figure for Calculation lit Total Use (I/p/day) 0.00 6.57	wmption (I) ation (I/s) % I/p/d and harvested HB taps (I) er Supply (I) acity (I)	0.00 d rainwater 0 96.41 56.10 0.00]
Maximum Consumption Average Consumption (Weighted Average Cons Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type WC Single Flush WC Dual Flush	Flow Rate Litres/Min 8.00 6.00 c.) c (I/s) unit Volume (I)	(No.) 1 1 2 Capacity/ Flow Rate 0.00	0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00	Fixed use (//p/day) 0.00	Maximum Consumption Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 45 Use of grey water ar Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00	wmption (I) ation (I/s) % I/p/d and harvested HB taps (I) er Supply (I) acity (I)	0.00 d rainwater 0 96.41 56.10 0.00]
Maximum Consumption Average Consumption (Weighted Average Consider Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Average Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type WC Single Flush WC Dual Flush WC's (Multiple) Taps Exc. Kitchen	Flow Rate Litres/Min 8.00 6.00 c.) (I/s) t (I/s) rent Unit Volume (I) Pt Flush (I) Yolume (I) Flow Rate	Capacity/ Flow Rate 0.00 4.50 3.00 0.00 5.60	0.80 0.56 0.80 Total per Fitting type 8.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.46 2.96 4.42 1.58	Fixed use (l/p/day) 0.00 0.00 0.00 1.58	Maximum Consumption Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 45 Use of grey water ar Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 6.57 8.88 0.00 10.43	wmption (I) ation (I/s) % I/p/d and harvested HB taps (I) er Supply (I) acity (I)	0.00 d rainwater 0 96.41 56.10 0.00]
Maximum Consumption Average Consumption (Weighted Average Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type WC Single Flush WC Dual Flush WC's (Multiple) Taps Exc. Kitchen Bath (shower present)	Flow Rate Litres/Min 8.00 6.00 6.00 Litius (I/s) Reflection (I/s)	Capacity/ Flow Rate 0.00 4.50 3.00 0.00 5.60 180.00	0.80 0.56 0.80 Total per Fitting type 8.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.46 2.96 4.42 1.58	Fixed use (//p/day) 0.00 0.00 0.00 0.00 1.58 0.00	Maximum Consumption Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water ar Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Cap Figure for Calculation lit Total Use (I/p/day) 0.00 6.57 8.88 0.000 10.43 19.80	wmption (I) ation (I/s) % I/p/d and harvested HB taps (I) er Supply (I) acity (I)	0.00 d rainwater 0 96.41 56.10 0.00]
Maximum Consumption Average Consumption (Weighted Average Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type WC Single Flush WC Dual Flush WC's (Multiple) Taps Exc. Kitchen Bath (shower present) Shower (bath present)	Flow Rate Litres/Min 8.00 6.00 b.) r (l/s) ment Unit Volume (l) Full Flush (l) Volume (l) Flow Rate (l/s) (l/s) (l/s) (l/s) (l/s) (l/s) (l/s)	Capacity/ Flow Rate 0.00 4.50 3.00 0.00 5.60	0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 5.60 7.00 5.60 7.00 Use Factor 4.42 1.46 2.96 4.42 1.58 0.11	Fixed use (l/p/day) 0.00 0.00 0.00 1.58 0.00 0.00	Maximum Consumption Average Consumption (I Weighted Average Consumption (I Weighted Average Consumption for Calcul. Other Fittings Waste Disposal Y/N Water softner Consumption beyond 45 Use of grey water ar Total Grey water from W Total Availible Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation litt Total Use (I/p/day) 0.00 6.57 8.88 0.00 10.43 19.80 28.41	wmption (I) ation (I/s) % I/p/d and harvested HB taps (I) er Supply (I) acity (I)	0.00 d rainwater 0 96.41 56.10 0.00	
Maximum Consumption Average Consumption (Weighted Average Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Average Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type WC Single Flush WC Dual Flush WC's (Multiple) Taps Exc. Kitchen Bath (shower present) Shower (bath present) Bath Only Shower Only	Flow Rate Litres/Min 8.00 6.00 c.(l/s)	Capacity/ Flow Rate 0.00 4.50 3.00 0.00 6.50 0.00 0.00	0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.46 2.96 4.42 1.58 0.11 4.37 0.50 5.60	Fixed use (l/p/day) 0.00 0.00 0.00 1.58 0.00 0.00 0.00	Maximum Consumption Average Consumption (I Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water ar Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 6.57 8.88 0.00 10.43 19.80 28.41 0.00 0.00	wmption (I) ation (I/s) % I/p/d and harvested HB taps (I) er Supply (I) acity (I)	0.00 d rainwater 0 96.41 56.10 0.00]
Maximum Consumption Average Consumption (Weighted Average Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Fotal Flow (I/s) Average Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type WC Single Flush WC Dual Flush WC's (Multiple) Faps Exc. Kitchen Bath (shower present) Shower (bath present) Shower (Dath present) Shower Only Kitchen Taps	Flow Rate Litres/Min 8.00 6.00 c.) It (I/s) Unit Volume (I) Full Flush (I) Volume (I) Flow Rate (I/s)	Capacity/ Flow Rate 0.00 4.50 3.00 0.00 5.60 180.00 0.00 0.00 0.00	0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 7.00 Use Factor 4.42 1.58 0.11 4.37 0.50 5.60 0.44	Fixed use (l/p/day) 0.00 0.00 0.00 1.58 0.00 0.00 0.00 10.36	Maximum Consumption Average Consumption (I Weighted Average Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 45 Use of grey water ar Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 6.57 8.88 0.000 10.43 19.80 28.41 0.00 0.00 1.00	wmption (I) ation (I/s) % I/p/d and harvested HB taps (I) er Supply (I) acity (I)	0.00 d rainwater 0 96.41 56.10 0.00	
Maximum Consumption Average Consumption (Weighted Average Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Fotal Flow (I/s) Maximum Flow (I/s) Meximum Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type WC Single Flush WC Dual Flush WC's (Multiple) Faps Exc. Kitchen Bath (shower present) Shower (bath present) Sath Only Shower Only Kitchen Taps Washing Machines	Flow Rate Litres/Min 8.00 6.00 6.00 Littin (I/s) Reflection (I/s) Reflecti	Capacity/ Flow Rate 0.00 4.50 3.00 0.00 5.60 180.00 0.00 0.00 7.00 6.00	0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.58 0.11 4.37 0.50 5.60 0.44 2.10	Fixed use (I/p/day) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.	Maximum Consumption Average Consumption (I Weighted Average Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water ar Total Grey water from W Total Availble Grey Water Softner Consumption beyond (I) Grey/Rain Installed Capa Figure for Calculation little (I/p/day) 0.00 6.57 8.88 0.00 10.43 19.80 28.41 0.00 13.44 12.60	wmption (I) ation (I/s) % I/p/d and harvested HB taps (I) er Supply (I) acity (I)	0.00 d rainwater 0 96.41 56.10 0.00	
Maximum Consumption Average Consumption (Weighted Average Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type NC Single Flush NC Dual Flush NC's (Multiple) Taps Exc. Kitchen Bath (shower present) Shower (bath present) Bath Only Shower Only Kitchen Taps Washing Machines Dishwashers	Flow Rate Litres/Min 8.00 6.00 c.) It (I/s) Unit Volume (I) Full Flush (I) Volume (I) Flow Rate (I/s)	Capacity/ Flow Rate 0.00 4.50 3.00 0.00 5.60 180.00 0.00 0.00 0.00	0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.46 2.96 4.42 1.58 0.11 4.37 0.50 5.60 0.44 2.10 3.60	Fixed use (l/p/day) 0.00 0.00 0.00 1.58 0.00 0.00 0.00 10.36	Maximum Consumption Average Consumption (I Weighted Average Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 45 Use of grey water ar Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 6.57 8.88 0.000 10.43 19.80 28.41 0.00 0.00 1.00	wmption (I) ation (I/s) % I/p/d and harvested HB taps (I) er Supply (I) acity (I)	0.00 d rainwater 0 96.41 56.10 0.00	
Maximum Consumption Average Consumption (Weighted Average Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Average Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type WC Single Flush WC Dual Flush WC's (Multiple) Taps Exc. Kitchen Bath (shower present) Bath Only Sichwashers Waste Disposal Water Softner	Flow Rate Litres/Min 8.00 6.00 c.) I (I/s) I (I/s) Rent Unit Volume (I) Full Flush (I) Folow Rate (I/s)	Capacity/ Flow Rate 0.00 4.50 3.00 0.00 5.60 0.00 7.000 6.00 0.80	0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.46 2.96 4.42 1.58 0.11 4.37 0.50 5.60 0.44 2.10 3.60 3.08	Fixed use (//p/day) 0.00 0.00 0.00 1.58 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0	Maximum Consumption Average Consumption (I Weighted Average Consumption (I Weighted Average Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 45 Use of grey water ar Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 6.57 8.88 0.00 10.43 19.80 28.41 0.00 0.00 13.44 12.60 2.88 0.00 0.00 0.00	wmption (I) ation (I/s) % I/p/d and harvested HB taps (I) er Supply (I) acity (I)	0.00 d rainwater 0 96.41 56.10 0.00	
Maximum Consumption Average Consumption (Weighted Average Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Meighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type WC Single Flush WC Dual Flush WC Dual Flush WC's (Multiple) Taps Exc. Kitchen Bath (shower present) Shower (Dath present) Shower (Dath present) Shower Only Kitchen Taps Washing Machines Dishwashers Waste Disposal Water Softner Total Calculated Water Total Calculated Water	Flow Rate Litres/Min 8.00 6.00 1.) (I/s) Helian (I/s) Volume (I) Full Flush (I) Volume (I) Flow Rate (I/s) (I/s) (I/s) (I/s)	Capacity/ Flow Rate 0.00 4.50 3.00 0.00 6.50 0.00 7.00 6.00 0.80 0.80	0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.46 2.96 4.42 1.58 0.11 4.37 0.50 5.60 0.44 2.10 3.60 3.08	Fixed use (I/p/day) 0.00 0.00 0.00 0.00 1.58 0.00 0.00 0.00 10.36 0.00 0.00 0.00 0.00	Maximum Consumption Average Consumption (I Weighted Average Consumption (I Weighted Average Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 45 Use of grey water ar Total Grey water from Water from Water Softner Consumption beyond I Grey Water ar Total Grey water from Water from Water Softner Consumption beyond I Grey Water ar Total Grey water from Water from Water Softner Consumption beyond I Grey Water ar Total Grey water from Water from Water Softner Consumption Description Water From Water Softner Consumption Description Water From Water Softner Consumption Description Desc	wmption (I) ation (I/s) % I/p/d and harvested HB taps (I) er Supply (I) acity (I)	0.00 d rainwater 0 96.41 56.10 0.00	
Maximum Consumption Average Consumption (Weighted Average Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type NC Single Flush NC Dual Flush NC's (Multiple) Taps Exc. Kitchen Bath (shower present) Shower (bath present) Bath Only	Flow Rate Litres/Min 8.00 6.00 1.) (I/s) Helian (I/s) Volume (I) Full Flush (I) Volume (I) Flow Rate (I/s) (I/s) (I/s) (I/s)	Capacity/ Flow Rate 0.00 4.50 3.00 0.00 6.50 0.00 7.00 6.00 0.80 0.80	0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.46 2.96 4.42 1.58 0.11 4.37 0.50 5.60 0.44 2.10 3.60 3.08	Fixed use (I/p/day) 0.00 0.00 0.00 0.00 1.58 0.00 0.00 0.00 10.36 0.00 0.00 0.00 0.00	Maximum Consumption Average Consumption (I Weighted Average Consumption (I Weighted Average Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 45 Use of grey water ar Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 6.57 8.88 0.00 10.43 19.80 28.41 0.00 0.00 13.44 12.60 2.88 0.00 0.00 0.00	wmption (I) ation (I/s) % I/p/d and harvested HB taps (I) er Supply (I) acity (I)	0.00 d rainwater 0 96.41 56.10 0.00	
Maximum Consumption Average Consumption (Weighted Average Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Average Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type WC Single Flush WC Dual Flush WC Dual Flush WC's (Multiple) Taps Exc. Kitchen Bath (shower present) Shower (bath present) Bath Only Kitchen Taps Washing Machines Dishwashers Waste Disposal Water Softner Total Calculated Water I Grey/RainWater Reused Normalisation Factor Total Consumption CSH Total Calculated CSH Tota	Flow Rate Litres/Min 8.00 6.00 c.) I (I/s) I (I/s) Bent Unit Volume (I) Full Flush (I) Pt Flush (I) Flow Rate (I/s)	Capacity/ Flow Rate 0.00 4.50 3.00 0.00 6.50 0.00 7.00 6.00 0.80 0.80	0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.46 2.96 4.42 1.58 0.11 4.37 0.50 5.60 0.44 2.10 3.60 3.08	Fixed use (I/p/day) 0.00 0.00 0.00 0.00 1.58 0.00 0.00 0.00 10.36 0.00 0.00 0.00 0.00	Maximum Consumption Average Consumption (I Weighted Average Consumption (I Weighted Average Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water ar Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lite Total Use (I/p/day) 0.00 6.57 8.88 0.00 10.43 19.80 28.41 0.00 10.43 19.80 28.41 0.00 0.00 13.44 12.60 2.88 0.00 0.00 0.00 0.00 0.00 0.00 0.0	wmption (I) ation (I/s) % I/p/d and harvested HB taps (I) er Supply (I) acity (I)	0.00 d rainwater 0 96.41 56.10 0.00	
Maximum Consumption Average Consumption (Weighted Average Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type NC Single Flush NC Dual Flush NC's (Multiple) Taps Exc. Kitchen Bath (shower present) Bothomer (bath present) Bothomer Only Kitchen Taps Washing Machines Dishwashers Waste Disposal Water Softner Total Calculated Water I Grey/RainWater Reused	Flow Rate Litres/Min 8.00 6.00 1.) I (I/s)	Capacity/ Flow Rate 0.00 4.50 3.00 0.00 6.50 0.00 7.00 6.00 0.80 0.80	0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.46 2.96 4.42 1.58 0.11 4.37 0.50 5.60 0.44 2.10 3.60 3.08	Fixed use (I/p/day) 0.00 0.00 0.00 0.00 1.58 0.00 0.00 0.00 10.36 0.00 0.00 0.00 0.00	Maximum Consumption Average Consumption (I Weighted Average Consumption (I Weighted Average Consumption for Calculation Consumption for Calculation Consumption for Calculation Consumption beyond 49 Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water ar Total Grey water from W Total Availible Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lite Total Use (I/p/day) 0.00 6.57 8.88 0.00 10.43 19.80 28.41 0.00 0.00 13.44 12.60 2.88 0.00 0.00 0.00 0.00 0.00 0.00 0.0	wmption (I) ation (I/s) % I/p/d and harvested HB taps (I) er Supply (I) acity (I)	0.00 d rainwater 0 96.41 56.10 0.00	

Project Details								
Adress/Reference		Avenue NW3				LG05		
Number of Bedrooms	1	l			Occupancy for Calculation	Purposes		
Appliance/Useage D	etails							
aps (Excluding Kite					Showers			
Tap Fitting Type	Flow Rate Litres/Min	Quantity (No.)	Total per Fitting type		Shower fitting Type	Flow Rate Litres/Min	Quantity (No.)	Total per Fitting type
Basin Type 1	5.60	2	11.20		Bath 1	6.50		6.5
			0.00 0.00					0.0
			0.00					0.0
			0.00					0.0
Total No. of Fittings (No	.)	2	0.00		Total No. of Fittings (No.	.)	1	0.0
Total Flow (I/s)			11.20		Total Flow (I/s)			6.5
Maximum Flow (I/s) Average Flow (I/s)			5.60 5.60		Maximum Flow (I/s) Average Flow (I/s)			6.5 6.5
Weighted Average Flow			3.92		Weighted Average Flow			4.5
Flow for Calculation (I/s)		5.60		Flow for Calculation (I/s)			6.5
Baths					WCs			
Bath Type	Capacity to		Total per			Full Flush	Part Flush	Quantity
Bath 1	Overflow 180.00	(No.)	Fitting type 180.00		WC Type Standard Dual	Volume 4.50	Volume 3.00	(No)
			0.00					
			0.00					
Total No. of Fittings (No	.)	1						
Fotal Capacity (I) Maximum Capacity (I)			180.00 180.00		Total number of fittings	a volume		3.5
Naximum Capacity (I) Average Capacity (I)			180.00		Average effective flushing	ig volume		3.5
Weighted Average Capa			126.00					
Capacity for Calculation	ı (I)		180.00					
Dishwashers					Washing Machines			
Dishwasher Type	I was Diago	O					O	Total per
Distiwastici Type	L per Place		Total per		Washing Machine	L per Kg	Quantity	
TBC	Setting 0.80	(No.)	Fitting type 0.80		Washing Machine Type TBC	L per Kg Dry Load 6.00	(No.)	Fitting type
TBC	Setting 0.80	(No.)	Fitting type		Type TBC	Dry Load 6.00	(No.)	Fitting type 6.0
TBC Fotal No. of Fittings (No	Setting 0.80	(No.)	Fitting type 0.80 0.00		Type TBC Total No. of Fittings (No.	Dry Load 6.00	(No.)	Fitting type 6.0 0.0
TBC	Setting 0.80	(No.)	Fitting type 0.80		Type TBC	6.00 0	(No.)	Fitting type 6.0 0.0
TBC Total No. of Fittings (No Fotal Consumption (I) Maximum Consumption (I) Average Consumption (I)	Setting 0.80	(No.)	0.80 0.80 0.80 0.80 0.80 0.80		Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption Average Consumption (I	0.00 6.00 (I) /s)	(No.)	Fitting type 6.0 0.0 6.0 6.0 6.0
Total No. of Fittings (No Total Consumption (I) Maximum Consumption	Setting 0.80 .) (I) I/s) sumption (I)	(No.)	Fitting type 0.80 0.00 0.80 0.80 0.80		Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption	Dry Load 6.00 (I) /s) umption (I)	(No.)	Fitting type 6.0 0.0 6.0 6.0 6.0 4.2
Fotal No. of Fittings (No Fotal Consumption (I) Maximum Consumption Average Consumption (I) Weighted Average Cons Consumption for Calcul	Setting 0.80 .) (I) I/s) sumption (I)	(No.)	0.80 0.80 0.80 0.80 0.80 0.80 0.80 0.56		Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption Average Consumption (I Weighted Average Cons Consumption for Calcula	Dry Load 6.00 (I) /s) umption (I)	(No.)	Fitting type
FBC Fotal No. of Fittings (No Fotal Consumption (I) Maximum Consumption (I) Average Consumption (I) Weighted Average Consumption for Calcul Kitchen Taps	Setting 0.80 .) (I) (Isomorphism (Isomor	1	0.80 0.80 0.80 0.80 0.80 0.80 0.56 0.80		Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption Average Consumption (I) Weighted Average Cons Consumption for Calcula Other Fittings	Dry Load 6.00 (I) /s) umption (I)	(No.) 1	Fitting type 6.0 0.0 6.0 6.0 6.0 4.2
Fotal No. of Fittings (No Fotal Consumption (I) Maximum Consumption Average Consumption (I) Weighted Average Cons Consumption for Calcul	Setting 0.80 .) (I) I/s) sumption (I)	(No.)	0.80 0.80 0.80 0.80 0.80 0.80 0.80 0.56		Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption Average Consumption (I Weighted Average Cons Consumption for Calcula	Dry Load 6.00 (I) /s) umption (I)	(No.)	Fitting type 6.0 0.0 6.0 6.0 6.0 4.2
FBC Fotal No. of Fittings (No Fotal Consumption (I) Maximum Consumption (Average Consumption (I) Weighted Average Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold	Setting 0.80 (I) (I) (I/s) sumption (I) ation (I/s) Flow Rate Litres/Min 8.00	Quantity (No.)	0.80 0.80 0.80 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00		Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption Average Consumption (I Weighted Average Cons Consumption for Calcula Other Fittings Waste Disposal Y/N	Dry Load 6.00 (I) (I) /s) umption (I) ation (I/s)	(No.) 1	Fitting type 6.0 0.0 6.0 6.0 6.0 4.2 6.0
Focal No. of Fittings (No Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consconsumption for Calcul Kitchen Taps	O.80 O.80 O.80 O.80 O.80 O.80 O.80 O.80	(No.) 1 1 Quantity (No.)	Fitting type		Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption Average Consumption (I Weighted Average Cons Consumption for Calcula Other Fittings Waste Disposal Y/N Water softner	Dry Load 6.00 (I) (I) (s) umption (I) ation (I/s)	0 0	Fitting type 6.0 6.0 6.0 6.0 6.0 6.0
Focal No. of Fittings (No Fotal No. of Fittings (No Fotal Consumption (I) Maximum Consumption (I) Meighted Average Consconsumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No	Setting 0.80 .) (I) //s) sumption (I) ation (I/s) Flow Rate Litres/Min 8.00 6.00	Quantity (No.)	Fitting type		Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Weighted Average Consumption for Calcula Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water an	Dry Load 6.00 (I) (I) (s) umption (I) ation (I/s) 6 I/p/d ad harvestee	(No.) 1	Fitting type 6.0 6.0 6.0 6.0 6.0 6.0 6.0
Focal No. of Fittings (No Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Fotal Flow (I/s)	Setting 0.80 .) (I) //s) sumption (I) ation (I/s) Flow Rate Litres/Min 8.00 6.00	Quantity (No.)	Fitting type 0.80 0.00 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00		Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption Average Consumption (I) Weighted Average Cons Consumption for Calcula Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water and Total Grey water from W	Dry Load 6.00 (I) (I) (s) umption (I) ation (I/s) 6 I/p/d d harvested HB taps (I)	0 0.00 d rainwate	Fitting type 6.0 6.0 6.0 6.0 6.0 6.0
Focal No. of Fittings (No Fotal No. of Fittings (No Fotal Consumption (I) Maximum Consumption (I) Meighted Average Consconsumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No	Setting 0.80 .) (I) //s) sumption (I) ation (I/s) Flow Rate Litres/Min 8.00 6.00	Quantity (No.)	Fitting type		Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Weighted Average Consumption for Calcula Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water an	Dry Load 6.00 (I) (I) (s) umption (I) ation (I/s) 6 I/p/d d harvested HB taps (I)	(No.) 1	Fitting type 6.0 6.0 6.0 6.0 6.0 7. 6.0
Fotal No. of Fittings (No Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow	Setting 0.80 (I) (I) (Is) (Is) (Is) (Is) Flow Rate Litres/Min 8.00 6.00 (I/s)	Quantity (No.)	Fitting type 0.80 0.00 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60		Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Weighted Average Cons Consumption for Calcula Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water an Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Capa	Dry Load 6.00 (I) (I) (Is) (I) (Is) (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	0 0.00 d rainwate 96.41 56.14	Fitting type 6.0 6.0 6.0 6.0 6.0 6.0 7 6.0 7 7 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8
Fotal No. of Fittings (No Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s)	Setting 0.80 .) (I) (I/s) sumption (I) ation (I/s) Flow Rate Litres/Min 8.00 6.00 .)	Quantity (No.)	Fitting type 0.80 0.00 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00		Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Weighted Average Cons Consumption for Calcula Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water and Total Grey water from W Total Availble Grey Water Possible Demand (I)	Dry Load 6.00 (I) (I) (Is) (I) (Is) (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	0 0.000 d rainwate	Fitting type 6.0 6.0 6.0 6.0 6.0 6.0 7 6.0 7 7 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8
Focal No. of Fittings (No Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption for Calcul Kitchen Taps Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm	Setting 0.80 (I) (Is) (Is) (Is) (Is) (Is) (Is) (Is)	Quantity (No.) 1 2	Total per Fitting type 0.80 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00		Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Weighted Average Cons Consumption for Calcula Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water and Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit	Dry Load 6.00 (I) (I) (Is) (I) (Is) (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	0 0.00 d rainwate 96.41 56.14	Fitting type 6.0 6.0 6.0 6.0 6.0 6.0 6.0
Fotal No. of Fittings (No Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s)	Setting 0.80 .) (I) l/s) sumption (I) ation (I/s) Flow Rate Litres/Min 8.00 6.00 .)	Quantity (No.) 1 2 Capacity/	Fitting type 0.80 0.00 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60	Fixed use	Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Weighted Average Cons Consumption for Calcula Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water and Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit	Dry Load 6.00 (I) (I) (Is) (I) (Is) (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	0 0.00 d rainwate 96.41 56.14	Fitting type 6.0 6.0 6.0 6.0 6.0 6.0 6.0
Focal No. of Fittings (No Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption for Calcul Kitchen Taps Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm	Setting 0.80 (I) (Is) (Is) (Is) (Is) (Is) (Is) (Is)	Quantity (No.) 1 2	Total per Fitting type 0.80 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00		Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Weighted Average Cons Consumption for Calcula Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water and Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit	Dry Load 6.00 (I) (I) (Is) (I) (Is) (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	0 0.00 d rainwate 96.41 56.14	Fitting type 6.0 6.0 6.0 6.0 6.0 6.0 7 6.0 7 7 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8
Fotal No. of Fittings (No Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Neighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type	Setting 0.80 (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	Quantity (No.) 1 Capacity/ Flow Rate 0.00 0.00	Total per Fitting type 0.80 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 Use Factor 4.42 1.46	Fixed use (l/p/day) 0.00 0.00	Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Weighted Average Consconsumption for Calculation for Calcul	Dry Load 6.00 (I) (I) (Is) (I) (Is) (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	0 0.00 d rainwate 96.41 56.14	Fitting type 6.0 6.0 6.0 6.0 6.0 6.0 7 6.0 7 7 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8
Fotal No. of Fittings (No Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (Neighted Average Consumption (I) Meighted Average Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow for Calculation (I/s) Water Use Assessm Installation Type WC Single Flush WC Dual Flush	Setting 0.80 (I) (Is) (Is) (Is) (Is) (Is) (Is) (Is)	Quantity (No.) 1 Capacity/ Flow Rate 0.00 0.00 0.00	Fitting type 0.80 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 7.00 5.60 7.00 Use Factor	Fixed use (//p/day) 0.00 0.00 0.00	Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Weighted Average Cons Consumption for Calcula Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water and Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 0.00	Dry Load 6.00 (I) (I) (Is) (I) (Is) (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	0 0.00 d rainwate 96.41 56.14	Fitting type 6.0 6.0 6.0 6.0 6.0 6.0 7 6.0 7 7 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8
Focal No. of Fittings (No Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Fotal Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Mater Use Assessm Installation Type WC Single Flush WC Single Flush WC's (Multiple) Faps Exc. Kitchen	Setting 0.80 (I) (I) (Is) Sumption (I) ation (I/s) Flow Rate Litres/Min 8.00 6.00 (I/s) Unit Volume (I) Full Flush (I) Volume (I) Flow Rate	Quantity (No.) 1 Capacity/ Flow Rate 0.00 0.00 0.00 3.50 5.60	Total per Fitting type 0.80 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.46 2.96 4.42 1.58	Fixed use (l/p/day) 0.00 0.00 0.00 0.00 1.58	Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Weighted Average Consumption for Calculation Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water and Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 0.00 15.47 10.43	Dry Load 6.00 (I) (I) (Is) (I) (Is) (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	0 0.00 d rainwate 96.41 56.14	Fitting type 6.0 6.0 6.0 6.0 6.0 6.0 7 6.0 7 7 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8
Fotal No. of Fittings (No Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Fotal Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type WC Single Flush WC Dual Flush WC's (Multiple) Faps Exc. Kitchen Bath (shower present)	Setting 0.80 (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	Quantity (No.) 1 Capacity/ Flow Rate 0.00 0.00 3.50 5.60 180.00	Total per Fitting type 0.80 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 Use Factor 4.42 1.46 2.96 4.42 1.58 0.11	Fixed use (l/p/day) 0.00 0.00 0.00 1.58 0.00	Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Weighted Average Cons Consumption for Calcula Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water an Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 0.00 0.00 15.47 10.43 19.80	Dry Load 6.00 (I) (I) (Is) (I) (Is) (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	0 0.00 d rainwate 96.41 56.14	Fitting type 6.0 6.0 6.0 6.0 6.0 6.0 7 6.0 7 7 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8
Focal No. of Fittings (No Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Fotal Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Mater Use Assessm Installation Type WC Single Flush WC Single Flush WC's (Multiple) Faps Exc. Kitchen	Setting 0.80 (I) (I) (Is) Sumption (I) ation (I/s) Flow Rate Litres/Min 8.00 6.00 (I/s) Unit Volume (I) Full Flush (I) Volume (I) Flow Rate	Quantity (No.) 1 Capacity/ Flow Rate 0.00 0.00 0.00 3.50 5.60	Total per Fitting type 0.80 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.46 2.96 4.42 1.58	Fixed use (l/p/day) 0.00 0.00 0.00 0.00 1.58	Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Weighted Average Consumption for Calculation Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water and Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 0.00 15.47 10.43	Dry Load 6.00 (I) (I) (Is) (I) (Is) (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	0 0.00 d rainwate 96.41 56.14	Fitting type 6.0 6.0 6.0 6.0 6.0 6.0 7 6.0 7 7 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8
Fotal No. of Fittings (No Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Fotal Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Neighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type MC Single Flush MC Dual Flush MC's (Multiple) Faps Exc. Kitchen Bath (shower present) Shower (bath present) Bath Only Shower Only	Setting 0.80 (I) (I/s) sumption (I) ation (I/s) Flow Rate Litres/Min 8.00 6.00 (I/s)) tunit Volume (I) Full Flush (I) Volume (I) Flow Rate (I/s)	Capacity/ Flow Rate 0.00 0.00 3.50 5.60 180.00 0.00 0.00 0.00	Total per Fitting type 0.80 0.80 0.80 0.80 0.80 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 Use Factor 4.42 1.46 2.96 4.42 1.58 0.11 4.37 0.50 5.60	Fixed use (//p/day) 0.00 0.00 0.00 1.58 0.00 0.00 0.00	Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Weighted Average Cons Consumption for Calcula Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water and Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 0.00 15.47 10.43 19.80 28.41 0.00 0.00	Dry Load 6.00 (I) (I) (Is) (I) (Is) (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	0 0.00 d rainwate 96.41 56.14	Fitting type 6.0 6.0 6.0 6.0 6.0 6.0 7 6.0 7 7 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8
Fotal No. of Fittings (No Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Fotal Flow (I/s) Maximum Flow (I/s) More Galculation (I/s) Water Use Assessm Installation Type WC Single Flush WC Single Flush WC's (Multiple) Faps Exc. Kitchen Bath (shower present) Shower (bath present) Shower Only Kitchen Taps	0.80 0.80	Quantity (No.) 1 Capacity/ Flow Rate 0.00 0.00 0.560 180.00 6.50 0.00	Total per Fitting type 0.80 0.80 0.80 0.80 0.80 0.80 0.80 0.8	Fixed use (//p/day) 0.00 0.00 0.00 1.58 0.00 0.00 0.00	Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Weighted Average Consumption for Calculation Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water and Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 0.00 0.00 15.47 10.43 19.80 28.41 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0	Dry Load 6.00 (I) (I) (Is) (I) (Is) (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	0 0.00 d rainwate 96.41 56.14	Fitting type 6.0 6.0 6.0 6.0 6.0 6.0 7 6.0 7 7 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8
Fotal No. of Fittings (No Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Maximum Consumption (Neighted Average Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Fotal Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Average Flow (I/s) Weighted Average Flow (I/s) Water Use Assessm Installation Type MC Single Flush MC Dual Flush MC's (Multiple) Faps Exc. Kitchen Bath (Shower present) Shower (Dath present) Bath Only Shower Only Kitchen Taps Washing Machines Dishwashers	0.80 0.80	Quantity (No.) 1 Capacity/ Flow Rate 0.00 0.00 0.00 0.5.60 180.00 6.50 0.00 7.00 0.00 6.00 0.80	Total per Fitting type 0.80 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 5.60 7.00 Use Factor 4.42 1.58 0.11 4.37 0.50 5.60 0.44 2.10 3.60	Fixed use (I/p/day) 0.00 0.00 0.00 1.58 0.00 0.00 0.00 1.036 0.00 0.00 0.00	Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Weighted Average Consumption for Calculation Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water arm Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 0.00 15.47 10.43 19.80 28.41 0.00 0.00 13.44 12.60 2.88	Dry Load 6.00 (I) (I) (Is) (I) (Is) (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	0 0.00 d rainwate 96.41 56.14	Fitting type 6.0 6.0 6.0 6.0 6.0 6.0
Focal No. of Fittings (No Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Maximum Consumption (No Heighted Average Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Fotal Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Water Use Assessm Installation Type WC Single Flush WC Dual Flush WC Dual Flush WC's (Multiple) Faps Exc. Kitchen Bath (shower present) Shower (bath present) Sath Only Shower Only Kitchen Taps Washing Machines Dishwashers Waste Disposal	Setting	Capacity/ (No.) 2 Capacity/ Flow Rate 0.00 0.00 0.560 180.00 0.00 0.00 0.00 0.00 0.00 0.00 0	Total per Fitting type 0.80 0.80 0.80 0.80 0.80 0.566 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 Use Factor 4.42 1.46 2.96 4.42 1.58 0.11 4.37 0.560 0.44 2.10 3.60 3.08	Fixed use (//p/day) 0.00 0.00 0.00 1.58 0.00 0.00 0.00 10.36 0.00 0.00 0.00 0.00	Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Weighted Average Cons Consumption for Calcula Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water and Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 0.00 0.00 15.47 10.43 19.80 28.41 0.00 0.00 13.44 12.60 2.88	Dry Load 6.00 (I) (I) (Is) (I) (Is) (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	0 0.00 d rainwate 96.41 56.14	Fitting type 6.0 6.0 6.0 6.0 6.0 6.0
Fotal No. of Fittings (No Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Maximum Consumption (Neighted Average Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Fotal Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Average Flow (I/s) Weighted Average Flow (I/s) Water Use Assessm Installation Type MC Single Flush MC Dual Flush MC's (Multiple) Faps Exc. Kitchen Bath (Shower present) Shower (Dath present) Bath Only Shower Only Kitchen Taps Washing Machines Dishwashers	0.80 0.80	Quantity (No.) 1 Capacity/ Flow Rate 0.00 0.00 0.00 0.560 180.00 6.50 0.00 7.00 0.00 6.00 0.80	Total per Fitting type 0.80 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 5.60 7.00 Use Factor 4.42 1.58 0.11 4.37 0.50 5.60 0.44 2.10 3.60	Fixed use (I/p/day) 0.00 0.00 0.00 1.58 0.00 0.00 0.00 1.036 0.00 0.00 0.00	Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Weighted Average Consumption for Calculation Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water arm Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 0.00 15.47 10.43 19.80 28.41 0.00 0.00 13.44 12.60 2.88	Dry Load 6.00 (I) (I) (Is) (I) (Is) (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	0 0.00 d rainwate 96.41 56.14	Fitting type 6.0 6.0 6.0 6.0 6.0 6.0
Fotal No. of Fittings (No Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Maximum Consumption (Neighted Average Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Fotal Flow (I/s) Maximum Flow (I/s) More Gelculation (I/s) Water Use Assessm Installation Type WC Single Flush WC Single Flush WC's (Multiple) Faps Exc. Kitchen Bath (Shower present) Shower (Dath present) Shower Only Kitchen Taps Washing Machines Dishwashers Waster Softner Fotal Calculated Water I Grey/RainWater Reused Grey/RainWater Reused	0.80 0.80	Capacity/ (No.) 2 Capacity/ Flow Rate 0.00 0.00 0.560 180.00 0.00 0.00 0.00 0.00 0.00 0.00 0	Total per Fitting type 0.80 0.80 0.80 0.80 0.80 0.566 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 Use Factor 4.42 1.46 2.96 4.42 1.58 0.11 4.37 0.560 0.44 2.10 3.60 3.08	Fixed use (//p/day) 0.00 0.00 0.00 1.58 0.00 0.00 0.00 10.36 0.00 0.00 0.00 0.00	Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Weighted Average Cons Consumption for Calculation Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water are Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 0.00 0.00 15.47 10.43 19.80 28.41 0.00 0.00 13.44 12.60 2.88 0.00 0.00 0.00 0.00 0.00 0.00 0.0	Dry Load 6.00 (I) (I) (Is) (I) (Is) (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	0 0.00 d rainwate 96.41 56.14	Fitting type 6.0 6.0 6.0 6.0 6.0 6.0
Fotal No. of Fittings (No Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (Neighted Average Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Fotal Flow (I/s) Maximum Flow (I/s) More Use Assessm Installation Type NC Single Flush NC Dual Flush NC's (Multiple) Flaps Exc. Kitchen Sath (shower present) Shower (bath present) Shower Only Kitchen Taps Mashing Machines Dishwashers Maste Disposal Nater Softner Fotal Calculated Water It Grey/Rain/Water Reused (Normalisation Factor)	Setting	Capacity/ (No.) 2 Capacity/ Flow Rate 0.00 0.00 0.560 180.00 0.00 0.00 0.00 0.00 0.00 0.00 0	Total per Fitting type 0.80 0.80 0.80 0.80 0.80 0.566 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 Use Factor 4.42 1.46 2.96 4.42 1.58 0.11 4.37 0.560 0.44 2.10 3.60 3.08	Fixed use (//p/day) 0.00 0.00 0.00 1.58 0.00 0.00 0.00 10.36 0.00 0.00 0.00 0.00	Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Weighted Average Cons Consumption for Calcula Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water and Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 0.00 15.47 10.43 19.80 28.41 0.00 0.00 13.44 12.60 2.88 0.00 0.00 0.00 0.00 0.00 0.00 0.0	Dry Load 6.00 (I) (I) (Is) (I) (Is) (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	0 0.00 d rainwate 96.41 56.14	Fitting type 6.0 6.0 6.0 6.0 6.0 6.0
Fotal No. of Fittings (No Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Maximum Consumption (Neighted Average Consumption for Calcul Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Cold Main Sink Hot Fotal No. of Fittings (No Fotal Flow (I/s) Maximum Flow (I/s) More Gelculation (I/s) Water Use Assessm Installation Type WC Single Flush WC Single Flush WC's (Multiple) Faps Exc. Kitchen Bath (Shower present) Shower (Dath present) Shower Only Kitchen Taps Washing Machines Dishwashers Waster Softner Fotal Calculated Water I Grey/RainWater Reused Grey/RainWater Reused	0.80 0.80	Capacity/ (No.) 2 Capacity/ Flow Rate 0.00 0.00 0.560 180.00 0.00 0.00 0.00 0.00 0.00 0.00 0	Total per Fitting type 0.80 0.80 0.80 0.80 0.80 0.566 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 Use Factor 4.42 1.46 2.96 4.42 1.58 0.11 4.37 0.560 0.44 2.10 3.60 3.08	Fixed use (//p/day) 0.00 0.00 0.00 1.58 0.00 0.00 0.00 10.36 0.00 0.00 0.00 0.00	Type TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Weighted Average Cons Consumption for Calculation Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water are Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 0.00 0.00 15.47 10.43 19.80 28.41 0.00 0.00 13.44 12.60 2.88 0.00 0.00 0.00 0.00 0.00 0.00 0.0	Dry Load 6.00 (I) (I) (Is) (I) (Is) (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	0 0.00 d rainwate 96.41 56.14	Fitting type 6.0 6.0 6.0 6.0 6.0 6.0

Project Details	laa e					Izes:		
Adress/Reference Number of Bedrooms	39 Fitzjohns	Avenue NW3			Case Reference Occupancy for Calculation	TF01 n Purposes	_	-
A								
Appliance/Useage					Showers			
Taps (Excluding Kit	Flow Rate	Quantity	Total per		Shower fitting	Flow Rate	Quantity	Total pe
	Litres/Min	(No.)	Fitting type		Туре	Litres/Min	(No.)	Fitting ty
Basin Type 1	5.60	3	4		Bath 1	6.50		
			0.00		Bath 2	6.50	1	- '
			0.00					
			0.00					
Total No. of Fittings (No		3	0.00		Total No. of Fittings (No.		3] (
Total No. of Fittings (No Total Flow (I/s)	0.)	3	16.80		Total No. of Fittings (No Total Flow (I/s)).)	3	1:
Maximum Flow (I/s)			5.60		Maximum Flow (I/s)			(
Average Flow (I/s)	(11.)		5.60		Average Flow (I/s)	44.5		1
Weighted Average Flow Flow for Calculation (I/s			3.92 5.60		Weighted Average Flow Flow for Calculation (I/s			
	"		3.00			,		
Baths					WCs			
Bath Type	Capacity to Overflow	Quantity (No.)	Total per Fitting type		WC Type	Full Flush Volume	Part Flush Volume	Quantity (No)
Bath 1	180.00	2			Standard Dual	4.50		(140)
			0.00					
			0.00					
Total No. of Fittings (No))	2	0.00					
Total Capacity (I)	,.,	_	360.00		Total number of fittings			
Maximum Capacity (I)			180.00		Average effective flushi	ng volume		:
Average Capacity (I)	naitur (I)		180.00					
Weighted Average Capa Capacity for Calculation			126.00 180.00					
Dishwashers	- (-)				Washing Machines			
Dishwasher Type	L per Place	Quantity	Total per		Washing Machine	L per Kg	Quantity	Total pe
	Setting	(No.)	Fitting type		Туре	Dry Load	(No.)	Fitting t
TBC	0.80	1	0.80		TBC	6.00	1	4
Total No. of Fittings (No).)	1			Total No. of Fittings (No	0.)	1	•
Total Consumption (I)	,	1	0.80		Total Consumption (I)		1	•
Total Consumption (I) Maximum Consumption	ı (l)	1	0.80 0.80		Total Consumption (I) Maximum Consumption	(I)	1	
Total Consumption (i) Maximum Consumption Average Consumption (Weighted Average Cons	ı (I) (I/s) sumption (I)	1	0.80 0.80 0.80 0.56		Total Consumption (I) Maximum Consumption Average Consumption (Weighted Average Cons	(I) I/s) sumption (I)	1	•
Total Consumption (i) Maximum Consumption Average Consumption (Weighted Average Cons	ı (I) (I/s) sumption (I)	1	0.80 0.80 0.80		Total Consumption (I) Maximum Consumption Average Consumption ((I) I/s) sumption (I)	1	· (
Total Consumption (i) Maximum Consumption Average Consumption (Weighted Average Cons Consumption for Calcul	ı (I) (I/s) sumption (I)	1	0.80 0.80 0.80 0.56		Total Consumption (I) Maximum Consumption Average Consumption (Weighted Average Cons	(I) I/s) sumption (I)	1	
Total Consumption (I)	I (I) (I/s) sumption (I) lation (I/s)	Quantity	0.80 0.80 0.80 0.56 0.80		Total Consumption (I) Maximum Consumption Average Consumption (Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N	(I) I/s) sumption (I)	0	· (
Total Consumption (I) Maximum Consumption Average Consumption Weighted Average Cons Consumption for Calcul Kitchen Taps	n (I) (I/s) sumption (I) lation (I/s)	Quantity (No.)	0.80 0.80 0.80 0.56 0.80 Total per Fitting type		Total Consumption (I) Maximum Consumption Average Consumption (Weighted Average Consumption for Calcul Other Fittings	(I) I/s) sumption (I) lation (I/s)	0 0.00	
Total Consumption (I) Maximum Consumption Average Consumption Weighted Average Cons Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold	I (I) (I/s) sumption (I) lation (I/s) Flow Rate Litres/Min	(No.)	0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00		Total Consumption (I) Maximum Consumption Average Consumption Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4	(I) I/s) sumption (I) lation (I/s)	0.00]
Total Consumption (I) Maximum Consumption Average Consumption Weighted Average Cons Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot	(l/s) sumption (l) lation (l/s) Flow Rate Litres/Min 8.00 6.00	(No.)	0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00		Total Consumption (I) Maximum Consumption Average Consumption (Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner	(I) I/s) sumption (I) lation (I/s)	0.00]
Total Consumption (I) Maximum Consumption Average Consumption Weighted Average Cons Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No	(l/s) sumption (l) lation (l/s) Flow Rate Litres/Min 8.00 6.00	(No.)	0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00		Total Consumption (I) Maximum Consumption (I) Maximum Consumption (Weighted Average Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4' Use of grey water an	(I) I/s) sumption (I) lation (I/s) % I/p/d nd harveste	0.00 d rainwater	
Total Consumption (I) Maximum Consumption Average Consumption (Weighted Average Cons Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s)	(l/s) sumption (l) lation (l/s) Flow Rate Litres/Min 8.00 6.00	(No.)	0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00		Total Consumption (I) Maximum Consumption Average Consumption Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4	(I) (I/s) (I/s) (I/s) (I/s) (I/s) (I/s) (I/p/d (I/p/d (I/p/d (I/p/d (I/s) (I/p/d (I/s) (I/p/d (I/s) (I/p/d	0.00	
Total Consumption (I) Maximum Consumption Average Consumption (Weighted Average Cons Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Average Flow (I/s)	(l/s) sumption (l) lation (l/s) Flow Rate Litres/Min 8.00 6.00	(No.)	0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00		Total Consumption (I) Maximum Consumption Average Consumption Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4' Use of grey water an Total Grey water from W Total Availble Grey Water Possible Demand (I)	(I) I/s) sumption (I) lation (I/s) % I/p/d and harveste //HB taps (I) er Supply (I)	0.00 d rainwater 0 241.03 140.35	
Total Consumption (I) Maximum Consumption (I) Maximum Consumption (Weighted Average Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Average Flow (Vs) Weighted Average Flow	(l/s) sumption (l) lation (l/s) Flow Rate Litres/Min 8.00 6.00	(No.)	0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60		Total Consumption (I) Maximum Consumption (I) Maximum Consumption (Average Consumption (I) Weighted Average Consumption (I) Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4' Use of grey water all Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Cap	(I) I/s) sumption (I) lation (I/s) % I/p/d nd harveste //HB taps (I) er Supply (I) acity (I)	0.00 d rainwater 0 241.03 140.35 0.00	
Total Consumption (I) Maximum Consumption (I) Maximum Consumption (Weighted Average Consumption (Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No. Total Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s)	f (l) (l/s) sumption (l) lation (l/s) Flow Rate Litres/Min 8.00 6.00 b.)	(No.)	0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00		Total Consumption (I) Maximum Consumption Average Consumption Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4' Use of grey water an Total Grey water from W Total Availble Grey Water Possible Demand (I)	(I) I/s) sumption (I) lation (I/s) % I/p/d nd harveste //HB taps (I) er Supply (I) acity (I)	0.00 d rainwater 0 241.03 140.35	
Total Consumption (I) Maximum Consumption (I) Maximum Consumption (Average Consumption (Average Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm	r (l/s) sumption (l) lation (l/s) Flow Rate Litres/Min 8.00 6.00 c.)	(No.) 1 1 1 2	0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00	Fiyed	Total Consumption (I) Maximum Consumption (I) Maximum Consumption (Weighted Average Consumption (I) Weighted Average Consumption for Calculation (I) Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4 Use of grey water and Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Cap Figure for Calculation In	(I) I/s) sumption (I) lation (I/s) % I/p/d nd harveste //HB taps (I) er Supply (I) acity (I)	0.00 d rainwater 0 241.03 140.35 0.00	
Total Consumption (I) Maximum Consumption (I) Maximum Consumption (Weighted Average Consumption (I) Weighted Average Consumption (I) Weighted Average Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (Notational Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessminstallation Type	Flow Rate Litres/Min 8.00 6.00 b.) (I/s) Flow Rate Litres/Min 8.00 6.00 Unit	(No.) 1 1 2 Capacity/ Flow Rate	0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor	(l/p/day)	Total Consumption (I) Maximum Consumption (I) Maximum Consumption (Average Consumption (I) Weighted Average Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4' Use of grey water al Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Cap Figure for Calculation lift Total Use (I/p/day)	(I) I/s) sumption (I) lation (I/s) % I/p/d and harveste //HB taps (I) er Supply (I) acity (I) I/person/day	0.00 d rainwater 0 241.03 140.35 0.00	
Total Consumption (I) Maximum Consumption (I) Maximum Consumption (Average Consumption (I) Weighted Average Consumption (I) Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type WC Single Flush	(l/s) sumption (l) lation (l/s) Flow Rate Litres/Min 8.00 6.00 o.)	(No.) 1 1 2 Capacity/ Flow Rate 0.00	0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor	(l/p/day) 0.00	Total Consumption (I) Maximum Consumption (I) Maximum Consumption (Average Consumption (I) Weighted Average Consumption (I) Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4' Use of grey water an Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Cap Figure for Calculation li Total Use (I/p/day) 0.00	(I) I/s) sumption (I) lation (I/s) % I/p/d nd harveste //HB taps (I) er Supply (I) acity (I) t/person/day	0.00 d rainwater 0 241.03 140.35 0.00	
Total Consumption (I) Maximum Consumption Average Consumption Weighted Average Cons Consumption for Calcul Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Average Flow (I/s)	Flow Rate Litres/Min 8.00 6.00 C(l/s) Unit Volume (l) Full Flush (l)	(No.) 1 1 2 2 Capacity/ Flow Rate 0.00 0.00	0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.46	(l/p/day) 0.00 0.00	Total Consumption (I) Maximum Consumption (I) Maximum Consumption (Average Consumption (I) Weighted Average Consumption (I) Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4' Use of grey water all Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Cap Figure for Calculation Ii Total Use (I/p/day) 0.00 0.00	(I) I/s) Sumption (I) Iation (I/s) % I/p/d and harveste I/HB taps (I) er Supply (I) acity (I) t/person/day	0.00 d rainwater 0 241.03 140.35 0.00	
Total Consumption (I) Maximum Consumption (I) Maximum Consumption (Weighted Average Consumption (I) Weighted Average Consumption (I) Weighted Average Consumption (I) Total No. of Fittings (Notation (I) Total Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type WC Single Flush WC Dual Flush	(l/s) sumption (l) lation (l/s) Flow Rate Litres/Min 8.00 6.00 o.)	(No.) 1 1 2 Capacity/ Flow Rate 0.00	0.80 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.46	(l/p/day) 0.00	Total Consumption (I) Maximum Consumption (I) Maximum Consumption (Average Consumption (I) Weighted Average Consumption (I) Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4' Use of grey water an Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Cap Figure for Calculation li Total Use (I/p/day) 0.00	(I) I/s) sumption (I) lation (I/s) % I/p/d and harveste //HB taps (I) er Supply (I) acity (I) t/person/day	0.00 d rainwater 0 241.03 140.35 0.00	
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Appliance/Useage Deta Taps (Excluding Kitche Tap Fitting Type Flo Basin Type 1 Fotal No. of Fittings (No.) Fotal Flow (I/s) Maximum Flow (I/s) Meighted Average Flow (I/s) Baths Bath Type Calculation (I/s) Baths Bath Type Calculation (I/s) Flow for Calculation (I/s) Maximum Capacity (I) Maximum Capacity (I) Maximum Capacity (I) Moreover Capacity for Calculation (I) Dishwashers Dishwashe	ails en Taps; when Taps; sen Taps; s	Quantity (No.) Quantity (No.) Quantity (No.) Quantity (No.)	Total per Fitting type 22.40 0.00 0.00 0.00 0.00 5.60 Total per Fitting type 540.00 0.00 0.00 180.00 180.00 Total per Fitting type 540.00 180.00 180.00		Case Reference Occupancy for Calculation Showers Shower fitting Type Bath 1 Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) WCs WC Type Standard Dual Total number of fittings Average effective flushin Washing Machines Washing Machine Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption (I)	Flow Rate Litres/Min 6.50 (I/s)) Full Flush Volume 4.50 L per Kg Dry Load 6.00 .)	Part Flush Volume 3.00	19.50 0.00 0.00 0.00 19.55 6.55 6.55 4.55 6.56 Quantity (No) 3.56 Total per Fitting type 6.00 0.00 6.00
Appliance/Useage Deta Taps (Excluding Kitche Tap Fitting Type Flo Litt Basin Type 1 Fotal No. of Fittings (No.) Fotal Flow (I/s) Average Flow (I/s) Baths Bath Type Cal Overage Capacity (I) Maximum Capacity (I) Maximum Capacity (I) Maximum Capacity (I) Average Capacity (I) Maximum Capacity (I) Maximum Capacity (I) Average Capacity (I) Capacity for Calculation (I) Dishwashers Dishwasher Type L p Etal Dishwashers Dishwashers Dishwashers Dishwasher I'ye Dishwashers Dishwashers Dishwasher I'ye Dishwashers Dishwasher I'ye Dishwashers Dishwashers Dishwashers Dishwashers Dishwashers Dishwashers Dishwashers Dishwashers Dishwashers Dishwasher I'ye Dishwashers Dishwashers Dishwashers Dishwashers Dishwasher I'ye Dishwashers Dishwashers Dishwashers Dishwashers Dishwasher I'ye Dishwashers	pacity to rerflow 180.00 (I) (I) per Place titing 0.80	Quantity (No.) Quantity (No.) Quantity (No.) Quantity (No.)	Fitting type 22.40 0.00 0.00 0.00 0.00 5.60 Total per Fitting type 540.00 0.00 180.00 180.00 Total per Fitting type 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.		Showers Shower fitting Type Bath 1 Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) WCs WC Type Standard Dual Total number of fittings Average effective flushing Washing Machines Washing Machine Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption (I)	Flow Rate Litres/Min 6.50 (I/s)) Full Flush Volume 4.50 L per Kg Dry Load 6.00 .)	Part Flush Volume 3.00 Quantity (No.)	Fitting type 19.56 0.00 0.00 0.00 19.56 6.56 6.56 4.59 Quantity (No) Total per Fitting type 6.00 0.00 6.00
Taps (Excluding Kitche Tap Fitting Type Flo Litt Basin Type 1 Fotal No. of Fittings (No.) Fotal Flow (I/s) Meximum Flow (I/s) Meighted Average Flow (I/s) Bath 1 Fotal No. of Fittings (No.) Fotal Capacity (I) Maximum Capacity (I) Maximum Capacity (I) Meighted Average Capacity (I) Meighted Average Capacity (I) Maximum Capacity (I) More Capacity (I) Mo	en Taps; bw Rate res/Min 5.60 5.60 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1	Quantity (No.) 4 Quantity (No.) 3 Quantity (No.)	Fitting type 22.40 0.00 0.00 0.00 0.00 5.60 Total per Fitting type 540.00 0.00 180.00 180.00 Total per Fitting type 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.		Shower fitting Type Bath 1 Total No. of Fittings (No Total Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) WCs WC Type Standard Dual Total number of fittings Average effective flushin Washing Machine Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption (I)	Litres/Min 6.50 6.50 (I/s)) Full Flush Volume 4.50 L per Kg Dry Load 6.00	Part Flush Volume 3.00 Quantity (No.)	Fitting type 19.56 0.00 0.00 0.00 19.56 6.56 6.56 4.55 6.56 (No) Quantity (No) 5 Total per Fitting type 6.00 0.00 6.00
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Maximum Flow (I/s) Average Flow (I/s) Average Flow (I/s) Meighted Average Flow (I/s) Flow for Calculation (I/s) Baths Bath Type Calculation (I/s) Bath 1 Fotal No. of Fittings (No.) Fotal Capacity (I) Maximum Capacity (I) Average Capacity (I) Capacity for Calculation (I) Dishwashers Dishwasher Type L p Set Fotal No. of Fittings (No.) Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Average Consumption (I/s) Weighted Average Consumption for Calculation Kitchen Taps Fap Fitting Type Flow Litt Main Sink Cold Main Sink Hot Fotal No. of Fittings (No.) Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Average Flow (I/s) Veighted Average Flow (I/s) Veighted Average Flow (I/s) Veighted Average Flow (I/s) Veighted Average Flow (I/s)	pacity to verflow 180.00 (I) per Place titing 0.80	Quantity (No.)	5.60 5.60 3.92 5.60 Total per Fitting type 540.00 0.00 180.00 180.00 180.00 Total per Fitting type 0.80 0.80 0.80 0.80		Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) WCs WC Type Standard Dual Total number of fittings Average effective flushin Washing Machines Washing Machine Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption (I)	Full Flush Volume 4.50 A per Kg Dry Load 6.00	Volume 3.00 Quantity (No.)	6.56 6.57 4.58 6.50 Quantity (No) 3.56 Total per Fitting type 6.00 0.00 6.00
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Ovidant 1 Fotal No. of Fittings (No.) Fotal Capacity (I) Maximum Capacity (I) Weighted Average Capacity Capacity for Calculation (I) Dishwashers Dishwasher Type L p Set FBC Fotal No. of Fittings (No.) Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Maximum Consumption for Calculation Kitchen Taps Fap Fitting Type Flo Litt Main Sink Cold Main Sink Hot Fotal No. of Fittings (No.) Fotal Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Meighted Average Flow (I/s) Weighted Average Flow (I/s) Weighted Average Flow (I/s)	/ (I) Der Place tting 0.80	Quantity (No.)	540.00 0.00 0.00 180.0		Total number of fittings Average effective flushin Washing Machine Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption	Volume 4.50 ng volume L per Kg Dry Load 6.00	Volume 3.00 Quantity (No.)	Total per Fitting type 6.0 0.00 6.00
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Total Capacity (I) Maximum Capacity (I) Average Capacity (I) Average Capacity (I) Average Capacity (I) Capacity for Calculation (I) Dishwashers Dishwasher Type L p Set TEC Fotal No. of Fittings (No.) Fotal Consumption (I) Maximum Consumption (I) Average Consumption (I/s) Weighted Average Consumption for Calculation Kitchen Taps Fap Fitting Type John John Cold Main Sink Cold Main Sink Hot Fotal No. of Fittings (No.) Fotal Flow (I/s) Average Flow (I/s) Average Flow (I/s) Average Flow (I/s) Veighted Average Flow (I/s)	oer Place tting 0.80	Quantity (No.)	540.00 180.00 180.00 126.00 180.00 Total per Fitting type 0.80 0.00		Washing Machines Washing Machine Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption	L per Kg Dry Load 6.00	(No.)	Total per Fitting type 6.00 0.00
Average Capacity (I) Weighted Average Capacity Capacity for Calculation (I) Dishwashers Dishwasher Type L p Set Total No. of Fittings (No.) Total Consumption (I) Average Consumption (I/s) Weighted Average Consumption (I/s) Consumption for Calculation Citchen Taps Tap Fitting Type Flo Litt Main Sink Cold Main Sink Hot Total No. of Fittings (No.) Total Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Verighted Average Flow (I/s) Veighted Average Flow (I/s)	oer Place tting 0.80	(No.)	180.00 126.00 180.00 Total per Fitting type 0.80 0.00 0.80 0.80 0.80		Washing Machines Washing Machine Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption	L per Kg Dry Load 6.00	(No.)	Total per Fitting type 6.00 0.00
Weighted Average Capacity Capacity for Calculation (I) Dishwashers Dishwasher Type L p Set TBC Total No. of Fittings (No.) Total Consumption (I) Maximum Consumption (Is) Weighted Average Consumption for Calculation Kitchen Taps Tap Fitting Type Flo Litt Main Sink Cold Main Sink Hot Total No. of Fittings (No.) Total Flow (Is) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow (I/s) Weighted Average Flow (I/s)	oer Place tting 0.80	(No.)	126.00 180.00 Total per Fitting type 0.80 0.00 0.80 0.80 0.80		Washing Machine Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption	Dry Load 6.00	(No.)	Fitting type 6.00 0.00
Capacity for Calculation (I) Dishwashers Dishwasher Type L p Set Total No. of Fittings (No.) Fotal Consumption (I) Maximum Consumption (I/s) Weighted Average Consumption for Calculation Kitchen Taps Fap Fitting Type Floe Litt Main Sink Cold Main Sink Hot Fotal No. of Fittings (No.) Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Veighted Average Flow (I/s) Weighted Average Flow (I/s)	oer Place tting 0.80	(No.)	Total per Fitting type 0.80 0.00 0.80 0.80 0.80 0.80 0.80		Washing Machine Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption	Dry Load 6.00	(No.)	Fitting type 6.00 0.00
Dishwasher Type L p Set FBC Fotal No. of Fittings (No.) Fotal Consumption (I) Maximum Consumption (I/s) Weighted Average Consumption for Calculatio Kitchen Taps Fap Fitting Type Flo Litt Main Sink Cold Main Sink Hot Fotal No. of Fittings (No.) Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Veighted Average Flow (I/s) Weighted Average Flow (I/s)	0.80 option (I)	(No.)	0.80 0.80 0.80 0.80 0.80 0.80		Washing Machine Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption	Dry Load 6.00	(No.)	Fitting type 6.00 0.00
Dishwasher Type L p Set FBC Fotal No. of Fittings (No.) Fotal Consumption (I) Maximum Consumption (I/s) Weighted Average Consumption for Calculatio Kitchen Taps Fap Fitting Type Flo Litt Main Sink Cold Main Sink Hot Fotal No. of Fittings (No.) Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Veighted Average Flow (I/s) Weighted Average Flow (I/s)	0.80 option (I)	(No.)	0.80 0.80 0.80 0.80 0.80 0.80		Washing Machine Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption	Dry Load 6.00	(No.)	Fitting type 6.00 0.00
Fotal No. of Fittings (No.) Fotal Consumption (I) Maximum Consumption (Is) Meighted Average Consumption for Calculation Kitchen Taps Fap Fitting Type Flo Litt Main Sink Cold Main Sink Hot Fotal No. of Fittings (No.) Fotal Flow (Is) Maximum Flow (I/s) Average Flow (I/s) Veighted Average Flow (I/s) Weighted Average Flow (I/s)	0.80 option (I)	(No.)	0.80 0.80 0.80 0.80 0.80 0.80		Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption	Dry Load 6.00	(No.)	Fitting type 6.00 0.00
FIGO Fotal No. of Fittings (No.) Fotal Consumption (I) Maximum Consumption (I/s) Weighted Average Consumption for Calculatio Kitchen Taps Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No.) Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow (I/s) Weighted Average Flow (I/s)	0.80		0.80 0.80 0.80 0.80		TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption	6.00		6.00 0.00
Total Consumption (I) Alaximum Consumption (I) Average Consumption (I/s) Average Consumption (I/s) Veighted Average Consumption for Calculation Consumption for Calculation Citchen Taps Tap Fitting Type Flow Litt Alain Sink Cold Alain Sink Hot Total No. of Fittings (No.) Total Flow (I/s) Average Flow (I/s) Veighted Average Flow (I/s) Veighted Average Flow (I/s)		1	0.80 0.80 0.80		Total Consumption (I) Maximum Consumption		1	6.0
Fotal Consumption (i) Maximum Consumption (l) Average Consumption (l) Average Consumption (l) Weighted Average Consump Consumption for Calculation Kitchen Taps Fap Fitting Type Flo Litt Main Sink Cold Main Sink Hot Fotal No. of Fittings (No.) Fotal Flow (I/s) Average Flow (I/s) Weighted Average Flow (I/s) Weighted Average Flow (I/s)		,	0.80 0.80		Total Consumption (I) Maximum Consumption		,	
Average Consumption (I/s) Weighted Average Consumption for Calculation Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No.) Fotal Flow (I/s) Average Flow (I/s) Weighted Average Flow (I/s)			0.80			(1)		0.00
Weighted Average Consumption for Calculation Kitchen Taps Fap Fitting Type Flo Litt Main Sink Cold Main Sink Hot Fotal No. of Fittings (No.) Fotal Flow (I/s) Average Flow (I/s) Weighted Average Flow (I/s) Weighted Average Flow (I/s)								6.00
Consumption for Calculation Kitchen Taps Fap Fitting Type Flow Main Sink Cold Main Sink Hot Fotal No. of Fittings (No.) Fotal Flow (I/s) Average Flow (I/s) Weighted Average Flow (I/s) Weighted Average Flow (I/s)			0.50		Average Consumption (I Weighted Average Cons			6.0 4.2
Flor Fitting Type Flor Litt Main Sink Cold Main Sink Hot Fotal No. of Fittings (No.) Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow (I/s)			0.80		Consumption for Calcul			6.0
Tap Fitting Type Flo Litt Main Sink Cold Main Sink Hot Fotal No. of Fittings (No.) Fotal Flow (I/s) Average Flow (I/s) Weighted Average Flow (I/s)					Other Fittings			
Main Sink Cold Main Sink Hot Fotal No. of Fittings (No.) Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow (I/s)	ow Rate	Quantity	Total per		Waste Disposal Y/N		0	1
Main Sink Hot Fotal No. of Fittings (No.) Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow (I/s)	res/Min	(No.)	Fitting type		Water softner			
Fotal No. of Fittings (No.) Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow (I/s)	8.00				Consumption beyond 49	% I/p/d	0.00	
Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow (I/s)	6.00	1	6.00 0.00		Use of grey water ar	nd harveste	d rainwater	
Maximum Flow (I/s) Average Flow (I/s) Neighted Average Flow (I/s)		2	_		occ or groy mater ar	14 1141 10010	a rammato.	
Average Flow (I/s) Neighted Average Flow (I/s)			14.00		Total Grey water from W		0	
Weighted Average Flow (I/s)			8.00 7.00		Total Availble Grey Water Possible Demand (I)	er Supply (I)	192.82 112.28	
Flow for Calculation (I/s)	;)		5.60		Grey/Rain Installed Capa	acity (I)	0.00	
			7.00		Figure for Calculation lit	t/person/day	0.00	
Water Use Assessment	t							
nstallation Type Uni	it	Capacity/	Use Factor		Total Use			
WC Single Flush Vol	lume (I)	Flow Rate	4.42	(l/p/day) 0.00	(I/p/day) 0.00			
	Il Flush (I)			0.00				
Pt i	Flush (I)	0.00	2.96	0.00	0.00			
	lume (I) w Rate	3.50 5.60		0.00 1.58				
Bath (shower present) (I/s)		180.00		0.00				
Shower (bath present) (1/s)		6.50	4.37	0.00	28.41			
Bath Only (I) Shower Only (I/s)	.)	0.00		0.00				
Snower Only (1/s) Kitchen Taps (1/s)	,	7.00		10.36				
Washing Machines (I/kg	gdry)	6.00	2.10	0.00	12.60			
	olace)	0.80		0.00				
Vaste Disposal (I/s) Vater Softner (I/s)		0.00		0.00				
Fotal Calculated Water Use	,	0.00	1.00	0.00	103.02			
Grey/RainWater Reused (I)					0.00			
Normalisation Factor (Fa	actor)				0.91 93.75			
External Water Use Allowance								
Total Comsumption Part G	0 (1)				5 00			
Assesment Result					5.00 98.75			

Project Details								
Adress/Reference Number of Bedrooms	39 Fitzjohns 2	Avenue NW3			Case Reference Occupancy for Calculation	FF01		
		J			Occupancy for Galculation	i i diposes		
Appliance/Useage D					Chamara			
Γaps (Excluding Kitα Γap Fitting Type	cnen Taps) Flow Rate	Quantity	Total per		Showers Shower fitting	Flow Rate	Quantity	Total per
	Litres/Min	(No.)	Fitting type		Туре	Litres/Min	(No.)	Fitting typ
Basin Type 1	5.60	1	5.60 0.00		Bath 1	6.50	1	6. 0.
			0.00					0.
			0.00					0. 0.
			0.00			,		0.
Гotal No. of Fittings (No. Гotal Flow (I/s)	.)	1	5.60		Total No. of Fittings (No. Total Flow (I/s)	.)	1	6.
Maximum Flow (I/s)			5.60		Maximum Flow (I/s)			6.
Average Flow (I/s) Weighted Average Flow	(I/s)		5.60 3.92		Average Flow (I/s) Weighted Average Flow	(I/s)		6. 4.
Flow for Calculation (I/s)			5.60		Flow for Calculation (I/s)			6.
Baths					WCs			
Bath Type	Capacity to Overflow		Total per		WC Type	Full Flush	Part Flush	Quantity
Sath 1	180.00	(No.)	Fitting type 180.00		WC Type Standard Dual	Volume 4.50	Volume 3.00	(No)
			0.00					
			0.00 0.00					
Total No. of Fittings (No.	.)	1	•		Total number of Cur			
Fotal Capacity (I) Maximum Capacity (I)			180.00 180.00		Total number of fittings Average effective flushing	ng volume		N
Average Capacity (I)	- i4 (1)		180.00					
Weighted Average Capa Capacity for Calculation			126.00 180.00					
Dishwashers					Washing Machines			
							Ougatitus	Total per
Dishwasher Type	L per Place		Total per		Washing Machine	L per Kg	Quantity	
	L per Place Setting 0.80	(No.)	Fitting type 0.80		Washing Machine Type TBC	L per Kg Dry Load 6.00	(No.)	Fitting typ
Dishwasher Type	Setting 0.80	(No.)	Fitting type		Type TBC	Dry Load 6.00	(No.)	Fitting typ
	Setting 0.80	(No.)	Fitting type 0.80		Туре	Dry Load 6.00	(No.)	Fitting typ
TBC Total No. of Fittings (No. Total Consumption (I) Maximum Consumption	0.80 0.80 0.80	(No.)	Fitting type 0.80 0.00 0.80 0.80 0.80		Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption	6.00 6.00 (I)	(No.)	6. 6. 6.
TBC Total No. of Fittings (No. Total Consumption (I)	0.80 0.80 0.80 0.80	(No.)	0.80 0.80 0.00		Type TBC Total No. of Fittings (No Total Consumption (I)	6.00 6.00 (I) /s)	(No.)	6. 6. 6. 6.
Total No. of Fittings (No. Fotal Consumption (I) Maximum Consumption (I) Average Consumption (I	O.80 O.80 O.80 O.80 O.80 O.80 O.80 O.80	(No.)	0.80 0.80 0.80 0.80 0.80 0.80		Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption (I) Average Consumption (I)	Dry Load 6.00 (I) /s) umption (I)	(No.)	Fitting typ 6. 0. 6. 6. 6. 4.
Total No. of Fittings (No. Fotal Consumption (I) Maximum Consumption (I) Average Consumption (I) Weighted Average Cons Consumption for Calculation	O.80 O.80 O.80 O.80 O.80 O.80 O.80 O.80	(No.)	0.80 0.80 0.80 0.80 0.80 0.80 0.80 0.56		Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption (I) Weighted Average Cons	Dry Load 6.00 (I) /s) umption (I)	(No.)	6. 6. 6. 6. 4.
Total No. of Fittings (No. Fotal Consumption (I) Maximum Consumption (I) Average Consumption (I) Weighted Average Cons	O.80 (I) //s) umption (I) ation (I/s)	(No.) 1	Fitting type 0.80 0.00 0.80 0.80 0.80 0.56 0.80 Total per		Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption (I) Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N	Dry Load 6.00 (I) /s) umption (I)	(No.)	Fitting typ 6.
Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Weighted Average Consumption for Calcula Kitchen Taps	O.80 (I) //s) umption (I) ation (I/s) Flow Rate Litres/Min 8.00	Quantity (No.)	Fitting type		Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption (I) Weighted Average Consumption for Calcul Other Fittings	Dry Load 6.00 (I) //s) umption (I) ation (I/s)	(No.) 1	6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6
Total No. of Fittings (No. Fotal Consumption (I) Maximum Consumption (I) Meighted Average Consumption for Calculation (I) Kitchen Taps	O.80 (I) (I) //s) umption (I) ation (I/s) Flow Rate Litres/Min	Quantity (No.)	Fitting type 0.80 0.00 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00		Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption Average Consumption Weighted Average Cons Consumption for Calcula Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49	Dry Load 6.00 (I) (s) umption (I) ation (I/s)	0 0 0.00	Fitting typ 6.0.0.6.6.6.6.6.6.46.6.
Total No. of Fittings (No. Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Weighted Average Cons Consumption for Calcula Kitchen Taps Tap Fitting Type Main Sink Cold	Setting 0.80 (I) (Is) umption (I) ation (I/s) Flow Rate Litres/Min 8.00 6.00	Quantity (No.)	Fitting type 0.80 0.00 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00		Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption (I) Weighted Average Cons Consumption for Calcul- Other Fittings Waste Disposal Y/N Water softner	Dry Load 6.00 (I) (s) umption (I) ation (I/s)	0 0 0.00	Fitting typ 6.0.0.6.6.6.6.6.6.46.6.
Total No. of Fittings (No. Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Weighted Average Consconsumption for Calcula Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No. Fotal Flow (I/s)	Setting 0.80 (I) (Is) umption (I) ation (I/s) Flow Rate Litres/Min 8.00 6.00	Quantity (No.)	Fitting type 0.80 0.00 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00		Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption (I) Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 45 Use of grey water ar	Dry Load 6.00 (I) /s) umption (I) ation (I/s) % I/p/d and harvestee HB taps (I)	0 0.00 d rainwater	Fitting typ 6. 0. 6. 6. 4. 6.
Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption for Calcula Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No.	Setting 0.80 (I) (Is) umption (I) ation (I/s) Flow Rate Litres/Min 8.00 6.00	Quantity (No.)	Fitting type 0.80 0.00 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00		Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption (I) Meighted Average Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water ar	Dry Load 6.00 (I) /s) umption (I) ation (I/s) % I/p/d and harvestee HB taps (I)	0 0.00 d rainwater	Fitting typ 6. 0. 6. 6. 4. 6.
Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption for Calcula Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No. Total Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow	Setting 0.80 (I) //s) umption (I) ation (I/s) Flow Rate Litres/Min 8.00 6.00 (I/s)	Quantity (No.)	Fitting type 0.80 0.00 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60		Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption (I) Weighted Average Cons Consumption for Calcula Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water ar Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Capa	Dry Load 6.00 (I) (s) umption (I) ation (I/s) // I/p/d and harvestee HB taps (I) er Supply (I) acity (I)	0 0.00 d rainwater 0 144.62 84.15 0.00	Fitting typ 6. 0. 6. 6. 4. 6.
FIGO Fotal No. of Fittings (No. Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption (I) Weighted Average Consumption for Calculation Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No. Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s)	Setting 0.80 (I) //s) umption (I) ation (I/s) Flow Rate Litres/Min 6.00 6.00	Quantity (No.)	Fitting type 0.80 0.00 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00		Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption Average Consumption Weighted Average Cons Consumption for Calcula Other Fittings Waste Disposal Y/N Water softner Consumption beyond 45 Use of grey water ar Total Grey water from W Total Availble Grey Wate Possible Demand (I)	Dry Load 6.00 (I) (s) umption (I) ation (I/s) // I/p/d and harvestee HB taps (I) er Supply (I) acity (I)	0 0.00 d rainwater	Fitting typ 6. 0. 6. 6. 4. 6.
FIGO Fotal No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consconsumption for Calcula Kitchen Taps Fotal Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No. Fotal Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm	Setting 0.80 (I) //s) umption (I) ation (I/s) Flow Rate Litres/Min 8.00 6.00 (I/s)	Quantity (No.)	Total per Fitting type 0.80 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00		Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption (I) Weighted Average Cons Consumption for Calcul Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water ar Total Grey water from W Total Availble Grey Wate Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit	Dry Load 6.00 (I) (s) umption (I) ation (I/s) // I/p/d and harvestee HB taps (I) er Supply (I) acity (I)	0 0.00 d rainwater 0 144.62 84.15 0.00	Fitting typ 6. 0. 6. 6. 4. 6.
Focal No. of Fittings (No. Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption (I) Meighted Average Consumption for Calculation Consumption for Calculation Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No. Fotal Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type	Setting 0.80 (I) (I) (Is) umption (I) ation (I/s) Flow Rate Litres/Min 8.00 6.00 (I/s) (I/s) Unit	Quantity (No.) 1 Capacity/ Flow Rate	Fitting type	Fixed use (//p/day)	Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption Average Consumption Weighted Average Cons Consumption for Calcula Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water ar Total Grey water from W Total Availible Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lite Total Use (I/p/day)	Dry Load 6.00 (I) (s) umption (I) ation (I/s) // I/p/d and harvestee HB taps (I) er Supply (I) acity (I)	0 0.00 d rainwater 0 144.62 84.15 0.00	Fitting typ 6. 0. 6. 6. 4. 6.
Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption for Calculation Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No. Total Flow (I/s) Maximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type WC Single Flush	Setting 0.80 (I) //s) umption (I) ation (I/s) Flow Rate Litres/Min 8.00 6.00 (I/s) unit Volume (I)	Quantity (No.) 1 Capacity/ Flow Rate 0.00	Fitting type	Fixed use (l/p/day) 0.00	Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption (I) Meighted Average Consumption for Calculation	Dry Load 6.00 (I) (s) umption (I) ation (I/s) // I/p/d and harvestee HB taps (I) er Supply (I) acity (I)	0 0.00 d rainwater 0 144.62 84.15 0.00	Fitting typ 6. 0. 6. 6. 4. 6.
For a large of the control of the co	Setting 0.80 (I) //s) umption (I) ation (I/s) Flow Rate Litres/Min 8.00 6.00 (I/s) (I/s) umption (I) Full Flush (I) Pt Flush (I)	Quantity (No.) 1 Capacity/ Flow Rate 0.00 4.50 3.00	Fitting type 0.80 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 7.00 5.60 7.00 Use Factor 4.42 1.46 2.96	Fixed use (//p/day) 0.00 0.00 0.00	Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption Average Consumption (Weighted Average Consumption (I) Other Fittings Waste Disposal Y/N Water softner Consumption beyond 45 Use of grey water ar Total Grey water from W Total Avaiible Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 6.57 8.88	Dry Load 6.00 (I) (s) umption (I) ation (I/s) // I/p/d and harvestee HB taps (I) er Supply (I) acity (I)	0 0.00 d rainwater 0 144.62 84.15 0.00	Fitting typ 6. 0. 6. 6. 4. 6.
Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption (I) Meighted Average Consumption (I) Consumption for Calculation Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Main Sink Hot Total Ro. of Fittings (No. Total Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type MC Single Flush MC Dual Flush MC's (Multiple)	Setting 0.80 (I) (I) (Is) umption (I) ation (I/s) Flow Rate Litres/Min 8.00 6.00 (I/s) Unit Volume (I) Pt Flush (I) Volume (I) Volume (I) Volume (I)	Quantity (No.) 1 Capacity/ Flow Rate 0.00 4.50 3.00 0.00	Fitting type 0.80 0.80 0.80 0.80 0.80 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 7.00 5.60 7.00 Use Factor 4.42 1.46 2.96 4.42	Fixed use (/p/day) 0.00 0.00 0.00 0.00	Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption Average Consumption Weighted Average Cons Consumption for Calcula Other Fittings Waste Disposal Y/N Water softner Consumption beyond 45 Use of grey water ar Total Grey water from W Total Avaiible Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 6.57 8.88 0.00	Dry Load 6.00 (I) (s) umption (I) ation (I/s) // I/p/d and harvestee HB taps (I) er Supply (I) acity (I)	0 0.00 d rainwater 0 144.62 84.15 0.00	Fitting typ 6. 0. 6. 6. 4. 6.
Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption for Calculation (I) Maximum Flow (I) Maximum Flow (I/s) Meighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type MC Single Flush MC Dual Flush MC's (Multiple) Taps Exc. Kitchen Bath (shower present)	Setting 0.80 (I) //s) umption (I) ation (I/s) Flow Rate Litres/Min 8.00 6.00 (I/s) Unit Volume (I) Full Flush (I) Volume (I) Flow Rate (I/s)	Quantity (No.) 1 Capacity/ Flow Rate 0.00 4.50 3.00 0.000 5.60 180.00	Total per Fitting type 0.80 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.58 0.11	Fixed use (l/p/day) 0.00 0.00 0.00 1.58 0.00	Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption (I) Weighted Average Consumption for Calcula Other Fittings Waste Disposal Y/N Water softner Consumption beyond 45 Use of grey water ar Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 6.57 8.88 0.000 10.43 19.80	Dry Load 6.00 (I) (s) umption (I) ation (I/s) // I/p/d and harvestee HB taps (I) er Supply (I) acity (I)	0 0.00 d rainwater 0 144.62 84.15 0.00	Fitting typ 6. 0. 6. 6. 4. 6.
FBC Fotal No. of Fittings (No. Fotal Consumption (I) Maximum Consumption (I) Meximum Consumption (I) Meighted Average Consumption (I) Meighted Average Consumption for Calculated (I) Fotal Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No. Fotal Flow (I/s) Meximum Flow (I/s) Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type MC Single Flush MC Single Flush MC's (Multiple) Flaps Exc. Kitchen Bath (shower present) Shower (bath present)	Setting 0.80 (I) //s) umption (I) ation (I/s) Flow Rate Litres/Min 8.00 6.00 (I/s) ent Unit Volume (I) Full Flush (I) Volume (I) Flow Rate (I/s) (I/s) (I/s) (I/s) (I/s) (I/s)	Quantity (No.) 1 Capacity/ Flow Rate 0.00 4.50 3.00 0.00 5.60 180.00 6.50	Total per Fitting type 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 5.60 7.00 Use Factor 4.42 1.46 2.96 4.42 1.58 0.11 4.37	Fixed use (I/p/day) 0.00 0.00 0.00 1.58 0.00 0.00	Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption Average Consumption (Weighted Average Consumption (I) Other Fittings Waste Disposal Y/N Water softner Consumption beyond 4st Use of grey water ar Total Grey water from W Total Avaiible Grey Wate Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 6.57 8.88 0.00 10.43 19.80 28.41	Dry Load 6.00 (I) (s) umption (I) ation (I/s) // I/p/d and harvestee HB taps (I) er Supply (I) acity (I)	0 0.00 d rainwater 0 144.62 84.15 0.00	Fitting typ 6. 0. 6. 6. 4. 6.
Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Maximum Consumption (Meighted Average Consumption for Calculation (I) Maximum Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No. Total Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type MC Single Flush MC Dual Flush MC's (Multiple) Taps Exc. Kitchen Bath (shower present) Shower (bath present) Bath Only Shower Only	Setting 0.80 (I) (I) (I/s) umption (I) ation (I/s) Flow Rate Litres/Min 8.00 6.00 (I/s) Unit Volume (I) Full Flush (I) Volume (I) Flow Rate (I/s)	Capacity/ Flow Rate 0.00 4.50 3.00 0.00 5.60 180.00 0.00 0.00 0.00	Fitting type 0.80 0.80 0.80 0.80 0.80 0.80 0.80 0.8	Fixed use (l/p/day) 0.00 0.00 0.00 1.58 0.00 0.00 0.00	Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption Average Consumption Weighted Average Cons Consumption for Calcula Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water ar Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 6.57 8.88 0.00 10.43 19.80 28.41 0.00 0.00	Dry Load 6.00 (I) (s) umption (I) ation (I/s) // I/p/d and harvestee HB taps (I) er Supply (I) acity (I)	0 0.00 d rainwater 0 144.62 84.15 0.00	Fitting typ 6. 0. 6. 6. 4. 6.
Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption for Calculation Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Total No. of Fittings (No. Total Flow (I/s) Maximum Flow (I/s) Meighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type WC Single Flush WC Dual Flush WC's (Multiple) Taps Exc. Kitchen Bath (shower present) Shower (bath present) Shower Only Kitchen Taps	0.80 0.80	Capacity/ (No.) 1 Capacity/ Flow Rate 0.00 4.50 3.00 0.00 5.60 180.00 0.00 0.00 7.00	Fitting type 0.80 0.80 0.80 0.80 0.80 0.80 0.56 0.80 Total per Fitting type 8.00 6.00 0.00 14.00 8.00 7.00 Use Factor 4.42 1.58 0.11 4.37 0.50 5.60 0.44	Fixed use (l/p/day) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 10.36	Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption (I) Weighted Average Consumption for Calcula Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water ar Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 6.57 8.88 0.000 10.43 19.80 28.41 0.000 0.000 13.44	Dry Load 6.00 (I) (s) umption (I) ation (I/s) // I/p/d and harvestee HB taps (I) er Supply (I) acity (I)	0 0.00 d rainwater 0 144.62 84.15 0.00	Fitting typ 6. 0. 6. 6. 4. 6.
Focal No. of Fittings (No. Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption for Calculation Kitchen Taps Tap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No. Fotal Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Meighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type NC Single Flush NC Dual Flush NC's (Multiple) Flaps Exc. Kitchen Bath (shower present) Bothower (bath present) Bothower Only Shower Only Kashing Machines Dishwashers	Setting 0.80 (I) (I) (Is) (Is) (Implied to the set of	Capacity/ (No.) 1 Capacity/ Flow Rate	Total per Fitting type 0.80 0.80 0.80 0.80 0.80 0.80 0.80 0.8	Fixed use (//p/day) 0.00 0.00 0.00 1.58 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0	Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption (I) Maximum Consumption Average Consumption (I) Weighted Average Cons Consumption for Calcula Other Fittings Waste Disposal Y/N Water softner Consumption beyond 45 Use of grey water ar Total Grey water from W Total Availible Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lite Total Use (I/p/day) 0.00 6.57 8.88 0.00 10.43 19.80 28.41 0.00 0.00 13.44 12.60 2.88	Dry Load 6.00 (I) (s) umption (I) ation (I/s) // I/p/d and harvestee HB taps (I) er Supply (I) acity (I)	0 0.00 d rainwater 0 144.62 84.15 0.00	Fitting typ 6. 0. 6. 6. 4. 6.
Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption (I) Meighted Average Consumption (I) Meighted Average Consumption (I) Main Sink Cold Main Sink Hot Total No. of Fittings (No. Total Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Meighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type WC Single Flush WC Dual Flush WC's (Multiple) Taps Exc. Kitchen Bath (shower present) Shower (bath present) Shower Only Kitchen Taps Washing Machines Dishwashers Waste Disposal	Setting 0.80 (I) //s) umption (I) ation (I/s) Flow Rate Litres/Min 8.00 6.00 (I/s) Unit Volume (I) Full Flush (I) Volume (I) Flow Rate (I/s)	Capacity/ Flow Rate 0.00 4.50 0.00 180.00 6.50 0.00 0.00 7.00 6.00 0.80 0.00	Fitting type	Fixed use (l/p/day) 0.00 0.00 0.00 1.58 0.00 0.00 10.36 0.00 0.00 0.00 0.00	Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption Average Consumption Weighted Average Cons Consumption for Calcula Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water ar Total Grey water from W Total Availible Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 6.57 8.88 0.00 10.43 19.80 28.41 0.00 0.00 13.44 12.60 2.88 0.00	Dry Load 6.00 (I) (s) umption (I) ation (I/s) // I/p/d and harvestee HB taps (I) er Supply (I) acity (I)	0 0.00 d rainwater 0 144.62 84.15 0.00	Fitting ty, 6. 6. 6. 6. 6.
For all No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption (I) Weighted Average Consumption for Calculated Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No. Total Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Meighted Average Flow Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type MC Single Flush MC Single Flush MC Dual Flush MC's (Multiple) Faps Exc. Kitchen Bath (shower present) Bath Only Shower (bath present) Bath Only Kitchen Taps Washing Machines Dishwashers Waste Disposal Water Softner Fotal Calculated Water L Fotal	Setting 0.80 (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	Capacity/ (No.) 1 Capacity/ Flow Rate	Total per Fitting type 0.80 0.80 0.80 0.80 0.80 0.80 0.80 0.8	Fixed use (//p/day) 0.00 0.00 0.00 1.58 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0	Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption (I) Weighted Average Consumption for Calculation Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water ar Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/Ip/day) 0.00 6.57 8.88 0.00 10.43 19.80 28.41 0.00 13.44 12.60 2.88 0.00 0.00 0.00 0.00 0.00 0.00 0.0	Dry Load 6.00 (I) (s) umption (I) ation (I/s) // I/p/d and harvestee HB taps (I) er Supply (I) acity (I)	0 0.00 d rainwater 0 144.62 84.15 0.00	Fitting typ 6. 0. 6. 6. 4. 6.
Fotal No. of Fittings (No. Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption for Calculation Kitchen Taps Fotal Fitting Type Main Sink Cold Main Sink Hot Fotal Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Maximum Flow (I/s) Meighted Average Flow (I/s) Meighted Average Flow (I/s) Water Use Assessm Installation Type MC Single Flush MC Dual Flush MC's (Multiple) Flaps Exc. Kitchen Bath (Shower present) Bothower (Dath present) Both Only Shower Only Kitchen Taps Washing Machines Dishwashers Waste Disposal Water Softner Fotal Calculated Water L Grey/RainWater Reused (I)	Setting 0.80 (I) (I) (I) (I) (I) (I) (I) (I) (I) (I	Capacity/ Flow Rate 0.00 4.50 0.00 180.00 0.00 7.00 0.00 0.80 0.00	Fitting type	Fixed use (l/p/day) 0.00 0.00 0.00 1.58 0.00 0.00 10.36 0.00 0.00 0.00 0.00	Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption Average Consumption (Weighted Average Consumption (I) Water Softner Consumption for Calculation Other Fittings Waste Disposal Y/N Water softner Consumption beyond 45 Use of grey water ar Total Grey water from W Total Avaiible Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 6.57 8.88 0.00 10.43 19.80 28.41 0.00 0.00 1.344 12.60 2.88 0.00 0.00 1.03.00 0.00 1.03.00 0.00	Dry Load 6.00 (I) (s) umption (I) ation (I/s) // I/p/d and harvestee HB taps (I) er Supply (I) acity (I)	0 0.00 d rainwater 0 144.62 84.15 0.00	Fitting ty, 6. 6. 6. 6. 6.
Fotal No. of Fittings (No. Fotal Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption (I) Meighted Average Consumption for Calculation Consumption for Calculation Kitchen Taps Fap Fitting Type Main Sink Cold Main Sink Hot Fotal No. of Fittings (No. Fotal Flow (I/s) Maximum Flow (I/s) More Use Assessm Installation Type MC Single Flush MC Single Flush MC Single Flush MC's (Multiple) Faps Exc. Kitchen Bath (Shower present) Shower (Dath present) Shower Only Kitchen Taps Mashing Machines Dishwashers Maste Disposal Mater Softner Fotal Calculated Water L Grey/RainWater Reused Normalisation Factor Fotal Consumption CSH	0.80 0.80	Capacity/ Flow Rate 0.00 4.50 0.00 180.00 0.00 7.00 0.00 0.80 0.00	Fitting type	Fixed use (l/p/day) 0.00 0.00 0.00 1.58 0.00 0.00 10.36 0.00 0.00 0.00 0.00	Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption (I) Maximum Consumption Average Consumption (I) Weighted Average Cons Consumption for Calcula Other Fittings Waste Disposal Y/N Water softner Consumption beyond 49 Use of grey water ar Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 6.57 8.88 0.00 10.43 19.80 28.41 0.00 10.43 19.80 28.41 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0	Dry Load 6.00 (I) (s) umption (I) ation (I/s) // I/p/d and harvestee HB taps (I) er Supply (I) acity (I)	0 0.00 d rainwater 0 144.62 84.15 0.00	Fitting ty, 6. 6. 6. 6. 6.
Total No. of Fittings (No. Total Consumption (I) Maximum Consumption (I) Maximum Consumption (I) Meighted Average Consumption for Calculation (I) Maximum Flow (I) Main Sink Cold Main Sink Hot Total No. of Fittings (No. Total Flow (I/s) Maximum Flow (I/s) Meighted Average Flow (I/s) Weighted Average Flow (I/s) Weighted Average Flow Flow for Calculation (I/s) Water Use Assessm Installation Type MC Single Flush MC Dual Flush MC's (Multiple) Taps Exc. Kitchen Bath (shower present) Shower (bath present) Bath Only Shower Only Kitchen Taps Washing Machines Dishwashers Waste Disposal Water Softner	Setting 0.80 (I) //s) umption (I) ation (I/s) Flow Rate Litres/Min 8.00 6.00 (I/s) ent Unit Volume (I) Full Flush (I) Volume (I) Flow Rate (I/s)	Capacity/ Flow Rate 0.00 4.50 0.00 180.00 0.00 7.00 0.00 0.80 0.00	Fitting type	Fixed use (l/p/day) 0.00 0.00 0.00 1.58 0.00 0.00 10.36 0.00 0.00 0.00 0.00	Type TBC Total No. of Fittings (No Total Consumption (I) Maximum Consumption (I) Maximum Consumption Average Consumption (I) Maximum Consumption Average Consumption Consumption for Calcula Other Fittings Waste Disposal Y/N Water softner Consumption beyond 45 Use of grey water ar Total Grey water from W Total Availble Grey Water Possible Demand (I) Grey/Rain Installed Capa Figure for Calculation lit Total Use (I/p/day) 0.00 6.57 8.88 0.00 10.43 19.80 28.41 0.00 0.00 13.44 12.60 2.88 0.00 0.00 0.00 0.00 0.00 0.00 0.0	Dry Load 6.00 (I) (s) umption (I) ation (I/s) // I/p/d and harvestee HB taps (I) er Supply (I) acity (I)	0 0.00 d rainwater 0 144.62 84.15 0.00	Fitting typ 6. 0. 6. 6. 4. 6.