

Address 303a Riverbank House 1 Putney Bridge Approach Fulham London SW6 3JD

> Telephone 020 3397 4452 Fax

020 3397 0036 Email reception@ mavensustainability.com

Website www.mavensustainability.com

SUSTAINABILITY & ENERGY STATEMENT

for

A NEW VICARAGE WITH SELF-CONTAINED APARTMENT OVER AND TWO ADDITIONAL DWELLINGS

at

ST PETERS VICARAGE, 53 BELSIZE SQUARE, LONDON NW3 4HY

14th April 2016

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Executive Summary

This Statement accompanies a detailed planning application for the demolition of the existing Vicarage and the constructed of a new terrace comprising a new Vicarage with a self-contained apartment over and two additional houses at 53, Belsize Square. The Statement includes an energy demand assessment showing how selected energy efficiency and renewable energy measures have been incorporated into the development design.

The Ministerial Statement made on the 25th March 2015 has withdrawn the Code for Sustainable Homes and the Government have proposed local authorities do not seek to impose Code planning conditions with immediate effect.

Working drawings have yet to be progressed but representative SAP calculations have been prepared based upon the detailed planning drawings and an assumed construction specification.

It is proposed to enhance the fabric insulation standards of the homes and to install a photovoltaic array of 4.578 kW. This will be comprised of 14, 327W panels, which will be dispersed as five panels on the upper (third storey) flat section of the two 4-bedroom houses and four panels on the upper roof of the Vicarage. The panels will be laid flat and therefore will not be visible. The output of the panels has been discounted to allow for the comprised orientation.

	Total Emissions kg CO ₂ /year	% Reduction
Baseline (Building Regulations TER)	10,114	-
Be Lean - after energy efficiency (DER)	9,401	7.05% (of TER)
Be Green - after efficiency and LZCs	7,399	26.84% (of TER)
Reduction in emissions from renewable technologies	2,002	21.29% (of DER)

The carbon dioxide emissions can be summarised as follows:

In addition the water efficiency target of 105 litres per person will be achieved for each of the units. This is in accordance with the now revoked Code for Sustainable Homes Level 4 and the London Plan.

1.0 Introduction

- 1.1 This report has been commissioned by Maven Plan and provides a Sustainability and Energy Statement for the proposed demolition of the existing Vicarage at 53, Belsize Square and the construction of a new Vicarage with self-contained apartment over and two new dwellings adjacent.
- 1.2 The report describes the methodology used in assessing the proposed development and the initiatives proposed.
- 1.3 The buildings will be designed and constructed to reduce energy demand and carbon dioxide emissions. The objective is to reduce the energy demand to an economic minimum by making investment in the parts of the homes that have the greatest impact on energy demand and are the most difficult and costly to change in the future, namely the building fabric. Once a cost effective structure has been designed, renewable technologies will be considered for installation to provide heat and/or electricity.

The following hierarchy will be followed:

- Lean reduce demand and consumption
- Clean increase energy efficiency
- Green provide low carbon renewable energy sources
- 1.4 The report has been prepared by Maven Sustainability who are Sustainability Consultants, licensedCode for Sustainable Homes, Ecohomes and BREEAM Domestic Refurbishment Assessors.

2.0 Planning Policy

National Policy

- 2.1 The UK Government published its sustainable development strategy in 1999 entitled "A better quality of life: A strategy for sustainable development in the UK". This sets out four main objectives for sustainable development in the UK:
 - Social progress that recognises the needs of everyone.
 - Effective protection of the environment.
 - Prudent use of natural resources.
 - Maintenance of high stable levels of economic growth and employment.
- 2.2 The Sustainable Communities: Building for the future, known colloquially as the Communities Plan was published in 2003. The Plan sets out a long-term programme of action for delivering sustainable communities in both urban and rural areas. It aims to tackle housing supply issues in the South East, low demand in other parts of the country, and the quality of our public spaces. The Communities Plan describes sustainable communities as: active, inclusive and safe, well run, environmentally sensitive, well designed and built, well connected, thriving, well served and fair for everyone.
- 2.3 The most relevant national planning policy guidance on sustainability is set out in:
 - National Planning Policy Framework 2012

"support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change, and encourage the reuse of existing resources, including conversion of existing buildings, and encourage the use of renewable resources (for example, by the development of renewable energy)"

Regional and Local Policies

- 2.4 The Development Plan comprises the London Plan (2015), the Camden Core Strategy 2010-2015 and the Camden Development Policies Document (adopted 2010).
- 2.5 **London Plan, published March 2015 –** the following policies are relevant to the application:

Policy 5.2 - Minimising carbon dioxide emissions

- A Development proposals should make the fullest contribution to minimising carbon dioxide emissions in accordance with the following energy hierarchy:
 - 1 Be lean: use less energy
 - 2 Be clean: supply energy efficiently
 - *3 Be green: use renewable energy*
- D As a minimum, energy assessments should include the following details:
 - a calculation of the energy demand and carbon dioxide emissions covered by the Building Regulations and, separately, the energy demand and carbon dioxide emissions from any other part of the development, including plant or equipment, that are not covered by the Building Regulations (see paragraph 5.22) at each stage of the energy hierarchy
 - *b* proposals to reduce carbon dioxide emissions through the energy efficient design of the site, buildings and services
 - c proposals to further reduce carbon dioxide emissions through the use of decentralised energy where feasible, such as district heating and cooling and combined heat and power (CHP)
 - *d* proposals to further reduce carbon dioxide emissions through the use of on-site renewable energy technologies.

Policy 5.3 - Sustainable design and construction

- A The highest standards of sustainable design and construction should be achieved in London to improve the environmental performance of new developments and to adapt to the effects of climate change over their lifetime.
- B Development proposals should demonstrate that sustainable design standards are integral to

the proposal, including its construction and operation, and ensure that they are considered at the beginning of the design process.

Policy 5.15 – Water Use and Supplies

- *B* Development should minimise the use of mains water by:
 - *a incorporating water saving measures and equipment*
 - b designing residential development so that mains water consumption would meet a target of 105 litres or less per head per day

2.6 Sustainable Design and Construction SPG – April 2014

The SPG provides Guidance on how schemes should comply with the London Plan and this Sustainability Statement has been prepared in accordance with the Guidance provided.

London Borough of Camden

2.7 Camden Core Strategy 2010-2015

The following policies are specifically relevant to this topic area and have been edited for clarity and relevance.

CS13 – Tackling climate change through promoting higher environmental standards

Reducing the effects of and adapting to climate change

The Council will require all development to take measures to 6minimise the effects of, and adapt to, climate change and encourage all development to meet the highest feasible environmental standards that are financially viable during construction and occupation by:

- a) ensuring patterns of land use that 6minimise the need to travel by car and help support local energy networks;
- b) promoting the efficient use of land and buildings;

- c) minimising carbon emissions from the redevelopment, construction and occupation of buildings by implementing, in order, all of the elements of the following energy hierarchy:
 - 1. ensuring developments use less energy,
 - 3. generating renewable energy on-site; and
- *d) ensuring buildings and spaces are designed to cope with, and m7inimise the effects of, climate change.*

Policy CS13 also requires, "developments to achieve a reduction in carbon dioxide emissions of 20% from on-site renewable energy generation"

2.8 Camden Development Policies Document (adopted 2010)

Development Policies DP22 – Promoting sustainable design and construction

The Council will require development to incorporate sustainable design and construction measures.

Schemes must:

- a) demonstrate how sustainable development principles, including the relevant measures set out in paragraph 22.5 below (this states that the Council will have regard to costs and feasibility), have been incorporated into the design and proposed implementation; and
- b) incorporate green or brown roofs and green walls wherever suitable.

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

c) expecting new build housing to meet Code for Sustainable Homes Level 3 by 2010 and Code Level 4 by 2013 and encouraging Code Level 6 (zero carbon) by 2016.*

The Council will require development to be resilient to climate change by ensuring schemes include appropriate climate change adaptation measures, such as:

- *f) summer shading and planting;*
- g) limiting run-off;
- *h)* reducing water consumption;
- *i)* reducing air pollution; and
- *j)* not locating vulnerable uses in basements in flood-prone areas.

* The Ministerial Statement made on the 25th March 2015 by the DCLG said,

"From the date the Deregulation Bill 2015 is given Royal Assent, local planning authorities and qualifying bodies preparing neighbourhood plans should not set in their emerging Local Plans, neighbourhood plans, or supplementary planning documents, any additional local technical standards or requirements relating to the construction, internal layout or performance of new dwellings. This includes any policy requiring any level of the Code for Sustainable Homes to be achieved by new development; the government has now withdrawn the code, aside from the management of legacy cases. Particular standards or requirements for energy performance are considered later in this statement."

"For the specific issue of energy performance, local planning authorities will continue to be able to set and apply policies in their Local Plans which require compliance with energy performance standards that exceed the energy requirements of Building Regulations until commencement of amendments to the Planning and Energy Act 2008 in the Deregulation Bill 2015."

"This is expected to happen alongside the introduction of zero carbon homes policy in late 2016. The government has stated that, from then, the energy performance requirements in Building Regulations will be set at a level equivalent to the (outgoing) Code for Sustainable Homes Level 4. Until the amendment is commenced, we would expect local planning authorities to take this statement of the government's intention into account in applying existing policies and not set conditions with requirements above a Code level 4 equivalent."

3.0 Assessment Methodology

- 3.1 The baseline energy demand and carbon dioxide emissions for the site have been calculated by preparing SAP calculations for representative units.
- 3.2 These calculations have been based upon certain assumptions as to the building specification and these are clarified below. These are not design calculations but serve to establish the environmental, technical and economic viability of various renewable and low carbon technologies.

Emission Factors

3.3 The CO_2 emission factors, where applicable, used throughout this report have been taken from the Building Regulation Approved Document L - 2013.

Fuel	kg CO₂/kWh
Natural Gas	0.216
Grid supplied electricity	0.519
Displaced electricity	0.519

3.4 In assessing this proposal we have also been informed by the following guidance:

London Sustainability Checklist

BRE Green Guide to Specification

The Building Research Establishment Green Guide to Specification lists building materials and components, and ranks their potential life cycle environmental impact.

4.0 Proposal

4.1 The proposal is for the demolition of the existing Vicarage and the erection of a new terrace of buildings comprising a new Vicarage with self-contained 1-bedroom apartment over and two new 4-bedroom terrace houses.

The accommodation schedule in detail is as follows;

Unit Type	No.	Area	Totals
		m²	m²
1-Bedroom apartment	1	65.0	65.0
3-Bedroom maisonette (Vicarage)	1	178.0	178.0
4-Bedroom terrace house	2	247.0	494.0
Total			737.0

5.0 Demand Reduction (Be Lean and Be Clean)

Design

- 5.1 The energy performance of a building is affected by the building design, its construction and its use. Whilst occupant behaviour is beyond the remit of this statement, better design and construction methods can significantly reduce the life cycle emissions of a building and assist the occupant to reduce consumption.
- 5.2 Sustainable design is not just about incorporating renewable technologies, buildings should be designed at the outset to provide suitable environmental conditions for the occupants whilst also consuming as little energy as practical. It is possible to exceed Building Regulations requirements (Part L 2013) through demand reduction measures alone, which typically include a combination of passive design measures (e.g. building design and efficient building fabric) and active design measures (e.g. variable speed motors)

Passive Design Measures

5.3 The passive design measures proposed include;

Passive Solar Gain

- 5.4 The architectural and structural features of a building will affect energy consumption and the use of natural daylight; orientation, thermal mass, shading and mitigation of wind exposure will reduce heating, cooling and lighting requirements.
- 5.5 The design and layout of the terrace within the site is in the context of surrounding development and respectful of the adjacent listed Church. However, the dwellings have been designed such that they all have multiple aspects and therefore benefit from good solar access throughout the day.

Efficient Building Fabric

Building Envelope

- 5.6 U-values of the dwelling envelope must meet Building Regulations Part L1A standards and further improvements to U-values will reduce the development heating requirements, favourably impacting in reduced energy demand.
- 5.7 The selection of high thermal density materials can help to stabilise temperature fluctuations in a building, reducing maximum demands on building services.
- 5.8 The construction will include external walls built in 350mm cavity construction with 100mm cavity wall insulation (CavityTherm XtraTherm or similar) and 50mm clear cavity. Ground floors will be insulated with 150mm Celotex PIR insulation or similar. Flat roofs will be insulated with at least 150mm 'Celotex' insulation or similar. The green roofs over the single-storey element will include 150mm PIR insulation over a concrete structure.
- 5.9 It is proposed to set maximum limits for the elemental U-values as follows;

Element	Proposed W/m ² K
External Walls	0.17
Flat roof (including green roof)	0.11
Floor	0.11
Windows	1.40

5.10 The increased thermal mass provided by traditional construction will assist in stabilising summer night-time.

Air Leakage

- 5.11 Large amounts of heat are lost in winter through air leakage from a building (also referred to as infiltration of air permeability) often through poor sealing of joints and openings in the building
- 5.12 ADL sets a minimum standard for air permeability of 10 m³ of air per hour per m² of envelope area, at 50Pa. Air tightness standards for the homes will be constructed to the 'Accredited Construction Details' as compiled by Department of Communities and Local Government (DCLG). These will average a 60% improvement over Building Regulations and will achieve a permeability of less than 4m³/hr/m².

Thermal Bridging

- 5.13 The significance of Thermal Bridging, as a potentially major source of fabric heat losses, is increasingly understood. Improving the U-values for the main building fabric without accurately addressing the Thermal Bridging is no longer an option and will not achieve the fabric energy efficiency and energy and CO₂ reduction targets set out in this strategy.
- 5.14 Accredited Construction Details (ACD's) have been developed to provide the performance standards required to achieve the higher energy efficiency requirements of the Building Regulations. The bridging losses have been calculated using SAP Appendix K Table 1.

Ventilation

5.15 As a result of increasing thermal efficiency and air tightness, Building Regulations Approved Document F was also revised in 2006 to address the possibility of overheating and poor air quality. Mechanical ventilation will be used for control of air quality although maximum use will be made of natural ventilation and night-time cooling.

Overheating

5.16 The possibility of summertime overheating is addressed by providing opening windows to provide natural ventilation and night cooling. The increased thermal mass provided by traditional construction will assist in stabilising summer night-time.

Active Design Measures

5.17 The active design measures proposed include;

Efficient Lighting and Controls

- 5.18 Throughout the scheme natural lighting will be optimised.
- 5.19 Approved Document L1A requires three in four light fittings (75%) to be dedicated low energy fittings. The development will exceed this and all light fittings will be of a dedicated energy efficient type.
- 5.20 External lighting will be fitted with time controls and light sensors to ensure illumination is restricted to required times. External lighting will be limited to a maximum fitting output of 150w. Daylight and PIR sensors will also be used in some communal areas and automatic dimming lights used in conjunction with the sensors.

6.0 Establishing Carbon Dioxide Emissions

- 6.1 Detailed working drawing design has not been carried out but SAP calculations have been prepared based upon the detailed planning drawings and an assumed specification. A SAP calculation has been prepared for the mid-terrace and end-terrace houses.
- 6.2 The energy efficiency measures described above have been included within the calculation. The calculation has been based upon the use of gas boilers installed to each unit.
- 6.6 The results from the SAP calculations are summarised as follows:

4-Bed Mid-terrace house 247 sq m	CO₂ TER	CO₂ DER
	kg CO ₂ /m ² /yr	kg CO ₂ /m ² /yr
Space Heating	9.44	8.41
Water heating	2.32	2.33
Electricity for pumps and fans	0.16	0.16
Electricity for lighting	1.37	1.37
Total SAP	13.29	12.27

4-Bed End-terrace house 247 sq m	CO ₂ TER kg CO ₂ /m²/yr	CO₂ DER kg CO₂/m²/yr
	kg CO ₂ /III /yi	Kg CO₂/111 / yi
Space Heating	10.10	9.14
Water heating	2.32	2.33
Electricity for pumps and fans	0.16	0.16
Electricity for lighting	1.37	1.37
Total SAP	13.94	13.00

6.7 Therefore the total TER and DER emissions from dwellings are;

Unit	Area	CO₂ TER	CO₂ BER/DER
	m²	kg CO₂/yr	kg CO₂/yr
Mid-terrace house	247.0	3,283	3,031
End-terrace units	490.0	6,831	6,370
Total		10,114	9,401

6.8 The Building Regulation maximum carbon dioxide emissions (based on the TER) are assessed as;

• 10,114 kg CO₂ per year

With the actual carbon dioxide emissions (based upon the DER) assessed as;

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• 9,401 kg CO₂ per year

The reduction in site CO_2 emissions as a result of the energy efficiency measures incorporated in the buildings are assessed as;

713 kg CO_2 per year, which equates to a reduction of 7.05%

7.0 Renewable Technologies

- 7.1 The energy demand established above has been used to test the viability of various renewable and low carbon technologies as follows.
- 7.2 This section determines the appropriateness of each renewable technology and considers the ability of each technology to comply with the planning requirements as set out above in Section 2.0.
- 7.3 The Government's Renewable Obligation defines renewable energy in the UK. The identified technologies are;
 - Small hydro-electric
 - Landfill and sewage gas
 - Onshore and offshore wind
 - Biomass
 - Tidal and wave power
 - Geothermal power
 - Solar
- 7.4 The use of landfill or sewage gas, offshore wind or any form of hydroelectric power is not suitable for the site due to its location. The remaining technologies are considered below;

Wind

- 7.5 Wind turbines are available in various sizes from large rotors able to supply whole communities to small roof or wall-mounted units for individual dwellings.
- 7.6 The Government wind speed database predicts local wind speeds at Belsize Square to be 5.6 m/s at 10m above ground level and 6.3 m/s at 25m above ground level. This is below the level generally required for commercial investment in large wind turbines and in addition the land take, potential for noise and signal interference make a large wind turbine unsuitable for this site.

7.7 Roof mounted turbines could be used at the development to generate small but valuable amounts of renewable electricity but the small output and contribution to total emissions means and investment would be small and purely tokenism.

Combined Heat and Power and Community Heating

- 7.8 Combined heat and power (CHP) also called co-generation is a de-centralised method of producing electricity from a fuel and 'capturing' the heat generated for us in buildings. The plant is essentially a small-scale electrical power station. The production and transportation of electricity via the National Grid is very inefficient with over 65% of the energy produced at the power station being lost to the atmosphere and through transportation.
- 7.9 Consequently CHP can demonstrate significant CO₂ savings and although not necessary classed as renewable energy (depending on the fuel used) the technology is low carbon.
- 7.10 For a CHP plant to be economic it needs to operate for as much of the time as possible (usually deemed to be in excess of 14 hours per day) and therefore the size of the unit is usually based upon the hot water load of the building (s) with additional boilers meeting the space heating demand.
- 7.11 Community heating schemes are similarly communal systems but seek to supply heat only without the electricity production. Therefore, unless using a biomass or biofuel a community heating system will not demonstrate significant CO₂ reductions
- 7.12 In order to optimise a combined heat and power system, the site needs is have a suitable minimum baseload. The baseload demand (hot water) for the dwellings is 7,950 kWh per year, which if using a micro CHP with an output of 12.5_{th} / 5.5_{e} would run for 1.74 hours per day. This is not viable and the use of CHP is therefore not proposed.

Ground Source Heat Pumps

- 7.13 Sub soil temperatures are reasonable constant and predictable in the UK, providing a store of the sun's energy throughout the year. Ground source heat pumps (GSHP) extract this low-grade heat and convert it to usable heat for space heating.
- 7.14 GSHP operates on a similar principle to refrigerators, transferring heat from a cool place to a warmer place. They operate most efficiently when providing space heating at a low temperature, typically via under floor heating or with low temperature radiators.
- 7.15 There are generally two types of installation being a bore-hole (open loop) and a closed loop system.
- 7.16 Open loop bore holes extract energy from ground water located deep below the surface and discharge the water back to the ground reservoir whereas closed loop systems circulate a fluid around a series of boreholes or horizontal 'slinky' and extract heat from the ground.
- 7.17 Ground source heat pumps could be used subject to satisfactory ground investigation to establish whether the sub-strata is appropriate. There is insufficient ground area to accommodate a 'slinky' system and a borehole system would be required.
- 7.18 Ground source heat pumps could theoretically be used but there is insufficient ground area to accommodate a horizontal system and a bore-hole system would be necessary.
- 7.19 Prohibitive costs of providing bore-holes mean this technology is not proposed for this scheme.

Solar

(i) Solar Water Heating

7.20 Solar hot water panels use the suns energy to directly heat water circulating through panels or pipes. The technology is simple and easily understood by purchasers.

- 7.21 Solar hot water heating panels are based generally around two types, which are available being 'flat plate collectors' and 'evacuated tubes'. Flat plate collectors can achieve an output of up to 1,124 kWh/year* and evacuated tubes can achieve outputs up to 1,365 kWh/year **
 - * Figures taken for Schuco Compact K
 - ** Figures taken from Riomay
- 7.22 Panels are traditionally roof mounted and for highest efficiencies should be mounted plus or minus30 degrees of due south.
- 7.23 The total hot water demand of the dwellings is 7,950 kWh per year and assuming panels would reduce energy demand by 50% the reduction in CO₂ emissions would be **859 kg CO₂ per year**, which equates to a reduction of **9.14%**. This is insufficient to meet the requirements of the planning policy and additional technologies would be required.
- 7.24 Solar hot water heating panels are not proposed.

ii) Photovoltaics

- 7.25 Photovoltaic panels (PV) provide clean silent electricity. They generate electricity during most daylight conditions although they are most efficient when exposed to direct sunlight or are orientated to face plus or minus 30 degrees of due south.
- 7.26 PV panels can be integrated into many different aspects of a development including roofs, walls, shading devices or architectural panels. The panels typically have an electrical warranty of 20-25 years and an expected system lifespan of 25-40 years.
- 7.27 As a result of the higher CO_2 emissions factors for electricity versus gas, PV can be effective where planning policies seek reduction is CO_2 emissions rather than production of renewable **energy**.
- 7.28 In order to avoid any panel installation impacting on the aesthetics of the development, any panels will be laid flat on the upper (third storey) flat roof. Assuming the use of 327W PV panels and discounting the output to 90% to account for the horizontal aspect, to achieve the 20% reduction in emissions required by the planning policy a total of 14 panels would be required.

- 7.29 There is sufficient space on the flat roof section (third storey) of each unit to accommodate the requisite number of panels.
- 7.30 Photovoltaic panels are an appropriate technology an array of 14 panels would reduce emissions by
 2,002 kg CO₂ per year, which equates to a reduction in the DER emissions of 21.29%.

Air Source Heat Pumps (ASHP)

- 7.31 Air sourced heat pumps operate using the same reverse refrigeration cycle as ground source heat pumps, however the initial heat energy is extracted from the external air rather than the ground. These heat pumps can be reversed to provide cooling to an area although this reduces the coefficient of performance of the pumps.
- 7.32 ASHP tend to have a lower coefficient of performance (CoP) than GSHP and with the emissions factor for electricity being 2.61 times that of gas (emissions factor is the weight of CO_2 emitted per kWh) installations with CoPs of less than this figure show little real saving in CO_2 emissions.
- 7.33 The efficiency of ASHPs can be significantly reduced where there is a high hot water demand and therefore their use is not appropriate for this site.

Other Technologies

7.34 New technologies are becoming available, which do not 'fit' into one of the above categories but which need to be considered and are regarded as low-carbon technologies.

Flue Gas Heat Recovery (FGHR)

7.35 One such system are flue gas heat recovery units. These devices are used in conjunction with gasfired boilers and recover the heat exhausted through the boiler flue.

8.0 Summary of Calculations and Proposals for Low-carbon and Renewable Technologies

- 8.1 The total site CO₂ emissions are calculated as **10,114 kg CO₂ per year** (TER) and **9,401 kg CO₂ per year** (DER).
- 8.2 To meet the requirements of the planning policy, the emissions need to be reduced by at least 20% through the installation of renewable technologies.
- 8.3 Various technologies are considered above and whilst wind turbines, combined heat and power, ground source and air source heat pumps and solar hot water heating panels are not considered appropriate the use of photovoltaic panels and flue-gas heat recovery units are considered feasible and viable. Flue-gas heat recovery units are regarded as 'low-carbon' and therefore do not qualify with the Council's requirement for renewable technologies.

Be Lean

8.4 The DER emissions are reduced from the TER emissions by **713 kg CO₂ per year**, which equates to a reduction of **7.05%** as a result of the energy efficiency measures.

Be Green

- 8.5 It is proposed to install a total of 14, 327W photovoltaic panels. There is sufficient space available on the third floor flat roof portion of each unit and the panels are shown on the Roof Plan within the architectural drawing pack. The panels will be dispersed as five panels for each of the 4-bedroom houses and four panels for the Vicarage. The panels will be laid flat and their output has been discounted to 90% of the maximum to allow for the compromised orientation.
- 8.6 The reduction in emissions as a result of renewable technologies is **2,002 kg CO₂ per year**, which as a percentage of the total site emissions equates to **21.29%** (% of DER).
- 8.7 The total emissions following energy efficiency measures, low-carbon and renewables technologies are 2,715 kg CO₂ per year, which equates to a reduction of 26.84% (% of TER).

9.0 Climate change adaption and Water resources

Sustainable Drainage Systems (SUDS)

- 9.1 The site lies within Flood Zone 1 and there is a low risk of flooding.
- 9.2 The surface water system will drain into the combined sewer within Belsize Square as does the existing system. However, attenuation is provided in the form of green roofs, which are proposed for the lower flat roofs areas over the Living Room of each unit.

Surface Water Management

9.3 Consideration has been given to the use of grey water recycling. However, the excavations required for storage tanks would necessitate the removal of additional subsoil and when coupled with customer's resistance to the appearance of the recycled water and the cost of systems it does not currently make them a viable option. They have therefore not been included in the proposals.

Water efficiency measures

- 9.4 In the South East of England, water demand exceeds the volume licensed for abstraction, with the shortfall being met from ground water. In excess of 20% of the UK's water is used domestically with over 50% of this used for flushing WCs and washing (source: Environment Agency). The majority of this comes from drinking quality standard or potable water.
- 9.5 The water efficiency measures included in this development will ensure that the water use target of105 litres per person per day is achieved using the measures described below.
- 9.6 Water efficient devices will be fully evaluated, and installed, wherever possible. The specification of such devices will be considered at detailed design stage and each will be subject to an evaluation based on technical performance, cost and market appeal, together with compliance with the water use regulations.

- 9.7 The following devices will be incorporated within the homes:
 - Water efficient taps.
 - Water efficient toilets.
 - Low output showers.
 - Flow restrictors to manage water pressures to achieve optimum levels.
 - Water meters with guidance on water consumption and savings.
- 9.8 Water consumption calculations have been carried out using the Water Efficiency Calculator provided by the BRE. Although not perfect this calculator gives a good indication of the probable water use in a dwelling, although this is largely dependent on the way on which occupants use their homes.
- 9.9 Below is a typical specification, which would achieve the 105 Litres per person per year target.

Schedule of Appliance Water Consumption		
Appliance	Flow rate or capacity	Total Litres
wc	4/2.6 litres dual flush	14.72
Basin	1.7 litres/min.	5.98
Shower	8 litres/min	24.00
Bath	160 litres	25.60
Sink	4 litres/min	14.13
Washing Machine	Default used	16.66
Dishwasher	Default used	3.90
		104.99

10.0 Materials

- 10.1 The BRE Green Guide to Specification is a simple guide for design professionals. The guide provides environmental impact, cost and replacement interval information for a wide range of commonly used building specifications over a notional 60-year building life. The construction specification will prioritise materials within ratings A+, A or B.
- 10.2 Preference will be given to the use of local materials & suppliers where viable to reduce the transport distances and to support the local economy. A full evaluation of these suppliers will be undertaken at the next stage of design.
- 10.3 In addition, timber would be sourced, where practical, certified by PEFC or an equivalent approved certification body and all site timber used within the construction process would be recycled.
- 10.4 All insulation materials to will have a zero ozone depleting potential

Construction waste

- 10.5 A Site Waste Management Plan will be prepared which will monitor and report on waste generated on site into defined waste groups.
- 10.6 The Plan will indicate the setting of targets to promote resource efficiency in accordance with guidance from WRAP, Envirowise, BRE and DEFRA.
- 10.7 The overarching principle of waste management is that waste should be treated or disposed of within the region where it is produced.
- 10.8 Construction operations generate waste materials as a result of general handling losses and surpluses. These wastes can be reduced through appropriate selection of the construction method, good site management practices and spotting opportunities to avoid creating unnecessary waste.

- 10.9 The Construction Strategy will explore these issues, some of which are set out below:
 - Proper handling and storage of all materials to avoid damage.
 - Efficient purchasing arrangements to minimise over ordering.
 - Segregation of construction waste to maximise potential for reuse/recycling.
 - Suppliers who collect and reuse/recycle packaging materials

Construction waste is a key element to be considered in achieving a reduction in all waste – it is estimated that some 40% of all waste is construction related.

APPENDIX 1

TER and DER SAP Calculation Sheets for modelled units

			User D	etails:						
Assessor Name: Software Name:	Stroma FSAP 201	2		Strom Softwa				Versic	on: 1.0.1.25	
Property Address: Belsize - 4-bed MID										
Address :										
1. Overall dwelling dimension	ons:									
			Area	a(m²)	1	Av. Hei	ght(m)	-	Volume(m ³)	-
Ground floor				121	(1a) x	2	.4	(2a) =	290.4	(3a)
First floor				68	(1b) x	2	.4	(2b) =	163.2	(3b)
Second floor				58	(1c) x	2	.4	(2c) =	139.2	(3c)
Total floor area TFA = (1a)+	(1b)+(1c)+(1d)+(1e	e)+(1n	i)	247	(4)			_		-
Dwelling volume					(3a)+(3b)+(3c)+(3d)	+(3e)+	.(3n) =	592.8	(5)
2. Ventilation rate:										-
		econdar neating	у	other		total			m ³ per hour	
Number of chimneys		0	+	0] = [0	× 4	40 =	0	(6a)
Number of open flues	0 +	0	_ + _	0		0	x	20 =	0	(6b)
Number of intermittent fans					Ē	5	x	10 =	50	(7a)
Number of passive vents					Ē	0	x '	10 =	0	(7b)
Number of flueless gas fires					Ē	0	X	40 =	0	(7c)
								Air ch	nanges per hou	ır
Infiltration due to chimneys,	flues and fans = (6)	a)+(6b)+(7	a)+(7b)+(7c) =	Г	50		÷ (5) =	0.08](8)
If a pressurisation test has been					continue fr			- (-)	0.00	
Number of storeys in the c	lwelling (ns)								0	(9)
Additional infiltration							[(9)	-1]x0.1 =	0	(10)
Structural infiltration: 0.25	for steel or timber	frame or	0.35 for	r masoni	ry constr	uction			0	(11)
if both types of wall are presended of the second deducting areas of openings);		ponding to	the great	er wall are	a (after					-
If suspended wooden floor		led) or 0.	1 (seale	ed), else	enter 0				0	(12)
If no draught lobby, enter	0.05, else enter 0	,	,	,.					0	(13)
Percentage of windows ar	nd doors draught st	ripped							0	(14)
Window infiltration				0.25 - [0.2	2 x (14) ÷ 1	00] =			0	(15)
Infiltration rate				(8) + (10)	+ (11) + (1	12) + (13) +	(15) =		0	(16)
Air permeability value, q50), expressed in cub	oic metre	s per ho	our per s	quare m	etre of e	nvelope	area	4	(17)
If based on air permeability	/alue, then (18) = [(1	7) ÷ 20]+(8	3), otherwi	ise (18) = ((16)				0.28	(18)
Air permeability value applies if a	a pressurisation test has	s been don	e or a deg	gree air pe	rmeability	is being us	ed			-
Number of sides sheltered									2	(19)
Shelter factor				(20) = 1 - (21) = (18)		[9)] =			0.85	(20)
Infiltration rate incorporating				0.24	(21)					
Infiltration rate modified for n						,		1	1	
Jan Feb Ma	r Apr May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	J	
Monthly average wind speed	-1					,		1	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 F	actor (2	2a)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			
Adjuste	ed infiltra	ation rat	e (allowi	ng for sł	nelter an	d wind s	speed) =	: (21a) x	(22a)m						
-	0.31	0.3	0.3	0.27	0.26	0.23	0.23	0.22	0.24	0.26	0.27	0.28			
			change i	rate for t	he appli	cable ca	se						, r		-
	echanica			" N (0	al.) (aa	、 – (. (00)) (00)			(0	(23a)
			using Appe) = (23a)			(0	(23b)
			overy: effici	-	-									0	(23c)
,			anical ve			i	<u> </u>	1	ŕ	<u>, </u>	1	i , ,	÷100]		(0.4-)
(24a)m=	0	0	0	0	0	0	0	0	0	0	0	0	İ		(24a)
,			anical ve			r	<u> </u>	, ``	ŕ	r í	, 1		1		(0.41)
(24b)m=	0	0	0	0	0	0	0	0	0	0	0	0	İ		(24b)
,			tract ven		•	•				E (00k	.)				
	, <i>,</i>	0 < 0.5	< (23b), t	0 nen	, ,	,	r È	C) = (22t)	ŕ	r È	ŕ		1		(24c)
(24c)m=	-		-		0	0	0	-	0	0	0	0	İ		(240)
,			on or whe en (24d)							0.51					
(24d)m=	. ,	0.55	0.54	0.54	0.53	0.53	0.53	0.52	0.53	0.53	0.54	0.54			(24d
` ´			rate - en			(24)	L c) or (24		(25)				1		
(25)m=	0.55	0.55	0.54	0.54	0.53	0.53	0.53	0.52	0.53	0.53	0.54	0.54			(25)
													1		
			eat l <mark>oss</mark> p												
ELEN		Groarea	ss (m²)	Openin m	-	Net Ar A ,r		U-val W/m2		A X U (W/I	K)	k-value kJ/m²-l		A X kJ/ł	
Doors			,			1.89		1.6		3.024					(26)
Windo	ws Type	e 1				1.7	x1	/[1/(1.4)+	0.04] =	2.25	=				(27)
Windov	ws Type	2				12.08	3	/[1/(1.4)+	0.04] =	16.02	\exists				(27)
Windov	ws Type	3				12.08	3	/[1/(1.4)+	0.04] =	16.02					(27)
Window	ws Type	e 4				17.16	3 x1	/[1/(1.4)+	0.04] =	22.75	=				(27)
Window	ws Type	5				2.73		/[1/(1.4)+	0.04] =	3.62	=				(27)
Window	ws Type	6				4.5		/[1/(1.4)+	0.04] =	5.97	=				(27)
Windov	ws Type	97				4.5		/[1/(1.4)+	0.04] =	5.97					(27)
Window	ws Type	8				7.77		/[1/(1.4)+	0.04] =	10.3	=				(27)
Window	ws Type	9				1.89	x1	/[1/(1.4)+	0.04] =	2.51					(27)
Window	ws Type	e 10				7.77		/[1/(1.4)+	0.04] =	10.3	=				(27)
Windov	ws Type	e 11				1.89		/[1/(1.4)+	0.04] =	2.51	=				(27)
Windov	ws Type	12				6	x1	/[1/(1.4)+	0.04] =	7.95	=				(27)
Window	ws Type	13				6	x1	/[1/(1.4)+	0.04] =	7.95					(27)
Floor						121	x	0.11	=	13.31	Ξ r				(28)
Walls		206	66	87.9	3	118.7	7 X	0.17	=	20.18	ז ר		ה ד		(29)
Roof 7	Гуре1	58	3	0		58	x	0.11		6.38	ז ר		īΓ		(30)

Roof Type2	10		0		10	x	0.11	=	1.1				(30)
Roof Type3	53		0		53	x	0.11	=	5.83	= ī		=	(30)
Total area of e	lements	, m²			448.6	6							(31)
Party wall 128.69 x 0 = 0													(32)
* for windows and roof windows, use effective window U-value calculated using formula 1/[(1/U-value)+0.04] as given in paragraph 3.2 ** include the areas on both sides of internal walls and partitions													
Fabric heat loss, W/K = S (A x U) $(26)(30) + (32) =$ 163.93												(33)	
Heat capacity $Cm = S(A \times k)$ ((28)(30) + (32) + (32a)(32e) =											36977.3	(34)	
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K Indicative Value: Medium											250	(35)	
For design assessments where the details of the construction are not known precisely the indicative values of TMP in Table 1f													
can be used instea				ining An	nondiv l	/							
Thermal bridge if details of therma				• •		^						30.68	(36)
Total fabric hea		are not kn	0001 (30) =	- <i>0. 15 x</i> (5	1)			(33) +	(36) =			194.62	(37)
Ventilation hea	t loss ca	alculated	monthly	/				(38)m	= 0.33 × ((25)m x (5)			` ´
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(38)m= 107.1	106.74	106.39	104.73	104.41	102.97	102.97	102.7	103.53	104.41	105.04	105.7		(38)
Heat transfer c	oefficier	nt W/K						(39)m	= (37) + (3	38)m		1	
(39)m= 301.72	301.36	301	299.34	299.03	297.58	297.58	297.32	298.14	299.03	299.66	300.32		
									Average =	Sum(39)1	₁₂ /12=	299.34	(39)
Heat loss para	meter (H	HLP), W/	/m²K					(40)m	= (39)m ÷	(4)			
(40)m= 1.22	1.22	1.22	1.21	1.21	1.2	1.2	1.2	1.21	1.21	1.21	1.22		_
Number of day	e in mor	oth (Tab	lo 12)						Average =	Sum(40)₁.	₁₂ /12=	1.21	(40)
Jan	Feb	Mar	, 	May	Jun	Jul	Δυα	Sep	Oct	Nov	Dec	1	
(41)m= 31	28	31	Apr 30	31	30	31	Aug 31	30	31	30	31		(41)
	20	01			00			00	01				()
4 Motor boot													
4. Water heat	ing ener	gy requi	irement.								kWh/ye	ear.	
Assumed occu											06]	(42)
if TFA > 13.9 if TFA £ 13.9		+ 1.76 x	[1 - exp	(-0.0003	849 x (11	-A -13.9)2)] + 0.0	0013 x (IFA -13.	.9)			
Annual averag		ater usag	ge in litre	s per da	ay Vd,av	erage =	(25 x N)	+ 36		100	6.95]	(43)
Reduce the annua not more that 125	-		• •		-	-	to achieve	a water u	se target o	f		1	
		,	, , , , , , , , , , , , , , , , , , ,			, I						1	
Hot water usage in	Feb	Mar day for ea	Apr Apr	May Vd m = fa	Jun	Jul Table 1c x	Aug (43)	Sep	Oct	Nov	Dec]	
					· · · · ·	1	1 / J	104.91	100.00	112.20	117.64	1	
(44)m= 117.64	113.36	109.09	104.81	100.53	96.25	96.25	100.53	104.81	109.09	113.36 m(44) ₁₁₂ =	117.64	1283.36	(44)
Energy content of	hot water	used - cal	culated mo	onthly $= 4$.	190 x Vd,r	m x nm x L	OTm / 3600					1205.50	(++)
(45)m= 174.46	152.58	157.45	137.27	131.71	113.66	105.32	120.86	122.3	142.53	155.58	168.95]	
			I	L	I	1	I		I Total = Su	l m(45) ₁₁₂ =	-	1682.69	(45)
lf instantaneous w	ater heatii	ng at point	of use (no	hot water	r storage),	enter 0 in	boxes (46) to (61)					
(46)m= 26.17	22.89	23.62	20.59	19.76	17.05	15.8	18.13	18.35	21.38	23.34	25.34]	(46)
Water storage		المحاد ال				ata						1	
Storage volum	e (iitres)	Includin	ig any so	bar or W	WHRS	storage	within sa	ame ves	sei		0		(47)

	•	-			-		litres in leous co	• •	ers) ente	er 'O' in (47)			
	storage		not wate			notantan	10000 00			51 0 111	,			
	-		eclared l	oss facto	or is kno	wn (kWł	n/day):					0	1	(48)
Tempe	Temperature factor from Table 2b											0	ĺ	(49)
			•	, kWh/ye vlinder l		or is not		(48) x (49)) =			0	j	(50)
				•		h/litre/da						0	1	(51)
	•	-	ee secti	on 4.3									-	
	Volume factor from Table 2a Temperature factor from Table 2b											0	4	(52)
												0	ļ	(53)
			-	, kWh/ye	ear			(47) x (51)) x (52) x (53) =		0	4	(54)
		54) in (5		ion o o ob	wa a with			((50)(0]	(55)
				or each				((56)m = (-		1	7	(==)
(56)m=	0	0	0	0	0	0	0 H11)] ÷ (50	0	0 = (56)		0	0		(56)
-										I	I			
(57)m=	0	0	0	0	0	0	0	0	0	0	0	0		(57)
		•		om Table								0		(58)
	·						(58) ÷ 36	· · · ·						
•	-						er heatir	-	-		· ·		_	(50)
(59)m=	0	0	0	0	0	0	0	0	0	0	0	0		(59)
Combi	loss ca	culate <mark>d</mark>	for each	month (61)m =	(60) ÷ 36	65 × (41))m				_	_	
(61)m=	<mark>5</mark> 0.96	46.03	50.96	49.32	50.96	47.47	49.05	50.96	49.32	50.96	49.32	50.96		(61)
Tota <mark>l h</mark>	eat requ	uired for	water h	eating ca	alculated	for eacl	n month	(62)m =	0.85 × ((45 <mark>)m +</mark>	(46)m +	(57)m +	+ (59)m + (61)m
(62)m=	225.42	198.61	208.41	<mark>186</mark> .59	182.67	161.13	154.37	171.82	171.62	19 <mark>3.4</mark> 9	204.9	219.91		(62)
Solar DH	HW input o	alculated	using App	endix G or	Appendix	H (negati	ve quantity	(enter '0)	' if <mark>no sola</mark>	r contribut	ion to wate	er heating)	
(add a	dditiona	lines if	FGHRS	and/or V	VWHRS	applies,	, see Ap	pendix C	G)	r	r	1	-	
(63)m=	0	0	0	0	0	0	0	0	0	0	0	0		(63)
Output	from w	ater hea	ter										-	
(64)m=	225.42	198.61	208.41	186.59	182.67	161.13	154.37	171.82	171.62	193.49	204.9	219.91		
								Outp	out from wa	ater heate	r (annual)₁	12	2278.93	(64)
Heat g	ains froi	n water	heating,	kWh/mo	onth 0.2	5 ´ [0.85	× (45)m	+ (61)m	n] + 0.8 x	(46)m	+ (57)m	+ (59)n	<u>ו</u>]	
(65)m=	70.75	62.24	65.09	57.97	56.53	49.66	47.28	52.93	52.99	60.13	64.06	68.92		(65)
inclu	de (57)ı	m in calo	culation of	of (65)m	only if c	ylinder is	s in the c	dwelling	or hot w	ater is fr	om com	munity l	heating	
5. Int	ernal ga	ins (see	Table 5	and 5a):									
Metabo	olic gain	s (Table	5), Wat	ts									_	
	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(66)m=	153.15	153.15	153.15	153.15	153.15	153.15	153.15	153.15	153.15	153.15	153.15	153.15]	(66)
Lightin	g gains	(calculat	ted in Ap	pendix l	L, equat	ion L9 oi	r L9a), a	lso see -	Table 5		-	-	-	
(67)m=	36.89	32.76	26.65	20.17	15.08	12.73	13.76	17.88	24	30.47	35.56	37.91]	(67)
Applia	nces gai	ns (calc	ulated in	Append	lix L, eq	uation L ⁻	13 or L1	3a), also	see Ta	ble 5			-	
(68)m=	413.78	418.07	407.25	384.21	355.14	327.81	309.55	305.26	316.08	339.11	368.19	395.52]	(68)
Cookin	ig gains	(calcula	ted in A	ppendix	L, equat	ion L15	or L15a)	, also se	e Table	5			-	

Pumps and fans gains (Table 5a) (70) $= 3$ 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	(69)m= 3	8.32	38.32	38.3	2	38.32	38.32		38.32	38.32	38.	32	38.32	38.32	2	38.32	38.3	32		(69)
(70)ms 3 <td colspan="13"></td>																				
(r1)m 122.52 125.55 125.55	· -					,	3	Т	3	3	3	3	3	3	Т	3	3			(70)
(r1)m 122.52 125.55 125.55																				
(72)m 95.03 92.62 87.49 80.52 75.99 68.37 63.56 71.14 73.6 80.82 88.97 92.63 (72) Total internal gains = (66)m + (67)m + (68)m + (69)m + (70)m + (71)m + (72)m (73)m 615.4 503.85 518.15 481.46 458.8 466.22 485.63 522.35 564.67 568.00 (73) Solar gains are calculated using solar flux from Table 6a and associated equations to convert to the applicable orientation. Orientation: Access Factor Area Flux D Area C Table 6b Table 7 92.65 (74) North 0.3x 0.77 × 17.08 × 10.63 × 0.85 × 0.77 = 7.45 (74) North 0.3x 0.77 × 17.77 × 10.63 × 0.85 × 0.77 = 7.45 (74) North 0.3x 0.77 × 17.77 × 10.63 × 0.85 × 0.77 = 14.24 (74) North </td <td>r</td> <td></td> <td>· ·</td> <td>· ·</td> <td>-</td> <td></td> <td><i>,</i> ,</td> <td>_</td> <td>,</td> <td>-122.52</td> <td>-122</td> <td>2.52 -</td> <td>122.52</td> <td>-122.5</td> <td>52 -</td> <td>22.52</td> <td>-122</td> <td>.52</td> <td></td> <td>(71)</td>	r		· ·	· ·	-		<i>,</i> ,	_	,	-122.52	-122	2.52 -	122.52	-122.5	52 -	22.52	-122	.52		(71)
Total internal gains = (66/m + (67/m + (68/m + (69/m + (71/m + (72/m +	Water heating gains (Table 5)																			
(7)m 617.7 615.4 593.33 556.85 518.15 481.46 486.83 466.22 485.63 522.35 564.67 598.01 (73) Solar gains are calculated using solar llux from Table 6a associated equations to convert to the applicable orientation. Orientation: Access Factor Area Table 6a 9 9 7 × 1.7 × 10.63 × 0.85 × 0.7 = 7.45 (74) North 0.9x 0.77 × 1.2.08 × 10.63 × 0.85 × 0.7 = 52.66 (74) North 0.9x 0.77 × 1.6.63 × 0.85 × 0.7 = 1.97.3 (74) North 0.9x 0.77 × 4.5 × 0.85 × 0.7 = 1.97.3 (74) North 0.9x 0.77 × 4.5 2.0.32 × 0.85 0.7 = 1.97.1 (74)	(72)m= 9	5.09	92.62	87.4	э	80.52	75.99	6	68.97	63.55	71.	14	73.6	80.82	2	38.97	92.	63		(72)
Solar gains are calculated using solar flux. from Table 6a and associated equations to convert to the applicable orientation. Orientation: Access Factor Area FL Gains Table 6a Table 6a Table 6b FF Gains North 0.77 x 1.17 x 0.65 x 0.77 colspan="2">7.45 (74) North 0.877 x 1.0.63 x 0.855 x 0.77 x 1.0.63 x 0.855 x 0.77 x 1.0.63 x 0.855 x 0.855 x 0.77 x 1.0.63 x 0.855 x 0.855 x 0.77 x 1.0.53 x 0.855<	Total inte	ernal	gains =						(66)	m + (67)m	ı + (68	B)m + ()m + (69)m + (70)m + (71				m			
Solar gains are calculated using solar flux from Table 6a and associated equations to convert to the applicable orientation. Orientation: Area Flux Table 6b FF Gains North 0.9x 0.77 × 1.7 × 10.63 × 0.85 × 0.7 = 52.96 (%) North 0.9x 0.77 × 1.2.08 × 10.63 × 0.85 × 0.7 = 52.96 (%) North 0.9x 0.77 × 1.2.08 × 10.63 × 0.85 × 0.7 = 52.96 (%) North 0.9x 0.77 × 1.6.3 × 0.85 × 0.7 = 34.07 (%) North 0.9x 0.77 × 1.7.7 × 20.32 × 0.85 × 0.7 = 34.07 (4.24 (%) North 0.9x 0.77 × 1.7 × 20.32 × 0.85 × 0.7 =	(73)m= 6	617.7	615.4	593.3	3	556.85	518.15	5 4	81.46	458.8	466	i.22 4	485.63	522.3	5 5	64.67	598	.01		(73)
Orientation: Access Factor Table 6d Area m ² Flux Table 6a g_ FF Gains (W) North 0.9% 0.77 × 1.7 × 10.63 × 0.85 × 0.7 = 7.45 (74) North 0.9% 0.77 × 12.08 × 10.63 × 0.85 × 0.7 = 52.96 (74) North 0.9% 0.77 × 4.5 × 10.63 × 0.85 × 0.7 = 34.07 (74) North 0.9% 0.77 × 1.7 × 20.32 × 0.85 × 0.7 = 10.122 (74) North 0.9% 0.77 × 12.08 × 0.85 × 0.7 = 60.77 60.77 60.77 × 0.85 × 0.7 = 60.77 60.77 × 17.2 0.85 ×	6. Solar gains:																			
Table 6dm²Table 6aTable 6bTable 6c(W)North $0.9x$ 0.77 x 1.7 x 10.63 x 0.85 x 0.7 = 7.45 (74) North $0.9x$ 0.77 x 12.08 x 10.63 x 0.85 x 0.7 = 52.96 (74) North $0.9x$ 0.77 x 4.5 x 10.63 x 0.85 x 0.7 = 34.07 (74) North $0.9x$ 0.77 x 6 x 10.63 x 0.85 x 0.7 = 20.31 (74) North $0.9x$ 0.77 x 1.7 x 20.32 x 0.85 x 0.7 = 1122 (74) North $0.9x$ 0.77 x 1.7 x 20.32 x 0.85 x 0.7 = 0.71 (74) North $0.9x$ 0.77 x 1.7 x 20.32 x 0.85 x 0.7 = 0.71 (74) North $0.9x$ 0.77 x 1.7 x 20.32 x 0.85 x 0.7 = 0.627 (74) North $0.9x$ 0.77 x 1.7 x 20.32 x 0.85 x 0.7 = 0.6407 (74) North $0.9x$ 0.77 x 1.7 x 34.53 x 0.85 x 0.7 = 0.77 (74) Nor																				
North $0.9x$ 0.77 x 1.7 x 10.63 x 0.85 x 0.7 z 7.45 (74) North $0.9x$ 0.77 x 12.08 x 10.63 x 0.85 x 0.7 z 52.96 (74) North $0.9x$ 0.77 x 4.5 x 10.63 x 0.85 x 0.7 z 34.07 (74) North $0.9x$ 0.77 x 7.77 x 10.63 x 0.85 x 0.7 z 34.07 (74) North $0.9x$ 0.77 x 1.7 x 20.32 x 0.85 x 0.7 z 14.24 (74) North $0.9x$ 0.77 x 1.7 x 20.32 x 0.85 x 0.7 z 14.24 (74) North $0.9x$ 0.77 x 4.5 20.32 x 0.85 x 0.7 z 14.24 (74) North $0.9x$ 0.77 x 4.5 20.32 x 0.85 x 0.7 z 14.24 (74) North $0.9x$ 0.77 x 1.7 x 20.32 x 0.85 x 0.7 z 14.24 (74) North $0.9x$ 0.77 x 1.7 x 20.32 x 0.85 x 0.7 z 17.4 North $0.9x$ 0.77 </td <td>Orientatio</td> <td></td> <td></td> <td>actor</td> <td></td> <td>- .</td> <td></td> <td></td> <td></td> <td></td> <td></td>	Orientatio			actor											- .					
North 0.sx 0.77 x 12.08 x 10.63 x 0.035 x 0.77 = 52.96 (74) North 0.9x 0.77 x 4.5 x 10.63 x 0.85 x 0.77 = 52.96 (74) North 0.9x 0.77 x 4.5 x 10.63 x 0.85 x 0.77 = 52.96 (74) North 0.9x 0.77 x 4.5 x 10.63 x 0.85 x 0.77 = 34.07 (74) North 0.9x 0.77 x 1.7 20.32 x 0.85 x 0.7 = 34.71 (74) North 0.9x 0.77 x 4.5 y 20.32 x 0.85 x 0.7 = 34.71 (74) North 0.9x 0.77 x 1.7 x 34.53 0.85 <td></td> <td></td> <td>able 6d</td> <td></td> <td></td> <td>m²</td> <td></td> <td></td> <td>Tai</td> <td>ole 6a</td> <td></td> <td>lat</td> <td>Die 6b</td> <td></td> <td>Tab</td> <td>le 6C</td> <td></td> <td>-</td> <td>(VV)</td> <td></td>			able 6d			m²			Tai	ole 6a		lat	Die 6b		Tab	le 6C		-	(VV)	
North $0.9x$ 0.77 × 4.5 × 10.63 × 0.85 × 0.7 = 19.73 (7) North $0.9x$ 0.77 × 7.77 × 1.77 × 10.63 × 0.85 × 0.7 = 34.07 (7) North $0.9x$ 0.77 × 7.77 × 1.7 × 10.63 × 0.85 × 0.7 = 34.07 (7) North $0.9x$ 0.77 × 1.7 × 20.32 × 0.85 × 0.7 = 10.22 (7) North $0.9x$ 0.77 × 1.7 × 20.32 × 0.85 × 0.7 = 10.22 (7) North $0.9x$ 0.77 × 1.7 × 20.32 × 0.85 × 0.7 = 37.71 (7) North $0.9x$ 0.77 × 1.7 × 20.32 × 0.85 × 0.7 = 37.71 (7) North $0.9x$ 0.77 × 4.5 × 20.32 × 0.85 × 0.7 = 37.71 (7) North $0.9x$ 0.77 × 4.5 × 20.32 × 0.85 × 0.7 = 37.71 (7) North $0.9x$ 0.77 × 1.7 × 20.32 × 0.85 × 0.7 = 37.71 (7) North $0.9x$ 0.77 × 4.5 × 20.32 × 0.85 × 0.7 = 32.71 (7) North $0.9x$ 0.77 × 4.5 × 20.32 × 0.85 × 0.7 = 32.27 (7) North $0.9x$ 0.77 × 4.5 × 20.32 × 0.85 × 0.7 = 32.27 (7) North $0.9x$ 0.77 × 1.7 × 34.53 × 0.85 × 0.7 = 52.27 (7) North $0.9x$ 0.77 × 1.7 × 34.53 × 0.85 × 0.7 = 110.63 (7) North $0.9x$ 0.77 × 1.7 × 34.53 × 0.85 × 0.7 = 110.63 (7) North $0.9x$ 0.77 × 1.7 × 34.53 × 0.85 × 0.7 = 110.63 (7) North $0.9x$ 0.77 × 1.7 × 34.53 × 0.85 × 0.7 = 110.63 (7) North $0.9x$ 0.77 × 1.7 × 55.46 × 0.85 × 0.7 = 110.63 (7) North $0.9x$ 0.77 × 1.7 × 1.7 × 55.46 × 0.85 × 0.7 = 110.291 (7) North $0.9x$ 0.77 × 1.7 ×	North	0.9x	0.77		x	1.	7	x	1	0.63	x	().85	×		0.7		=	7.45	(74)
North 0.9x 0.77 x 1.033 x 0.035 x 0.7 = 1.3.7 1.4.7 North 0.9x 0.77 x 7.77 x 10.63 x 0.85 x 0.7 = 34.07 (7) North 0.9x 0.77 x 1.6 x 0.85 x 0.77 = 14.24 (7) North 0.9x 0.77 x 1.7 x 20.32 x 0.85 x 0.7 = 14.24 (7) North 0.9x 0.77 x 1.7 x 20.32 x 0.85 x 0.7 = 101.22 (7) North 0.9x 0.77 x 4.5 x 20.32 x 0.85 x 0.7 = 66.11 (7) North 0.9x 0.77 x 1.7 x 3.453 x 0.85 x 0.7 = 64.07 (7) North 0.9x 0.77 x 1.7 <t< td=""><td>North</td><td>0.9x</td><td>0.77</td><td></td><td>x</td><td>12.</td><td>08</td><td>x</td><td>1</td><td>0.63</td><td>x</td><td>(</td><td>).85</td><td>x</td><td></td><td>0.7</td><td></td><td>=</td><td>52.96</td><td>(74)</td></t<>	North	0.9x	0.77		x	12.	08	x	1	0.63	x	().85	x		0.7		=	52.96	(74)
North 0.8 0.7 × 6 × 10.63 × 0.85 × 0.7 26.31 774 North 0.8 0.77 × 6 × 10.63 × 0.85 × 0.7 = 26.31 774 North 0.8 0.77 × 1.7 × 20.32 × 0.85 × 0.7 = 101.22 (74) North 0.9 0.77 × 4.5 × 20.32 × 0.85 × 0.7 = 101.22 (74) North 0.9 0.77 × 7.77 × 20.32 × 0.85 × 0.7 = 65.11 (74) North 0.9 0.77 × 1.7 × 34.53 × 0.85 × 0.7 = 172 (74) North 0.9 0.77 × 4.53 × 0.85 × 0.7	North	0.9x	0.77		x	4.	5	x	1	0.63	x	().85	x		0.7		=	19.73	(74)
North0.940.77×1.77×20.32×0.85×0.77=14.24(74)North0.980.77×12.08×20.32×0.85×0.77=101.22(74)North0.980.77×4.5×20.32×0.85×0.77=37.71(74)North0.980.77×4.5×20.32×0.85×0.77=66.11(74)North0.980.77×7.77×20.32×0.85×0.77=66.11(74)North0.980.77×1.7×20.32×0.85×0.77=50.27(74)North0.980.77×1.7×20.32×0.85×0.77=66.11(74)North0.980.77×1.7×34.53×0.85×0.77=64.07(74)North0.980.77×1.7×34.53×0.85×0.77=64.07(74)North0.980.77×1.7×34.53×0.85×0.77=64.07(74)North0.980.77×1.7×55.46×0.85×0.77=65.43(74)North0.980.77×1.7× <td>North</td> <td>0.9x</td> <td>0.77</td> <td></td> <td>x</td> <td>7.7</td> <td>7</td> <td>x</td> <td>1</td> <td>0.63</td> <td>x</td> <td>(</td> <td>).85</td> <td>x</td> <td></td> <td>0.7</td> <td></td> <td>=</td> <td>34.07</td> <td>(74)</td>	North	0.9x	0.77		x	7.7	7	x	1	0.63	x	().85	x		0.7		=	34.07	(74)
North 0.9×0.77 × $12.08 \times 20.32 \times 0.85 \times 0.7$ = 101.22 (74) North 0.9×0.77 × $12.08 \times 20.32 \times 0.85 \times 0.7$ = 37.71 (74) North 0.9×0.77 × $7.77 \times 20.32 \times 0.85 \times 0.7$ = 65.11 (74) North $0.9 \times 0.77 \times 7.77 \times 20.32 \times 0.85 \times 0.7$ = 65.11 (74) North $0.9 \times 0.77 \times 7.77 \times 20.32 \times 0.85 \times 0.7$ = 65.11 (74) North $0.9 \times 0.77 \times 7.77 \times 20.32 \times 0.85 \times 0.7$ = 50.27 (74) North $0.9 \times 0.77 \times 1.208 \times 34.53 \times 0.85 \times 0.7$ = 172 (74) North $0.9 \times 0.77 \times 12.08 \times 34.53 \times 0.85 \times 0.7$ = 1172 (74) North $0.9 \times 0.77 \times 12.08 \times 34.53 \times 0.85 \times 0.7$ = 1172 (74) North $0.9 \times 0.77 \times 12.08 \times 34.53 \times 0.85 \times 0.7$ = 110.63 (74) North $0.9 \times 0.77 \times 12.08 \times 34.53 \times 0.85 \times 0.7$ = 110.63 (74) North $0.9 \times 0.77 \times 1.77 \times 34.53 \times 0.85 \times 0.7$ = 110.63 (74) North $0.9 \times 0.77 \times 1.77 \times 55.46 \times 0.85 \times 0.7$ = 276.27 (74) North $0.9 \times 0.77 \times 1.77 \times 55.46 \times 0.85 \times 0.7$ = 102.91 (74) North $0.9 \times 0.77 \times 1.77 \times 55.46 \times 0.85 \times 0.7$ = 102.91 (74) North $0.9 \times 0.77 \times 1.77 \times 55.46 \times 0.85 \times 0.7$ = 110.231 (74) North $0.9 \times 0.77 \times 1.77 \times 7.777 \times 55.46 \times 0.855 \times 0.7$ = 1137.22 (74) North $0.9 \times 0.77 \times 1.77 \times 7.777 \times 20.85 \times 0.7$ = 137.22 (74) North $0.9 \times 0.77 \times 1.77 \times 12.08 \times 74.72 \times 0.855 \times 0.7$ = 137.22 (74) North $0.9 \times 0.77 \times 1.77 \times 12.08 \times 74.72 \times 0.855 \times 0.7$ = 137.22 (74) North $0.9 \times 0.77 \times 1.77 \times 74.72 \times 0.855 \times 0.7$ = 138.64 (74) North $0.9 \times 0.77 \times 1.77 \times 74.72 \times 0.855 \times 0.7$ = 138.64 (74) North $0.9 \times 0.77 \times 1.77 \times 74.72 \times 0.855 \times 0.7$ = 138.64 (74) North $0.9 \times 0.77 \times 1.77 \times 74.72 \times 0.855 \times 0.7$ = 138.64 (74) North $0.9 \times 0.77 \times 1.77 \times 74.72 \times 0.855 \times 0.7$ = 138.64 (74) North $0.9 \times 0.77 \times 1.77 \times 74.72 \times 0.855 \times 0.7$ = 138.64 (74) North $0.9 \times 0.77 \times 1.77 \times 74.72 \times 0.855 \times 0.7$ = 138.64 (74) North $0.9 \times 0.77 \times 1.77 \times 74.72 \times 0.855 \times 0.7$ = 138.64 (74) North $0.9 \times 0.77 \times 1.77 \times 74.72 \times 0.855 \times 0.7$ = 138.64 (74) North $0.9 \times 0.77 \times 1.77 \times 74.72 \times 0.855 \times 0.7$ = 138.64 (74) North $0.9 \times 0.77 \times 1.77 \times 74.72 \times 0.855 \times 0.7$ = 138.64 (74) North $0.9 \times 0.77 \times 1.77 \times 74.72 \times 0.855 \times 0.7$ =	North	0.9x	0.77		x	6		×	1	0.63	X	().85	x		0.7		=	26.31	(74)
North0.9x0.77x4.5x20.32x0.85x0.7=37.71(74)North0.9x0.77x7.77x20.32x0.85x0.7=66.11(74)North0.9x0.77x7.77x20.32x0.85x0.7=66.11(74)North0.9x0.77x6x20.32x0.85x0.7=60.27(74)North0.9x0.77x1.7x34.53x0.85x0.7=24.2(74)North0.9x0.77x1.7x34.53x0.85x0.7=24.2(74)North0.9x0.77x1.7x34.53x0.85x0.7=64.07(74)North0.9x0.77x4.5x34.53x0.85x0.7=64.07(74)North0.9x0.77x7.77x34.53x0.85x0.7=64.07(74)North0.9x0.77x1.7x55.46x0.85x0.7=276.27(74)North0.9x0.77x1.7x55.46x0.85x0.7=276.27(74)North0.9x0.77x1.7x55.46 <td>North</td> <td>0.9x</td> <td>0.77</td> <td></td> <td>x</td> <td>1.7</td> <td>7</td> <td>x</td> <td>2</td> <td>20.32</td> <td>х</td> <td></td> <td>).85</td> <td>×</td> <td></td> <td>0.7</td> <td></td> <td>-</td> <td>14.24</td> <td>(74)</td>	North	0.9x	0.77		x	1.7	7	x	2	20.32	х).85	×		0.7		-	14.24	(74)
North 0.9x 0.77 x 7.77 x 20.02 x 0.85 x 0.77 = 65.11 (74) North 0.9x 0.77 x 6 x 20.32 x 0.85 x 0.77 = 65.11 (74) North 0.9x 0.77 x 6 x 20.32 x 0.85 x 0.77 = 50.27 (74) North 0.9x 0.77 x 1.7 x 34.53 x 0.85 x 0.77 = 24.2 (74) North 0.9x 0.77 x 4.55 x 34.53 x 0.85 x 0.77 = 64.07 (74) North 0.9x 0.77 x 4.55 x 34.53 x 0.85 x 0.77 = 64.07 (74) North 0.9x 0.77 x 6 x 34.53 x 0.85 x 0.77 = 64.07 (74) North	North	0.9x	0.77		x	12.	08	x	2	20.32	×).85	x		0.7		=	101.22	(74)
North0.9x0.77x6x2.02x0.030.77z6x0.02x0.77z50.27(74)North0.9x0.77x1.7x34.53x0.85x0.7=24.2(74)North0.9x0.77x1.7x34.53x0.85x0.7=24.2(74)North0.9x0.77x1.2.08x34.53x0.85x0.7=172(74)North0.9x0.77x4.5x34.53x0.85x0.7=64.07(74)North0.9x0.77x7.77x34.53x0.85x0.7=110.63(74)North0.9x0.77x7.77x55.46x0.85x0.7=38.88(74)North0.9x0.77x1.7x55.46x0.85x0.7=102.91(74)North0.9x0.77x1.7x55.46x0.85x0.7=137.22(74)North0.9x0.77x1.7x55.46x0.85x0.7=137.22(74)North0.9x0.77x1.7x74.72x0.85x0.7=137.22(74)North0.9x <td>North</td> <td>0.9x</td> <td>0.77</td> <td></td> <td>x</td> <td>4.</td> <td>5</td> <td>x</td> <td>2</td> <td>20.32</td> <td>x</td> <td>(</td> <td>).85</td> <td>x</td> <td></td> <td>0.7</td> <td></td> <td>=</td> <td>37.71</td> <td>(74)</td>	North	0.9x	0.77		x	4.	5	x	2	20.32	x	().85	x		0.7		=	37.71	(74)
North $0.9x$ 0.77 x 1.7 x 34.53 x 0.85 x 0.7 z 24.2 (74) North $0.9x$ 0.77 x 1.7 x 34.53 x 0.85 x 0.7 z 24.2 (74) North $0.9x$ 0.77 x 12.08 x 34.53 x 0.85 x 0.7 z 172 (74) North $0.9x$ 0.77 x 4.5 x 34.53 x 0.85 x 0.7 z 64.07 (74) North $0.9x$ 0.77 x 7.77 x 34.53 x 0.85 x 0.7 z 64.07 (74) North $0.9x$ 0.77 x 7.77 x 34.53 x 0.85 x 0.7 z 110.63 (74) North $0.9x$ 0.77 x 1.7 x 55.46 x 0.85 x 0.7 z 276.27 (74) North $0.9x$ 0.77 x 4.5 x 55.46 x 0.85 x 0.7 z 102.91 (74) North $0.9x$ 0.77 x 4.5 x 55.46 x 0.85 x 0.7 z 102.91 (74) North $0.9x$ 0.77 x 6 x 55.46 x 0.85 x 0.7 z 102.91 (74) <tr<< td=""><td>North</td><td>0.9x</td><td>0.77</td><td></td><td>x</td><td>7.7</td><td>7</td><td>x</td><td>2</td><td>20.32</td><td>x</td><td>(</td><td>).85</td><td>x</td><td></td><td>0.7</td><td></td><td>=</td><td>65.11</td><td>(74)</td></tr<<>	North	0.9x	0.77		x	7.7	7	x	2	20.32	x	().85	x		0.7		=	65.11	(74)
North 0.9x 0.77 x 12.08 x 34.53 x 0.85 x 0.77 = 172 (74) North 0.9x 0.77 x 4.5 x 34.53 x 0.85 x 0.77 = 172 (74) North 0.9x 0.77 x 4.5 x 34.53 x 0.85 x 0.77 = 64.07 (74) North 0.9x 0.77 x 7.77 x 34.53 x 0.85 x 0.77 = 64.07 (74) North 0.9x 0.77 x 6 x 34.53 x 0.85 x 0.77 = 85.43 (74) North 0.9x 0.77 x 1.7 x 55.46 x 0.85 x 0.7 = 276.27 (74) North 0.9x 0.77 x 1.7 x 55.46 x 0.85 x 0.7 = 102.91 (74) North	North	0.9x	0.77		x	6		x	2	20.32	x	(0.85	x		0.7		=	50.27	(74)
North 0.9x 0.77 x 4.5 x 34.53 x 0.85 x 0.7 = 64.07 (74) North 0.9x 0.77 x 7.77 x 34.53 x 0.85 x 0.77 = 64.07 (74) North 0.9x 0.77 x 7.77 x 34.53 x 0.85 x 0.7 = 64.07 (74) North 0.9x 0.77 x 7.77 x 34.53 x 0.85 x 0.7 = 110.63 (74) North 0.9x 0.77 x 1.7 x 55.46 x 0.85 x 0.7 = 85.43 (74) North 0.9x 0.77 x 1.2.08 x 55.46 x 0.85 x 0.7 = 102.91 (74) North 0.9x 0.77 x 1.7 x 55.46 x 0.85 x 0.7 = 137.22 (74) North	North	0.9x	0.77		x	1.7	7	x	3	4.53	x	(0.85	x		0.7		=	24.2	(74)
North 0.9x 0.77 x 7.77 x 34.53 x 0.85 x 0.7 = 04.01 (1) North 0.9x 0.77 x 7.77 x 34.53 x 0.85 x 0.7 = 110.63 (74) North 0.9x 0.77 x 6 x 34.53 x 0.85 x 0.7 = 110.63 (74) North 0.9x 0.77 x 1.7 x 55.46 x 0.85 x 0.7 = 85.43 (74) North 0.9x 0.77 x 1.7 x 55.46 x 0.85 x 0.7 = 276.27 (74) North 0.9x 0.77 x 4.5 x 55.46 x 0.85 x 0.7 = 102.91 (74) North 0.9x 0.77 x 7.77 x 55.46 x 0.85 x 0.7 = 177.7 (74) North	North	0.9x	0.77		x	12.	08	x	3	4.53	x	(0.85	×		0.7		=	172	(74)
North 0.9x 0.77 × 6 × 34.53 × 0.85 × 0.77 = 85.43 (74) North 0.9x 0.77 × 1.7 × 55.46 × 0.85 × 0.7 = 85.43 (74) North 0.9x 0.77 × 1.7 × 55.46 × 0.85 × 0.7 = 85.43 (74) North 0.9x 0.77 × 1.208 × 55.46 × 0.85 × 0.7 = 276.27 (74) North 0.9x 0.77 × 4.5 × 55.46 × 0.85 × 0.7 = 102.91 (74) North 0.9x 0.77 × 7.77 × 55.46 × 0.85 × 0.7 = 137.22 (74) North 0.9x 0.77 × 1.7 × 74.72 × 0.85 × 0.7 = 52.37 (74) North	North	0.9x	0.77		x	4.	5	x	3	4.53	x	().85	x		0.7		=	64.07	(74)
North $0.9x$ 0.77 x 1.7 x 55.46 x 0.85 x 0.7 $=$ 38.88 (74) North $0.9x$ 0.77 x 12.08 x 55.46 x 0.85 x 0.7 $=$ 276.27 (74) North $0.9x$ 0.77 x 4.5 x 55.46 x 0.85 x 0.7 $=$ 102.91 (74) North $0.9x$ 0.77 x 4.5 x 55.46 x 0.85 x 0.7 $=$ 102.91 (74) North $0.9x$ 0.77 x 7.77 x 55.46 x 0.85 x 0.7 $=$ 177.7 (74) North $0.9x$ 0.77 x 6 x 55.46 x 0.85 x 0.7 $=$ 137.22 (74) North $0.9x$ 0.77 x 1.7 x 74.72 x 0.85 x 0.7 $=$ 52.37 (74) North $0.9x$ 0.77 x 12.08 x 74.72 x 0.85 x 0.7 $=$ 332.46 (74) North $0.9x$ 0.77 x 74.72 x 0.85 x 0.7 $=$ 138.64 (74) North $0.9x$ 0.77 x 74.72 x 0.85 x 0.7 $=$ 138.64 (74) North $0.9x$ 0.77 <	North	0.9x	0.77		x	7.7	7	x	3	4.53	x	().85	x		0.7		=	110.63	(74)
North $0.9x$ 0.77 x 12.08 x 55.46 x 0.85 x 0.7 = 276.27 (74) North $0.9x$ 0.77 x 4.5 x 55.46 x 0.85 x 0.7 = 102.91 (74) North $0.9x$ 0.77 x 7.77 x 55.46 x 0.85 x 0.7 = 102.91 (74) North $0.9x$ 0.77 x 7.77 x 55.46 x 0.85 x 0.7 = 177.7 (74) North $0.9x$ 0.77 x 6 x 55.46 x 0.85 x 0.7 = 137.22 (74) North $0.9x$ 0.77 x 1.7 x 74.72 x 0.85 x 0.7 = 52.37 (74) North $0.9x$ 0.77 x 1.208 x 74.72 x 0.85 x 0.7 = 138.64 (74) North $0.9x$ 0.77 x 4.5 x 74.72 x 0.85 x 0.7 = 239.38 (74) North $0.9x$ 0.77 x 6 x 74.72 x 0.85 x 0.7 = 239.38 (74) North $0.9x$ 0.77 x 6 x 74.72 x 0.85 x 0.7 = 138.64 (74) North $0.9x$ 0.77 x 1.7 x 79.99 <td>North</td> <td>0.9x</td> <td>0.77</td> <td></td> <td>x</td> <td>6</td> <td></td> <td>x</td> <td>3</td> <td>4.53</td> <td>x</td> <td>(</td> <td>).85</td> <td>x</td> <td></td> <td>0.7</td> <td></td> <td>=</td> <td>85.43</td> <td>(74)</td>	North	0.9x	0.77		x	6		x	3	4.53	x	().85	x		0.7		=	85.43	(74)
North $0.9x$ 0.77 x 4.5 x 55.46 x 0.85 x 0.7 = 102.91 (74) North $0.9x$ 0.77 x 7.77 x 55.46 x 0.85 x 0.7 = 177.7 (74) North $0.9x$ 0.77 x 6 x 55.46 x 0.85 x 0.7 = 137.22 (74) North $0.9x$ 0.77 x 1.7 x 74.72 x 0.85 x 0.7 = 52.37 (74) North $0.9x$ 0.77 x 12.08 x 74.72 x 0.85 x 0.7 = 372.16 (74) North $0.9x$ 0.77 x 4.5 x 74.72 x 0.85 x 0.7 = 138.64 (74) North $0.9x$ 0.77 x 7.77 x 74.72 x 0.85 x 0.7 = 239.38 (74) North $0.9x$ 0.77 x 7.77 x 74.72 x 0.85 x 0.7 = 239.38 (74) North $0.9x$ 0.77 x 1.7 79.99 x 0.85 x 0.7 = 398.41 (74) North $0.9x$ 0.77 x 1.7 79.99 x 0.85 x 0.7 = 398.41 (74) North $0.9x$ 0.77 x 12.08 x 79.99 x 0	North	0.9x	0.77		x	1.	7	x	5	5.46	x	().85	x		0.7		=	38.88	(74)
North 0.9x 0.77 x 7.77 x 55.46 x 0.85 x 0.7 = 177.7 (74) North 0.9x 0.77 x 6 x 55.46 x 0.85 x 0.7 = 137.22 (74) North 0.9x 0.77 x 6 x 55.46 x 0.85 x 0.7 = 137.22 (74) North 0.9x 0.77 x 1.7 x 74.72 x 0.85 x 0.7 = 52.37 (74) North 0.9x 0.77 x 1.7 x 74.72 x 0.85 x 0.7 = 52.37 (74) North 0.9x 0.77 x 12.08 x 74.72 x 0.85 x 0.7 = 332.16 (74) North 0.9x 0.77 x 7.77 x 74.72 x 0.85 x 0.7 = 239.38 (74) North	North	0.9x	0.77		x	12.	08	x	5	5.46	x	().85	x		0.7		=	276.27	(74)
North $0.9x$ 0.77 x 6 x 55.46 x 0.85 x 0.7 = 137.22 (74) North $0.9x$ 0.77 x 1.7 x 74.72 x 0.85 x 0.7 = 52.37 (74) North $0.9x$ 0.77 x 1.7 x 74.72 x 0.85 x 0.7 = 52.37 (74) North $0.9x$ 0.77 x 12.08 x 74.72 x 0.85 x 0.7 = 372.16 (74) North $0.9x$ 0.77 x 4.5 x 74.72 x 0.85 x 0.7 = 138.64 (74) North $0.9x$ 0.77 x 7.77 x 74.72 x 0.85 x 0.7 = 239.38 (74) North $0.9x$ 0.77 x 6 x 74.72 x 0.85 x 0.7 = 239.38 (74) North $0.9x$ 0.77 x 1.7 x 79.99 x 0.85 x 0.7 = 56.07 (74) North $0.9x$ 0.77 x 12.08 x 79.99 x 0.85 x 0.7 = 398.41 (74)	North	0.9x	0.77		x	4.	5	x	5	5.46	x	().85	x		0.7		=	102.91	(74)
North $0.9x$ 0.77 x 1.7 x 74.72 x 0.85 x 0.7 $=$ 52.37 (74) North $0.9x$ 0.77 x 12.08 x 74.72 x 0.85 x 0.7 $=$ 372.16 (74) North $0.9x$ 0.77 x 4.5 x 74.72 x 0.85 x 0.7 $=$ 138.64 (74) North $0.9x$ 0.77 x 4.5 x 74.72 x 0.85 x 0.7 $=$ 138.64 (74) North $0.9x$ 0.77 x 7.77 x 74.72 x 0.85 x 0.7 $=$ 239.38 (74) North $0.9x$ 0.77 x 6 x 74.72 x 0.85 x 0.7 $=$ 184.85 (74) North $0.9x$ 0.77 x 1.7 x 79.99 x 0.85 x 0.7 $=$ 56.07 (74) North $0.9x$ 0.77 x 12.08 x 79.99 x 0.85 x 0.7 $=$ 398.41 (74)	North	0.9x	0.77		x	7.7	7	x	5	5.46	x	().85	x		0.7		=	177.7	(74)
North $0.9x$ 0.77 x 12.08 x 74.72 x 0.85 x 0.7 $=$ 372.16 (74) North $0.9x$ 0.77 x 4.5 x 74.72 x 0.85 x 0.7 $=$ 138.64 (74) North $0.9x$ 0.77 x 7.77 x 74.72 x 0.85 x 0.7 $=$ 138.64 (74) North $0.9x$ 0.77 x 7.77 x 74.72 x 0.85 x 0.7 $=$ 239.38 (74) North $0.9x$ 0.77 x 6 x 74.72 x 0.85 x 0.7 $=$ 184.85 (74) North $0.9x$ 0.77 x 1.7 x 79.99 x 0.85 x 0.7 $=$ 56.07 (74) North $0.9x$ 0.77 x 12.08 x 79.99 x 0.85 x 0.7 $=$ 398.41 (74)	North	0.9x	0.77		x	6		x	5	5.46	x	().85	×		0.7		=	137.22	(74)
North $0.9x$ 0.77 x 4.5 x 74.72 x 0.85 x 0.7 $=$ 138.64 (74) North $0.9x$ 0.77 x 7.77 x 74.72 x 0.85 x 0.7 $=$ 239.38 (74) North $0.9x$ 0.77 x 6 x 74.72 x 0.85 x 0.7 $=$ 239.38 (74) North $0.9x$ 0.77 x 6 x 74.72 x 0.85 x 0.7 $=$ 184.85 (74) North $0.9x$ 0.77 x 1.7 x 79.99 x 0.85 x 0.7 $=$ 56.07 (74) North $0.9x$ 0.77 x 12.08 x 79.99 x 0.85 x 0.7 $=$ 398.41 (74)	North	0.9x	0.77		x	1.1	7	x	7	4.72	x	().85	×		0.7		=	52.37	(74)
North $0.9x$ 0.77 x 7.77 x 74.72 x 0.85 x 0.77 $=$ 239.38 (74) North $0.9x$ 0.77 x 6 x 74.72 x 0.85 x 0.77 $=$ 184.85 (74) North $0.9x$ 0.77 x 6 x 74.72 x 0.85 x 0.77 $=$ 184.85 (74) North $0.9x$ 0.77 x 1.7 x 79.99 x 0.85 x 0.77 $=$ 56.07 (74) North $0.9x$ 0.77 x 12.08 x 79.99 x 0.85 x 0.77 $=$ 398.41 (74)	North	0.9x	0.77		x	12.	08	x	7	4.72	x	().85	×		0.7		=	372.16	(74)
North $0.9x$ 0.77 x 6 x 74.72 x 0.85 x 0.7 z 11.7 x 79.99 x 0.85 x 0.7 z 11.7 x 79.99 x 0.85 x 0.7 z 56.07 (74) North $0.9x$ 0.77 x 12.08 x 79.99 x 0.85 x 0.7 z 398.41 (74) North $0.9x$ 0.77 x 12.08 x 79.99 x 0.85 x 0.7 z 398.41 (74)	North	0.9x	0.77		x	4.	5	x	7	4.72	x).85	×		0.7		=	138.64	(74)
North $0.9x$ 0.77 x 1.7 x 79.99 x 0.85 x 0.7 = 56.07 (74) North $0.9x$ 0.77 x 12.08 x 79.99 x 0.85 x 0.7 = 56.07 (74) North $0.9x$ 0.77 x 12.08 x 79.99 x 0.85 x 0.7 = 398.41 (74)	North	0.9x	0.77		x	7.7	7	x	7	4.72	x	().85	x		0.7		=	239.38	(74)
North $0.9x$ 0.77 x 12.08 x 79.99 x 0.85 x 0.7 = 398.41 (74)	North	0.9x	0.77		x	6		x	7	4.72	x	().85	x		0.7		=	184.85	(74)
	North	0.9x	0.77		x	1.	7	x	7	9.99	x	().85	x		0.7		=	56.07	(74)
	North	0.9x	0.77		x	12.	08	x	7	9.99	x	().85	x		0.7		=	398.41	(74)
North $0.9x$ 0.77 x 4.5 x 79.99 x 0.85 x 0.7 = 148.41 (74)	North	0.9x	0.77		x	4.	5	x	7	9.99	x	(0.85	x		0.7		=	148.41	(74)

Nom 0.8x 0.77 x 77 x 7889 x 0.85 x 0.77 = 298.0 (4) North 0.9x 0.77 x 1.7 x 74.88 x 0.86 x 0.77 = 62.38 (74) North 0.9x 0.77 x 1.208 x 7468 x 0.85 x 0.77 = 62.38 (74) North 0.9x 0.77 x 4.5 x 7468 x 0.85 x 0.77 = 138.58 (74) North 0.9x 0.77 x 1.7 x 592.5 x 0.85 x 0.77 = 145.50 (74) North 0.9x 0.77 x 4.55 x 0.85 x 0.77 = 17.3 1.7 x 582.5 x 0.85 x 0.77 = 1.41.52 1.88.5 1.7	N1 /1	r		1		1		,	[]	1	F			-
North 0.0. 0.01 0.02 0.000 0.000 0.000 0.000 0.01 0.010 0.0	North	0.9x	0.77	x	7.77	×	79.99	×	0.85	x	0.7	=	256.26	(74)
North 0.00 <t< td=""><td>North</td><td>0.9x</td><td>0.77</td><td>x</td><td>6</td><td>x</td><td>79.99</td><td>x</td><td>0.85</td><td>x</td><td>0.7</td><td>=</td><td>197.88</td><td>(74)</td></t<>	North	0.9x	0.77	x	6	x	79.99	x	0.85	x	0.7	=	197.88	(74)
North 0.0x 0.77 × 1.200	North	0.9x	0.77	x	1.7	x	74.68	x	0.85	x	0.7	=	52.35	(74)
North 0.00 0.00 1.00 1.00 0.00 <t< td=""><td>North</td><td>0.9x</td><td>0.77</td><td>x</td><td>12.08</td><td>x</td><td>74.68</td><td>X</td><td>0.85</td><td>x</td><td>0.7</td><td>=</td><td>371.96</td><td>(74)</td></t<>	North	0.9x	0.77	x	12.08	x	74.68	X	0.85	x	0.7	=	371.96	(74)
North 0.8x 0.77 × 6 × 74.88 × 0.000 × 0.77 × 1.77 × 56.25 × 0.85 × 0.77 = 114.75 (74) North 0.9x 0.77 × 1.2.08 × 59.25 × 0.85 × 0.77 = 225,11 (74) North 0.9x 0.77 × 4.5 × 59.25 × 0.85 × 0.77 = 198.982 (74) North 0.9x 0.77 × 1.7 × 59.25 × 0.85 × 0.77 = 146.56 (74) North 0.9x 0.77 × 1.7 × 41.52 × 0.85 × 0.77 = 120.679 (74) North 0.9x 0.77 × 7.77 × 14.52 × 0.85 × 0.77 = 120.679 (74	North	0.9x	0.77	x	4.5	x	74.68	×	0.85	x	0.7	=	138.56	(74)
North 0.8 0.7 × 1.7 × 592.5 × 0.85 × 0.77 × 11.7 × 592.5 × 0.85 × 0.77 = 11.53 (74) North 0.8 0.77 × 4.5 \$92.5 × 0.85 × 0.7 = 199.83 (74) North 0.8 0.77 × 7.77 × 592.5 × 0.85 × 0.7 = 199.82 (74) North 0.9 0.77 × 1.7 × 141.52 × 0.85 × 0.7 = 129.1 (74) North 0.9 0.77 × 12.08 × 141.52 × 0.85 × 0.7 = 120.679 (74) North 0.9 0.77 × 12.08 × 141.52 × 0.85 × 0.7 = 120.49 (74)	North	0.9x	0.77	x	7.77	x	74.68	x	0.85	x	0.7	=	239.25	(74)
North 0.0 0.0 0.0 0.0 0.00 0.	North	0.9x	0.77	x	6	x	74.68	×	0.85	x	0.7	=	184.75	(74)
North 0.8 0.77 x 4.5 x 50.25 x 0.85 x 0.77 x 1.00.11 (74) North 0.9 0.77 x 7.77 x 59.25 x 0.85 x 0.77 = 109.33 (74) North 0.9 0.77 x 1.7 x 41.52 x 0.85 x 0.77 = 146.58 (74) North 0.9 0.77 x 1.20.81 x 0.85 x 0.77 = 206.79 (74) North 0.9 0.77 x 4.5 x 0.85 x 0.77 = 102.71 (74) North 0.9 0.77 x 4.5 x 0.85 x 0.77 = 102.71 (74) North 0.9 0.77 x 4.5 2.4.19 x 0.85 x 0.77 x 12.6.9 (74)	North	0.9x	0.77	x	1.7	x	59.25	x	0.85	x	0.7	=	41.53	(74)
North 0.87 0.77 x 7.77 x 0.82 x 0.77 = 100000 (74) North 0.98 0.77 x 6 x 59.25 x 0.85 x 0.77 = 148.58 (74) North 0.98 0.77 x 1.7 x 41.52 x 0.85 x 0.77 = 2206.79 (74) North 0.98 0.77 x 4.5 x 4.152 x 0.85 x 0.77 = 2206.79 (74) North 0.98 0.77 x 4.5 x 4.82 x 0.85 x 0.77 = 102.71 (74) North 0.98 0.77 x 1.7 x 24.19 x 0.85 x 0.7 = 16.96 78 North 0.98 0.77 x 4.5 x 24.19 x 0.85	North	0.9x	0.77	x	12.08	x	59.25	x	0.85	x	0.7	=	295.11	(74)
North 0.8 0.77 x 6 x 9.25 x 0.85 x 0.77 = 14.65.68 (74) North 0.9x 0.77 x 1.7 x 41.52 x 0.85 x 0.77 = 29.1 (74) North 0.9x 0.77 x 4.5 x 41.52 x 0.85 x 0.77 = 206.79 (74) North 0.9x 0.77 x 4.5 x 41.52 x 0.85 x 0.77 = 102.71 (74) North 0.9x 0.77 x 6 x 41.52 x 0.85 x 0.77 = 102.64 (74) North 0.9x 0.77 x 1.2.08 24.19 x 0.85 x 0.77 = 120.49 (74) North 0.9x 0.77 x 1.7 24.19 x 0.85 </td <td>North</td> <td>0.9x</td> <td>0.77</td> <td>x</td> <td>4.5</td> <td>x</td> <td>59.25</td> <td>x</td> <td>0.85</td> <td>x</td> <td>0.7</td> <td>=</td> <td>109.93</td> <td>(74)</td>	North	0.9x	0.77	x	4.5	x	59.25	x	0.85	x	0.7	=	109.93	(74)
North 0.8 0.7 x 1.7 x 1.152 x 0.85 x 0.7 = 2.9.1 (74) North 0.9x 0.77 x 11.208 x 41.52 x 0.85 x 0.7 = 2.9.1 (74) North 0.9x 0.77 x 4.5 x 41.52 x 0.85 x 0.7 = 2.9.1 (74) North 0.9x 0.77 x 4.5 x 41.52 x 0.85 x 0.7 = 13.01 (74) North 0.9x 0.77 x 6 x 41.52 x 0.85 x 0.7 = 102.71 (74) North 0.9x 0.77 x 1.7 x 24.19 x 0.85 x 0.7 = 112.048 (74) North 0.9x 0.77 x 4.5 13.12 x	North	0.9x	0.77	x	7.77	x	59.25	x	0.85	x	0.7	=	189.82	(74)
North 0.8x 0.77 x 12.08 x 41.52 x 0.85 x 0.77 = 12.08 x 41.52 x 0.85 x 0.77 = 17.03 (74) North 0.9x 0.77 x 4.5 x 41.52 x 0.85 x 0.77 = 113.01 (74) North 0.9x 0.77 x 4.5 x 0.85 x 0.77 = 113.01 (74) North 0.9x 0.77 x 6 x 41.52 x 0.85 x 0.77 = 102.71 (74) North 0.9x 0.77 x 1.7 x 24.19 x 0.85 x 0.77 = 44.88 (74) North 0.9x 0.77 x 6 x 24.19 x 0.85 x 0.77 = 44.88 (74) North	North	0.9x	0.77	x	6	x	59.25	×	0.85	x	0.7	=	146.58	(74)
North 0.8x 0.77 x 4.5 x 41.52 x 0.85 x 0.77 = 20.01 (74) North 0.9x 0.77 x 7.77 x 41.52 x 0.85 x 0.77 = 113.01 (74) North 0.9x 0.77 x 7.77 x 41.52 x 0.85 x 0.77 = 113.01 (74) North 0.9x 0.77 x 7.77 X 24.19 x 0.85 x 0.77 = 116.96 (74) North 0.9x 0.77 x 4.5 x 24.19 x 0.85 x 0.77 = 44.88 (74) North 0.9x 0.77 x 7.77 X 24.19 x 0.85 x 0.77 = 59.84 (74) North 0.9x 0.77 x 1.7 x 13.12 x 0.85 x 0.77 = 65.34 (74) 0.85 x <td>North</td> <td>0.9x</td> <td>0.77</td> <td>x</td> <td>1.7</td> <td>x</td> <td>41.52</td> <td>×</td> <td>0.85</td> <td>x</td> <td>0.7</td> <td>=</td> <td>29.1</td> <td>(74)</td>	North	0.9x	0.77	x	1.7	x	41.52	×	0.85	x	0.7	=	29.1	(74)
North 0.3 0.77 × 7.77 × 1.102 × 0.85 × 0.77 = 133.01 (74) North 0.3x 0.77 × 6 × 41.52 × 0.85 × 0.77 = 133.01 (74) North 0.3x 0.77 × 6 × 41.52 × 0.85 × 0.77 = 133.01 (74) North 0.3x 0.77 × 12.08 × 24.19 × 0.85 × 0.77 = 120.49 (74) North 0.3x 0.77 × 14.5 × 24.19 × 0.85 × 0.77 = 120.49 (74) North 0.3x 0.77 × 7.77 × 24.19 × 0.85 × 0.7 = 32.43 (74) North 0.3x 0.77 × 1.7 13.12 × <td>North</td> <td>0.9x</td> <td>0.77</td> <td>x</td> <td>12.08</td> <td>x</td> <td>41.52</td> <td>×</td> <td>0.85</td> <td>x</td> <td>0.7</td> <td>=</td> <td>206.79</td> <td>(74)</td>	North	0.9x	0.77	x	12.08	x	41.52	×	0.85	x	0.7	=	206.79	(74)
North $0.3x$ 0.77 x $6.1x$ 0.85 x 0.77 i $i102.71$ (74) North $0.3x$ 0.77 x 1.7 x 24.19 x 0.85 x 0.7 $=$ 102.71 (74) North $0.9x$ 0.77 x 12.08 x 24.19 x 0.85 x 0.7 $=$ 112.049 (74) North $0.9x$ 0.77 x 4.5 x 24.19 x 0.85 x 0.7 $=$ 44.88 (74) North $0.9x$ 0.77 x 6 x 24.19 x 0.85 x 0.7 $=$ 44.88 (74) North $0.9x$ 0.77 x 1.7 x 13.12 x 0.85 x 0.7 $=$ 24.34 (74) North $0.9x$ 0.77 x $1.3.12$ x 0.85 x 0.7 $=$	North	0.9x	0.77	x	4.5	×	41.52	×	0.85	x	0.7	=	77.03	(74)
North 0.97 x 1.7 x 24.19 x 0.85 x 0.7 z 16.36 (74) North 0.98 0.77 x 1.7 x 24.19 x 0.85 x 0.7 z 16.36 (74) North 0.98 0.77 x 12.06 x 24.19 x 0.85 x 0.7 z 16.36 (74) North 0.98 0.77 x 1.5 x 24.19 x 0.85 x 0.7 z 16.38 (74) North 0.98 0.77 x 1.7 x 1.17 x 0.85 x 0.7 z 59.84 (74) North 0.98 0.77 x 1.17 x 13.12 x 0.85 x 0.7 z 24.34 (74) North 0.98 0.77 x 1.17 x 13.12 x 0.85 x 0.7 z 24.34 (74)<	North	0.9x	0.77	×	7.77	x	41.52	x	0.85	x	0.7	=	133.01	(74)
North 0.9x 0.77 x 12.08 x 24.19 x 0.085 x 0.77 = 120.49 (74) North 0.9x 0.77 x 4.5 x 24.19 x 0.85 x 0.77 = 120.49 (74) North 0.9x 0.77 x 4.5 x 24.19 x 0.85 x 0.77 = 44.88 (74) North 0.9x 0.77 x 6 x 24.19 x 0.85 x 0.77 = 77.5 (74) North 0.9x 0.77 x 1.7 x 13.12 x 0.85 x 0.77 = 59.84 (74) North 0.9x 0.77 x 1.7 x 13.12 x 0.85 x 0.77 = 24.34 (74) North 0.9x 0.77 x 1.5 x 1.3.12	North	0.9x	0.77	x	6	x	41.52	x	0.85	x	0.7	=	102.71	(74)
North 0.9x 0.77 x 4.5 x 24.19 x 0.85 x 0.77 = 44.88 (74) North 0.9x 0.77 x 7.77 x 24.19 x 0.85 x 0.77 = 7.75 (74) North 0.9x 0.77 x 6 x 24.19 x 0.85 x 0.77 = 7.75 (74) North 0.9x 0.77 x 1.7 x 13.12 x 0.85 x 0.77 = 59.84 (74) North 0.9x 0.77 x 1.5 x 13.12 x 0.85 x 0.77 = 24.34 (74) North 0.9x 0.77 x 4.5 x 13.12 x 0.85 x 0.77 = 24.34 (74) North 0.9x 0.77 x 1.7 x 8.86	North	0.9x	0.77	x	1.7	X	24.19	х	0.85	х	0.7	=	16.96	(74)
North $0.9x$ 0.77 x 7.77 x 24.19 x 0.85 x 0.7 z 7.75 (74) North $0.9x$ 0.77 x 6 x 24.19 x 0.85 x 0.7 z 59.84 (74) North $0.9x$ 0.77 x 1.7 x 13.12 x 0.85 x 0.7 z 59.84 (74) North $0.9x$ 0.77 x 1.7 x 13.12 x 0.85 x 0.7 z 59.84 (74) North $0.9x$ 0.77 x 1.5 x 13.12 x 0.85 x 0.7 z $e5.34$ (74) North $0.9x$ 0.77 x 4.5 x 13.12 x 0.85 x 0.7 z $e5.34$ (74) North $0.9x$ 0.77 x 4.5 x 13.12 x 0.85 x 0.7 z 24.34 (74) North $0.9x$ 0.77 x 1.7 x 8.86 x 0.85 x 0.7 z 24.34 (74) North $0.9x$ 0.77 x 1.7 x 8.86 x 0.85 x 0.7 z 24.34 (74) North $0.9x$ 0.77 x 1.6 x 8.86 x 0.85 x 0.7 z 24.5 (74) North	North	0.9x	0.77	x	12.08	x	24.19	x	0.85	x	0.7	=	1 <mark>20.49</mark>	(74)
North 0.3x 0.77 x 6 x 24.19 x 0.85 x 0.7 z 59.84 (74) North 0.9x 0.77 x 1.7 x 13.12 x 0.85 x 0.7 = 59.84 (74) North 0.9x 0.77 x 1.7 x 13.12 x 0.85 x 0.7 = 59.84 (74) North 0.9x 0.77 x 1.2.08 x 13.12 x 0.85 x 0.7 = 65.34 (74) North 0.9x 0.77 x 4.5 x 13.12 x 0.85 x 0.7 = 24.34 (74) North 0.9x 0.77 x 1.7 x 8.86 x 0.85 x 0.7 = 24.34 (74) North 0.9x 0.77 x 1.7 x 8.86 <	North	0.9x	0.77	x	4.5	x	24.19	x	0.85	x	0.7	=	44.88	(74)
North 0.9x 0.77 × 1.7 × 13.12 × 0.85 × 0.77 = 9.2 (74) North 0.9x 0.77 × 12.08 × 13.12 × 0.85 × 0.77 = 9.2 (74) North 0.9x 0.77 × 4.5 × 13.12 × 0.85 × 0.77 = 66.34 (74) North 0.9x 0.77 × 4.5 × 13.12 × 0.85 × 0.77 = 24.34 (74) North 0.9x 0.77 × 6 × 13.12 × 0.85 × 0.77 = 24.34 (74) North 0.9x 0.77 × 6 × 13.12 × 0.85 × 0.77 = 24.203 (74) North 0.9x 0.77 × 1.7 × 8.86 × 0.85 × 0.7 = 6.21 (74) North	North	0.9x	0.7 <mark>7</mark>	x	7.77	x	24.19	x	0.85	x	0.7	=	77.5	(74)
North 0.9x 0.77 x 12.08 x 13.12 x 0.85 x 0.77 = 66.34 (74) North 0.9x 0.77 x 4.5 x 13.12 x 0.85 x 0.77 = 24.34 (74) North 0.9x 0.77 x 7.77 x 13.12 x 0.85 x 0.77 = 24.34 (74) North 0.9x 0.77 x 7.77 x 13.12 x 0.85 x 0.77 = 24.34 (74) North 0.9x 0.77 x 6 x 13.12 x 0.85 x 0.77 = 42.03 (74) North 0.9x 0.77 x 1.7 x 8.86 x 0.85 x 0.7 = 6.21 (74) North 0.9x 0.77 x 4.5 x 8.86 x 0.85 x 0.7 = 6.21 (74) North	North	0.9x	0.77	×	6	×	24.19	x	0.85	x	0.7	=	59.84	(74)
North 0.9x 0.77 x 4.5 x 13.12 x 0.85 x 0.77 = 24.34 (74) North 0.9x 0.77 x 7.77 x 13.12 x 0.85 x 0.77 = 24.34 (74) North 0.9x 0.77 x 7.77 x 13.12 x 0.85 x 0.77 = 24.34 (74) North 0.9x 0.77 x 6 x 13.12 x 0.85 x 0.77 = 42.03 (74) North 0.9x 0.77 x 6 x 13.12 x 0.85 x 0.77 = 44.15 (74) North 0.9x 0.77 x 1.2.08 x 8.86 x 0.85 x 0.77 = 6.21 (74) North 0.9x 0.77 x 4.5 x 8.86 x 0.85 x 0.77 = 21.93 (74) North	North	0.9x	0.77	x	1.7	x	13.12	×	0.85	x	0.7	=	9.2	(74)
North 0.9x 0.77 x 7.77 x 13.12 x 0.85 x 0.7 = 42.03 (74) North 0.9x 0.77 x 7.77 x 13.12 x 0.85 x 0.77 = 42.03 (74) North 0.9x 0.77 x 6 x 13.12 x 0.85 x 0.7 = 42.03 (74) North 0.9x 0.77 x 1.7 x 8.86 x 0.85 x 0.7 = 6.21 (74) North 0.9x 0.77 x 1.7 x 8.86 x 0.85 x 0.7 = 6.21 (74) North 0.9x 0.77 x 4.5 x 8.86 x 0.85 x 0.7 = 16.45 (74) North 0.9x 0.77 x 7.77 x 8.86 x 0.85 x 0.7 = 21.93 (74) East 0.9x	North	0.9x	0.77	x	12.08	x	13.12	x	0.85	x	0.7	=	65.34	(74)
North 0.9x 0.77 x 6 x 13.12 x 0.85 x 0.7 = 32.45 (74) North 0.9x 0.77 x 1.7 x 8.86 x 0.85 x 0.7 = 6.21 (74) North 0.9x 0.77 x 1.7 x 8.86 x 0.85 x 0.7 = 6.21 (74) North 0.9x 0.77 x 1.2.08 x 8.86 x 0.85 x 0.7 = 6.21 (74) North 0.9x 0.77 x 4.5 x 8.86 x 0.85 x 0.7 = 64.21 (74) North 0.9x 0.77 x 4.5 x 8.86 x 0.85 x 0.7 = 28.4 (74) North 0.9x 0.77 x 6 x 8.86 x 0.85 x 0.7 = 21.93 (74) Bast 0.9x	North	0.9x	0.77	x	4.5	x	13.12	x	0.85	x	0.7	=	24.34	(74)
North 0.9x 0.77 x 1.7 x 8.86 x 0.85 x 0.7 = 6.21 (74) North 0.9x 0.77 x 12.08 x 8.86 x 0.85 x 0.7 = 6.21 (74) North 0.9x 0.77 x 12.08 x 8.86 x 0.85 x 0.7 = 6.21 (74) North 0.9x 0.77 x 12.08 x 8.86 x 0.85 x 0.7 = 6.21 (74) North 0.9x 0.77 x 4.5 x 8.86 x 0.85 x 0.7 = 16.45 (74) North 0.9x 0.77 x 6 x 8.86 x 0.85 x 0.7 = 21.93 (74) East 0.9x 1 x 1.89 x 19.64 x 0.85 x 0.7 = 10.73 (76) East 0.9x	North	0.9x	0.77	x	7.77	x	13.12	x	0.85	x	0.7	=	42.03	(74)
North 0.9x 0.77 x 12.08 x 8.86 x 0.85 x 0.7 = 44.15 (74) North 0.9x 0.77 x 4.5 x 8.86 x 0.85 x 0.7 = 44.15 (74) North 0.9x 0.77 x 4.5 x 8.86 x 0.85 x 0.7 = 14.45 (74) North 0.9x 0.77 x 7.77 x 8.86 x 0.85 x 0.7 = 28.4 (74) North 0.9x 0.77 x 6 x 8.86 x 0.85 x 0.7 = 21.93 (74) East 0.9x 1 x 1.89 x 19.64 x 0.85 x 0.7 = 10.73 (76) East 0.9x 1 x 1.89 x 38.42 x 0.85 x 0.7 = 21 (76) East 0.9x	North	0.9x	0.77	x	6	×	13.12	×	0.85	x	0.7	=	32.45	(74)
North 0.9x 0.77 x 4.5 x 8.86 x 0.85 x 0.7 = 16.45 (74) North 0.9x 0.77 x 7.77 x 8.86 x 0.85 x 0.7 = 16.45 (74) North 0.9x 0.77 x 7.77 x 8.86 x 0.85 x 0.7 = 28.4 (74) North 0.9x 0.77 x 6 x 8.86 x 0.85 x 0.7 = 28.4 (74) East 0.9x 1 x 1.89 x 19.64 x 0.85 x 0.7 = 10.73 (76) East 0.9x 1 x 1.89 x 38.42 x 0.85 x 0.7 = 21 (76) East 0.9x 1 x 1.89 x 38.42 x 0.85 x 0.7 = 21 (76) East 0.9x 1	North	0.9x	0.77	x	1.7	x	8.86	x	0.85	x	0.7	=	6.21	(74)
North 0.9x 0.77 x 7.77 x 8.86 x 0.85 x 0.7 = 28.4 (74) North 0.9x 0.77 x 6 x 8.86 x 0.85 x 0.7 = 28.4 (74) East 0.9x 1 x 1.89 x 19.64 x 0.85 x 0.7 = 21.93 (74) East 0.9x 1 x 1.89 x 19.64 x 0.85 x 0.7 = 10.73 (76) East 0.9x 1 x 1.89 x 19.64 x 0.85 x 0.7 = 10.73 (76) East 0.9x 1 x 1.89 x 38.42 x 0.85 x 0.7 = 21 (76) East 0.9x 1 x 1.89 x 38.42 x 0.85 x 0.7 = 21 (76) East 0.9x 1	North	0.9x	0.77	x	12.08	x	8.86	x	0.85	x	0.7	=	44.15	(74)
North 0.9x 0.77 x 6 x 8.86 x 0.85 x 0.7 = 21.93 (74) East 0.9x 1 x 1.89 x 19.64 x 0.85 x 0.7 = 21.93 (74) East 0.9x 1 x 1.89 x 19.64 x 0.85 x 0.7 = 10.73 (76) East 0.9x 1 x 1.89 x 19.64 x 0.85 x 0.7 = 10.73 (76) East 0.9x 1 x 1.89 x 38.42 x 0.85 x 0.7 = 21 (76) East 0.9x 1 x 1.89 x 38.42 x 0.85 x 0.7 = 21 (76) East 0.9x 1 x 1.89 x 63.27 x 0.85 x 0.7 = 34.58 (76) East 0.9x 1	North	0.9x	0.77	×	4.5	×	8.86	×	0.85	x	0.7	=	16.45	(74)
East 0.9x 1 × 1.89 × 19.64 × 0.85 × 0.7 = 10.73 (76) East 0.9x 1 × 1.89 × 19.64 × 0.85 × 0.7 = 10.73 (76) East 0.9x 1 × 1.89 × 19.64 × 0.85 × 0.7 = 10.73 (76) East 0.9x 1 × 1.89 × 38.42 × 0.85 × 0.7 = 21 (76) East 0.9x 1 × 1.89 × 38.42 × 0.85 × 0.7 = 21 (76) East 0.9x 1 × 1.89 × 63.27 × 0.85 × 0.7 = 34.58 (76) East 0.9x 1 × 1.89 × 63.27 × 0.85 × 0.7 = 34.58 (76) East 0.9x 1	North	0.9x	0.77	x	7.77	x	8.86	×	0.85	x	0.7	=	28.4	(74)
East $0.9x$ 1x 1.89 x 19.64 x 0.85 x 0.7 = 10.73 (76) East $0.9x$ 1x 1.89 x 38.42 x 0.85 x 0.7 = 21 (76) East $0.9x$ 1x 1.89 x 38.42 x 0.85 x 0.7 = 21 (76) East $0.9x$ 1x 1.89 x 38.42 x 0.85 x 0.7 = 21 (76) East $0.9x$ 1x 1.89 x 63.27 x 0.85 x 0.7 = 34.58 (76) East $0.9x$ 1x 1.89 x 63.27 x 0.85 x 0.7 = 34.58 (76) East $0.9x$ 1x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76) East $0.9x$ 1x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76)	North	0.9x	0.77	x	6	x	8.86	×	0.85	x	0.7	=	21.93	(74)
East $0.9x$ 1× 1.89 × 38.42 × 0.85 × 0.7 = 21 (76) East $0.9x$ 1× 1.89 × 38.42 × 0.85 × 0.7 = 21 (76) East $0.9x$ 1× 1.89 × 63.27 × 0.85 × 0.7 = 21 (76) East $0.9x$ 1× 1.89 × 63.27 × 0.85 × 0.7 = 34.58 (76) East $0.9x$ 1× 1.89 × 63.27 × 0.85 × 0.7 = 34.58 (76) East $0.9x$ 1× 1.89 × 92.28 × 0.85 × 0.7 = 50.43 (76) East $0.9x$ 1× 1.89 × 92.28 × 0.85 × 0.7 = 50.43 (76)	East	0.9x	1	x	1.89	x	19.64	×	0.85	x	0.7	=	10.73	(76)
East $0.9x$ 1x 1.89 x 38.42 x 0.85 x 0.7 = 21 (76) East $0.9x$ 1x 1.89 x 63.27 x 0.85 x 0.7 = 34.58 (76) East $0.9x$ 1x 1.89 x 63.27 x 0.85 x 0.7 = 34.58 (76) East $0.9x$ 1x 1.89 x 63.27 x 0.85 x 0.7 = 34.58 (76) East $0.9x$ 1x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76) East $0.9x$ 1x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76)	East	0.9x	1	x	1.89	x	19.64	×	0.85	x	0.7	=	10.73	(76)
East $0.9x$ 1x 1.89 x 63.27 x 0.85 x 0.7 = 34.58 (76)East $0.9x$ 1x 1.89 x 63.27 x 0.85 x 0.7 = 34.58 (76)East $0.9x$ 1x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76)East $0.9x$ 1x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76)East $0.9x$ 1x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76)	East	0.9x	1	x	1.89	x	38.42	×	0.85	x	0.7	=	21	(76)
East $0.9x$ 1 x 1.89 x 63.27 x 0.85 x 0.7 = 34.58 (76) East $0.9x$ 1 x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76) East $0.9x$ 1 x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76) East $0.9x$ 1 x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76)	East	0.9x	1	x	1.89	x	38.42	×	0.85	x	0.7	=	21	(76)
East $0.9x$ 1 x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76) East $0.9x$ 1 x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76) East $0.9x$ 1 x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76)	East	0.9x	1	×	1.89	×	63.27	×	0.85	x	0.7	=	34.58	(76)
East $0.9x$ 1 x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76)	East	0.9x	1	×	1.89	×	63.27	×	0.85	x	0.7	=	34.58	(76)
	East	0.9x	1	×	1.89	×	92.28	×	0.85	x	0.7	=	50.43	(76)
East 0.9x 1 x 1.89 x 113.09 x 0.85 x 0.7 = 61.81 (76)	East	0.9x	1	×	1.89	×	92.28	×	0.85	x	0.7	=	50.43	(76)
	East	0.9x	1	x	1.89	×	113.09	×	0.85	x	0.7	=	61.81	(76)

East	0 ov [1	L 4 99	۱.,	440.00	1	0.05			1		
	0.9x	1	X	1.89	×	113.09	×	0.85	x	0.7	=	61.81	(76)
East	0.9x	1	×	1.89	×	115.77	X	0.85	x	0.7	=	63.27	(76)
East	0.9x	1	×	1.89	X	115.77	X	0.85	x	0.7	=	63.27	(76)
East	0.9x	1	×	1.89	X	110.22	X	0.85	X	0.7	=	60.24	(76)
East	0.9x	1	×	1.89	X	110.22	X	0.85	x	0.7	=	60.24	(76)
East	0.9x	1	×	1.89	x	94.68	×	0.85	x	0.7	=	51.74	(76)
East	0.9x	1	×	1.89	x	94.68	x	0.85	x	0.7	=	51.74	(76)
East	0.9x	1	x	1.89	x	73.59	x	0.85	x	0.7	=	40.22	(76)
East	0.9x	1	x	1.89	x	73.59	X	0.85	x	0.7	=	40.22	(76)
East	0.9x	1	×	1.89	x	45.59	×	0.85	x	0.7	=	24.92	(76)
East	0.9x	1	×	1.89	x	45.59	x	0.85	x	0.7	=	24.92	(76)
East	0.9x	1	x	1.89	x	24.49	×	0.85	x	0.7	=	13.38	(76)
East	0.9x	1	×	1.89	x	24.49	x	0.85	x	0.7	=	13.38	(76)
East	0.9x	1	×	1.89	x	16.15	x	0.85	x	0.7	=	8.83	(76)
East	0.9x	1	x	1.89	x	16.15	x	0.85	x	0.7	=	8.83	(76)
South	0.9x	0.77	x	12.08	x	46.75	x	0.85	x	0.7	=	232.87	(78)
South	0.9x	0.3	×	2.73	x	46.75	x	0.85	x	0.7	=	20.5	(78)
Sout <mark>h</mark>	0.9x	0.77	x	4.5	x	46.75	х	0.85	x	0.7	-	86.75	(78)
Sout <mark>h</mark>	0.9x	0.77	x	7.77	x	46.75	x	0.85	x	0.7	-	149.79	(78)
Sout <mark>h</mark>	0.9x	0.77	x	6	х	46.75	×	0.85	x	0.7	=	115.67	(78)
Sout <mark>h</mark>	0.9x	0.77	x	12.08	x	76.57	x	0.85	x	0.7	i =	381.38	(78)
Sout <mark>h</mark>	0.9x	0.3	x	2.73	x	76.57	x	0.85	x	0.7	=	33.58	(78)
Sout <mark>h</mark>	0.9x	0.77	x	4.5	x	76.57	×	0.85	x	0.7	=	142.07	(78)
Sout <mark>h</mark>	0.9x	0.77	x	7.77	x	76.57	x	0.85	x	0.7	=	2 <mark>45.31</mark>	(78)
South	0.9x	0.77	×	6	x	76.57	x	0.85	x	0.7	=	189.43	(78)
South	0.9x	0.77	×	12.08	x	97.53	x	0.85	x	0.7	=	485.82	(78)
South	0.9x	0.3	×	2.73	x	97.53	x	0.85	x	0.7	=	42.78	(78)
South	0.9x	0.77	×	4.5	x	97.53	x	0.85	x	0.7	=	180.97	(78)
South	0.9x	0.77	x	7.77	x	97.53	×	0.85	x	0.7	=	312.48	(78)
South	0.9x	0.77	×	6	x	97.53	x	0.85	x	0.7	=	241.3	(78)
South	0.9x	0.77	×	12.08	x	110.23	x	0.85	x	0.7	=	549.08	(78)
South	0.9x	0.3	×	2.73	x	110.23	x	0.85	x	0.7	=	48.35	(78)
South	0.9x	0.77	×	4.5	x	110.23	×	0.85	x	0.7	=	204.54	(78)
South	0.9x	0.77	x	7.77	x	110.23	x	0.85	x	0.7	=	353.17	(78)
South	0.9x	0.77	x	6	x	110.23	x	0.85	x	0.7	=	272.72	(78)
South	0.9x	0.77	×	12.08	x	114.87	x	0.85	x	0.7	=	572.17	(78)
South	0.9x	0.3	×	2.73	x	114.87	x	0.85	x	0.7	=	50.38	(78)
South	0.9x	0.77	×	4.5	×	114.87	×	0.85	x	0.7	=	213.14	(78)
South	0.9x	0.77	×	7.77	×	114.87	×	0.85	x	0.7	=	368.03	(78)
South	0.9x	0.77	×	6	×	114.87	×	0.85	x	0.7	=	284.19	(78)
South	0.9x	0.77	×	12.08	×	110.55	×	0.85	x	0.7	=	550.64	(78)
	-		-		-		-				-		-

South 0.88 0.37 × 110.55 × 0.86 × 0.77 = 44.84 (78) South 0.87 0.77 × 4.5 × 110.55 × 0.85 × 0.77 = 235.12 (78) South 0.86 0.77 × 110.65 × 0.85 × 0.77 = 235.12 (78) South 0.86 0.77 × 120.64 × 0.86 × 0.77 = 638.01 (78) South 0.87 0.77 × 4.5 × 0.86 × 0.77 = 638.01 × 0.85 × 0.77 = 445.5 × 108.01 × 0.85 × 0.77 = 346.05 (78) South 0.87 0.77 × 45.5 × 104.80 × 0.85 × 0.77 = 346.07 (78) <t< th=""><th>South</th><th>о оу Г</th><th></th><th>Ι.,</th><th>0.70</th><th>۱.,</th><th>440.55</th><th></th><th>0.05</th><th></th><th>0.7</th><th>1</th><th>40.40</th><th></th></t<>	South	о оу Г		Ι.,	0.70	۱.,	440.55		0.05		0.7	1	40.40	
South O.S. O.S. <t< td=""><td></td><td></td><td></td><td></td><td></td><td>1</td><td></td><td></td><td></td><td></td><td></td><td>1</td><td></td><td></td></t<>						1						1		
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South 0.8 0.77 × 12.08 × 10.661 × 0.065 × 0.07 = 538.61 (7) South 0.8 0.3 × 2.73 × 108.01 × 0.85 × 0.07 = 47.37 (7) South 0.8 0.77 × 4.65 × 108.01 × 0.85 × 0.77 = 246.85 (7) South 0.3 0.77 × 6 × 108.01 × 0.85 × 0.77 = 247.22 (7) South 0.3 0.77 × 4.5 × 104.89 × 0.85 × 0.77 = 446 (7) South 0.3 0.77 × 10.459 × 0.85 × 0.77 = 249.61 (7) South 0.3 0.77 × 10.459 × 0.85 × 0.77		Ļ				1						1		4
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South 0.00 x 2.10 10001 x 0.0000 0.0000 0.0000		Ļ				1						1		4
South 0.8 0.77 × 7.77 × 108.01 × 0.85 × 0.77 = 326.05 (78) South 0.9x 0.77 × 108.01 × 0.85 × 0.77 = 267.22 (78) South 0.9x 0.77 × 12.08 × 104.89 × 0.85 × 0.77 = 522.48 (78) South 0.9x 0.77 × 12.08 × 104.89 × 0.85 × 0.77 = 144.63 (78) South 0.9x 0.77 × 7.77 × 104.89 × 0.85 × 0.77 = 259.51 (78) South 0.9x 0.77 × 11.08 × 0.85 × 0.77 = 144.68 (78) South 0.9x 0.77 × 101.89 × 0.85 × 0.77 = 144.86 (78) South 0.9x 0.77 × 12.08 × 0.85 × <td></td> <td></td> <td></td> <td></td> <td></td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>1</td> <td></td> <td>4</td>						1						1		4
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South Outh O<		Ļ				1						1		4
South Outh Clock Clock <thc< td=""><td></td><td></td><td></td><td></td><td></td><td>1</td><td></td><td></td><td></td><td></td><td></td><td>1</td><td></td><td>4</td></thc<>						1						1		4
South 0.0 <th0.0< th=""> <th0.0< td="" th<=""><td></td><td>Ļ</td><td>0.77</td><td>X</td><td>12.08</td><td>X</td><td>104.89</td><td>X</td><td>0.85</td><td>x</td><td>0.7</td><td>=</td><td>522.48</td><td>4</td></th0.0<></th0.0<>		Ļ	0.77	X	12.08	X	104.89	X	0.85	x	0.7	=	522.48	4
South 0.11 x 7.77 x 104.89 x 0.05 x 0.77 s 7.77 x 104.89 x 0.85 x 0.77 = 336.07 78 South 0.9x 0.77 x 6 x 104.89 x 0.85 x 0.77 = 507.49 78 South 0.9x 0.3 x 2.73 x 101.89 x 0.85 x 0.77 = 446.88 78 South 0.9x 0.77 x 4.5 x 101.89 x 0.85 x 0.77 = 446.88 78 South 0.9x 0.77 x 6 x 101.89 x 0.85 x 0.77 = 252.07 78 South 0.9x 0.77 x 12.08 82.59 x 0.85 x 0.77 = 242.07 78 South		Ļ	0.3	X	2.73	X		X	0.85	X	0.7	=	46	4
South 0.8x 0.77 x 6 x 104.89 x 0.85 x 0.77 = 2559.51 (78) South 0.9x 0.77 x 12.08 x 101.89 x 0.85 x 0.77 = 2559.51 (78) South 0.9x 0.3 x 2.73 x 101.89 x 0.85 x 0.77 = 446.68 (78) South 0.9x 0.77 x 4.15 x 101.89 x 0.85 x 0.77 = 189.05 (78) South 0.9x 0.77 x 6 x 101.89 x 0.85 x 0.77 = 242.07 (78) South 0.9x 0.77 x 4.5 82.59 x 0.85 x 0.77 = 243.078 0.85 x 0.77 = 244.59 (78) 0.85 x 0.77			0.77	x	4.5	x	104.89	x	0.85	x	0.7	=	194.63	4
South 0.8x 0.77 x 12.08 x 101.89 x 0.85 x 0.77 = 507.49 (78) South 0.9x 0.3 x 2.73 x 101.89 x 0.85 x 0.77 = 44.68 (78) South 0.9x 0.77 x 4.5 x 101.89 x 0.85 x 0.77 = 44.68 (78) South 0.9x 0.77 x 4.5 x 101.89 x 0.85 x 0.77 = 44.68 (78) South 0.9x 0.77 x 6 x 101.89 x 0.85 x 0.77 = 411.36 (78) South 0.9x 0.77 x 4.5 x 82.59 x 0.85 x 0.77 = 41.36 (78) South 0.9x 0.77 x 4.5 x 82.59 x 0.85 x 0.77 = 24.32 (78) 0.85 x <td></td> <td>0.9x</td> <td>0.77</td> <td>x</td> <td>7.77</td> <td>x</td> <td>104.89</td> <td>x</td> <td>0.85</td> <td>x</td> <td>0.7</td> <td>=</td> <td>336.07</td> <td>(78)</td>		0.9x	0.77	x	7.77	x	104.89	x	0.85	x	0.7	=	336.07	(78)
South Dirac Dira Dirac Dirac <thd< td=""><td></td><td>0.9x</td><td>0.77</td><td>x</td><td>6</td><td>x</td><td>104.89</td><td>x</td><td>0.85</td><td>x</td><td>0.7</td><td>=</td><td>259.51</td><td>(78)</td></thd<>		0.9x	0.77	x	6	x	104.89	x	0.85	x	0.7	=	259.51	(78)
South 0.9x 0.77 × 4.5 × 101.89 × 0.85 × 0.77 = 189.05 (78) South 0.9x 0.77 × 6 × 101.89 × 0.85 × 0.77 = 252.07 (78) South 0.9x 0.77 × 6 × 101.89 × 0.85 × 0.77 = 252.07 (78) South 0.9x 0.77 × 12.08 × 82.59 × 0.85 × 0.77 = 252.07 (78) South 0.9x 0.77 × 12.08 × 82.59 × 0.85 × 0.77 = 264.59 78) South 0.9x 0.77 × 12.08 × 55.42 × 0.85 × 0.77 = 276.03 78) South 0.9x 0.77 × 12.08 × 55		0.9x	0.77	x	12.08	x	101.89	x	0.85	x	0.7	=	507.49	(78)
South 0.8x 0.77 x 7.77 x 101.89 x 0.85 x 0.7 = 282.07 (78) South 0.9x 0.77 x 6 x 101.89 x 0.85 x 0.7 = 282.07 (78) South 0.9x 0.77 x 12.08 x 82.59 x 0.85 x 0.7 = 411.36 (78) South 0.9x 0.77 x 4.5 x 82.59 x 0.85 x 0.7 = 135.24 (78) South 0.9x 0.77 x 4.5 x 82.59 x 0.85 x 0.7 = 284.59 (78) South 0.9x 0.77 x 12.08 x 55.42 x 0.85 x 0.7 = 24.3 (78) South 0.9x 0.77 x 4.5 x 55.42 x 0.85 x 0.7 = 102.83 (78) South <td></td> <td>0.9x</td> <td>0.3</td> <td>x</td> <td>2.73</td> <td>×</td> <td>101.89</td> <td>x</td> <td>0.85</td> <td>x</td> <td>0.7</td> <td>=</td> <td>44.68</td> <td>(78)</td>		0.9x	0.3	x	2.73	×	101.89	x	0.85	x	0.7	=	44.68	(78)
South $0.9x$ 0.77 x 1.11 101.80 x 0.85 x 0.77 z 252.07 (78) South $0.9x$ 0.77 x 12.08 x 82.59 x 0.85 x 0.77 z 41133 (78) South $0.9x$ 0.3 x 2.73 x 82.59 x 0.85 x 0.77 z 415.322 (78) South $0.9x$ 0.77 x 4.5 x 82.59 x 0.85 x 0.77 z 415.224 (78) South $0.9x$ 0.77 x 4.5 x 82.59 x 0.85 x 0.77 z 264.59 (78) South $0.9x$ 0.77 x 7.77 x 82.59 x 0.85 x 0.77 z 264.59 (78) South $0.9x$ 0.77 x 7.77 x 82.59 x 0.85 x 0.77 z (78) South $0.9x$ 0.77 x 12.08 x 55.42 x 0.85 x 0.77 z (78) South $0.9x$ 0.77 x 4.5 x 55.42 x 0.85 x 0.77 z (78) South $0.9x$ 0.77 x 4.5 x 55.42 x 0.85 x 0.77 z (78) South $0.9x$ 0.77 x <td>South</td> <td>0.9x</td> <td>0.77</td> <td>x</td> <td>4.5</td> <td>x</td> <td>101.89</td> <td>x</td> <td>0.85</td> <td>x</td> <td>0.7</td> <td>=</td> <td>189.05</td> <td>(78)</td>	South	0.9x	0.77	x	4.5	x	101.89	x	0.85	x	0.7	=	189.05	(78)
South 0.9x 0.77 x 12.08 x 62.59 x 0.85 x 0.77 = 411.36 (78) South 0.9x 0.3 x 2.73 x 82.59 x 0.85 x 0.77 = 411.36 (78) South 0.9x 0.77 x 4.5 x 82.59 x 0.85 x 0.77 = 133.24 (78) South 0.9x 0.77 x 4.5 x 82.59 x 0.85 x 0.77 = 264.59 (78) South 0.9x 0.77 x 6 x 92.59 x 0.85 x 0.77 = 294.32 (78) South 0.9x 0.77 x 12.08 x 55.42 x 0.85 x 0.77 = 24.3 (78) South 0.9x 0.77 x 4.5 x 55.42 x 0.85 x 0.77 = 102.83 (78) South<	South	0.9x	0.77	x	7.77	X	101.89	х	0.85	x	0.7	=	326.43	(78)
South $0.9x$ 0.3 \times 2.73 \times 82.59 \times 0.85 \times 0.77 $=$ 36.22 (78) South $0.9x$ 0.77 \times 4.5 \times 82.59 \times 0.85 \times 0.77 $=$ 15.24 (78) South $0.9x$ 0.77 \times 7.77 \times 82.59 \times 0.85 \times 0.77 $=$ 284.59 (78) South $0.9x$ 0.77 \times 12.08 \times 82.59 \times 0.85 \times 0.77 $=$ 224.32 (78) South $0.9x$ 0.77 \times 12.08 \times 55.42 \times 0.85 \times 0.77 $=$ 224.32 (78) South $0.9x$ 0.77 \times 12.08 \times 55.42 \times 0.85 \times 0.77 $=$ 24.32 (78) South $0.9x$ 0.77 \times 4.5 \times 55.42 \times 0.85 \times 0.77 $=$ 24.3 (78) South $0.9x$ 0.77 \times 4.5 \times 55.42 \times 0.85 \times 0.7 $=$ 117.55 (78) South $0.9x$ 0.77 \times 7.77 \times 55.42 \times 0.85 \times 0.7 $=$ 117.72 (78) South $0.9x$ 0.77 \times 12.08 \times 40.4 \times 0.85 x 0.7 $=$ 17.72 $(7$	South	0.9x	0.77	x	6	х	101.89	x	0.85	x	0.7	=	252.07	(78)
South0.9x0.77x4.5x82.59x0.85x0.7=153.24(78)South0.9x0.77x7.77x82.59x0.85x0.7=264.59(78)South0.9x0.77x6x82.59x0.85x0.7=264.59(78)South0.9x0.77x12.08x55.42x0.85x0.7=24.3(78)South0.9x0.77x12.08x55.42x0.85x0.7=24.3(78)South0.9x0.77x4.5x55.42x0.85x0.7=24.3(78)South0.9x0.77x4.5x55.42x0.85x0.7=102.83(78)South0.9x0.77x7.77x55.42x0.85x0.7=177.55(78)South0.9x0.77x7.77x55.42x0.85x0.7=102.83(78)South0.9x0.77x12.08x40.4x0.85x0.7=177.55(78)South0.9x0.77x12.08x40.4x0.85x0.7=177.2(78)South0.9x0.77x17.16x<	South	0.9x	0.77	x	12.08	х	82.59	×	0.85	x	0.7	=	4 <mark>11.36</mark>	(78)
South $0.9x$ 0.77 x 7.77 x $82/59$ x 0.85 x 0.77 z 264.59 (78) South $0.9x$ 0.77 x 6 x $82/59$ x 0.85 x 0.77 z 204.32 (78) South $0.9x$ 0.77 x 12.08 x 55.42 x 0.85 x 0.7 z 276.03 (78) South $0.9x$ 0.77 x 12.08 x 55.42 x 0.85 x 0.7 z 24.3 (78) South $0.9x$ 0.77 x 4.5 x 55.42 x 0.85 x 0.7 z 102.83 (78) South $0.9x$ 0.77 x 4.5 x 55.42 x 0.85 x 0.7 z 117.55 (78) South $0.9x$ 0.77 x 7.77 x 55.42 x 0.85 x 0.7 z 17.55 (78) South $0.9x$ 0.77 x 12.08 x 40.4 x 0.85 x 0.7 z 201.22 (78) South $0.9x$ 0.77 x 12.08 x 40.4 x 0.85 0.7 z 17.72 (78) South $0.9x$ 0.77 x 40.4 x 0.85 x 0.7 z 17.72 (78) South $0.9x$	South	0.9x	0.3	x	2.73	x	82.59	x	0.85	x	0.7	=	36.22	(78)
South $0.9x$ 0.77 x 6 x 82.59 x 0.85 x 0.7 z 204.32 (78) South $0.9x$ 0.77 x 12.08 x 55.42 x 0.85 x 0.7 z 204.32 (78) South $0.9x$ 0.3 x 2.73 x 55.42 x 0.85 x 0.7 z 24.3 (78) South $0.9x$ 0.77 x 4.5 x 55.42 x 0.85 x 0.7 z 24.3 (78) South $0.9x$ 0.77 x 4.5 x 55.42 x 0.85 x 0.7 z 102.83 (78) South $0.9x$ 0.77 x 7.77 x 55.42 x 0.85 x 0.7 z 177.55 (78) South $0.9x$ 0.77 x 6 x 55.42 x 0.85 x 0.7 z 177.55 (78) South $0.9x$ 0.77 x 12.08 x 40.4 x 0.85 x 0.7 z 17.72 (78) South $0.9x$ 0.77 x 4.55 x 40.4 x 0.85 x 0.7 z 17.72 (78) South $0.9x$ 0.77 x 4.55 x 40.4 x 0.85 x 0.7 z 17.96 (78)	South	0.9x	0.77	x	4.5	x	82.59	Х	0.85	x	0.7	=	153.24	(78)
South0.9x0.77x12.08x55.42x0.85x0.7=276.03(78)South0.9x0.3x2.73x55.42x0.85x0.7=24.3(78)South0.9x0.77x4.5x55.42x0.85x0.7=102.83(78)South0.9x0.77x4.5x55.42x0.85x0.7=102.83(78)South0.9x0.77x7.77x55.42x0.85x0.7=117.15(78)South0.9x0.77x6x55.42x0.85x0.7=117.11(78)South0.9x0.77x12.08x40.4x0.85x0.7=201.22(78)South0.9x0.77x12.08x40.4x0.85x0.7=117.72(78)South0.9x0.77x4.5x40.4x0.85x0.7=12.43(78)South0.9x0.77x7.77x40.4x0.85x0.7=12.943(78)South0.9x0.77x7.77x40.4x0.85x0.7=12.943(78)South0.9x0.77x17.16x <t< td=""><td>South</td><td>0.9x</td><td>0.77</td><td>x</td><td>7.77</td><td>x</td><td>82.59</td><td>x</td><td>0.85</td><td>x</td><td>0.7</td><td>=</td><td>2<mark>64.59</mark></td><td>(78)</td></t<>	South	0.9x	0.77	x	7.77	x	82.59	x	0.85	x	0.7	=	2 <mark>64.59</mark>	(78)
South $0.9x$ 0.3 x 2.73 x 55.42 x 0.85 x 0.7 = 24.3 (78) South $0.9x$ 0.77 x 4.5 x 55.42 x 0.85 x 0.7 = 102.83 (78) South $0.9x$ 0.77 x 7.77 x 55.42 x 0.85 x 0.7 = 102.83 (78) South $0.9x$ 0.77 x 7.77 x 55.42 x 0.85 x 0.7 = 117.55 (78) South $0.9x$ 0.77 x 7.77 x 55.42 x 0.85 x 0.7 = 117.16 (78) South $0.9x$ 0.77 x 12.08 x 40.4 x 0.85 x 0.7 = 117.72 (78) South $0.9x$ 0.77 x 12.08 x 40.4 x 0.85 x 0.7 = 127.12 (78) South $0.9x$ 0.77 x 12.08 x 40.4 x 0.85 x 0.7 = 127.12 (78) South $0.9x$ 0.77 x 4.5 x 40.4 x 0.85 x 0.7 = 129.43 (78) South $0.9x$ 0.77 x 7.77 x 40.4 x 0.85 x 0.7 = 129.43 (78) South $0.9x$ 0.77 x 7.77 x 40.4 <	South	0.9x	0.77	x	6	x	82.59	x	0.85	x	0.7	=	204.32	(78)
South $0.9x$ 0.77 x 4.5 x 55.42 x 0.85 x 0.7 z 102.83 (78) South $0.9x$ 0.77 x 7.77 x 55.42 x 0.85 x 0.7 z 102.83 (78) South $0.9x$ 0.77 x 7.77 x 55.42 x 0.85 x 0.7 z 177.55 (78) South $0.9x$ 0.77 x 6 x 55.42 x 0.85 x 0.7 z 137.1 (78) South $0.9x$ 0.77 x 12.08 x 40.4 x 0.85 x 0.7 z 201.22 (78) South $0.9x$ 0.77 x 12.08 x 40.4 x 0.85 x 0.7 z 17.72 (78) South $0.9x$ 0.77 x 4.5 x 40.4 x 0.85 x 0.7 z 17.72 (78) South $0.9x$ 0.77 x 4.5 x 40.4 x 0.85 x 0.7 z 17.92 (78) South $0.9x$ 0.77 x 17.16 x 19.64 x 0.85 x 0.7 z 138.97 (80) West $0.9x$ 0.77 x 17.16 x 19.64 x 0.85 x 0.7 z 271.85 (80) <td>South</td> <td>0.9x</td> <td>0.77</td> <td>x</td> <td>12.08</td> <td>x</td> <td>55.42</td> <td>x</td> <td>0.85</td> <td>x</td> <td>0.7</td> <td>=</td> <td>276.03</td> <td>(78)</td>	South	0.9x	0.77	x	12.08	x	55.42	x	0.85	x	0.7	=	276.03	(78)
South $0.9x$ 0.77 x 7.77 x 55.42 x 0.85 x 0.7 $=$ 177.55 (78) South $0.9x$ 0.77 x 6 x 55.42 x 0.85 x 0.7 $=$ 137.1 (78) South $0.9x$ 0.77 x 12.08 x 40.4 x 0.85 x 0.7 $=$ 201.22 (78) South $0.9x$ 0.77 x 12.08 x 40.4 x 0.85 x 0.7 $=$ 201.22 (78) South $0.9x$ 0.77 x 4.5 x 40.4 x 0.85 x 0.7 $=$ 17.72 (78) South $0.9x$ 0.77 x 4.5 x 40.4 x 0.85 x 0.7 $=$ 129.43 (78) South $0.9x$ 0.77 x 7.77 x 40.4 x 0.85 x 0.7 $=$ 129.43 (78) South $0.9x$ 0.77 x 17.16 x 19.64 x 0.85 x 0.7 $=$ 138.97 (80) West $0.9x$ 0.77 x 17.16 x 19.64 x 0.85 x 0.7 $=$ 271.85 (80) West $0.9x$ 0.77 x 17.16 x 19.64 x 0.85 x 0.7 $=$ 447.7 (80) </td <td>South</td> <td>0.9x</td> <td>0.3</td> <td>x</td> <td>2.73</td> <td>x</td> <td>55.42</td> <td>x</td> <td>0.85</td> <td>x</td> <td>0.7</td> <td>=</td> <td>24.3</td> <td>(78)</td>	South	0.9x	0.3	x	2.73	x	55.42	x	0.85	x	0.7	=	24.3	(78)
South 0.9x 0.77 x 6 x 55.42 x 0.85 x 0.77 = 137.1 (78) South 0.9x 0.77 x 12.08 x 40.4 x 0.85 x 0.77 = 137.1 (78) South 0.9x 0.77 x 12.08 x 40.4 x 0.85 x 0.77 = 201.22 (78) South 0.9x 0.3 x 2.73 x 40.4 x 0.85 x 0.77 = 17.72 (78) South 0.9x 0.77 x 4.5 x 40.4 x 0.85 x 0.77 = 17.72 (78) South 0.9x 0.77 x 7.77 x 40.4 x 0.85 x 0.77 = 129.43 (78) South 0.9x 0.77 x 17.16 x 19.64 x 0.85 x 0.77 = 138.97 (80) West	South	0.9x	0.77	x	4.5	x	55.42	x	0.85	x	0.7	=	102.83	(78)
South $0.9x$ 0.77 x 12.08 x 40.4 x 0.85 x 0.7 = 201.22 (78) South $0.9x$ 0.3 x 2.73 x 40.4 x 0.85 x 0.7 = 17.72 (78) South $0.9x$ 0.77 x 4.5 x 40.4 x 0.85 x 0.7 = 74.96 (78) South $0.9x$ 0.77 x 4.5 x 40.4 x 0.85 x 0.7 = 129.43 (78) South $0.9x$ 0.77 x 7.77 x 40.4 x 0.85 x 0.7 = 129.43 (78) South $0.9x$ 0.77 x 7.77 x 40.4 x 0.85 x 0.7 = 129.43 (78) South $0.9x$ 0.77 x 6 x 40.4 x 0.85 x 0.7 = 129.43 (78) South $0.9x$ 0.77 x 17.16 x 19.64 x 0.85 x 0.7 = 138.97 (80) West $0.9x$ 0.77 x 17.16 x 19.64 x 0.85 x 0.7 = 271.85 (80) West $0.9x$ 0.77 x 17.16 x 92.28 x 0.85 x 0.7 = 652.94 (80) West $0.9x$ 0.77 x 17.16 x 113.09	South	0.9x	0.77	x	7.77	x	55.42	x	0.85	x	0.7	=	177.55	(78)
South $0.9x$ 0.3 x 2.73 x 40.4 x 0.85 x 0.7 $=$ 17.72 (78) South $0.9x$ 0.77 x 4.5 x 40.4 x 0.85 x 0.7 $=$ 74.96 (78) South $0.9x$ 0.77 x 4.5 x 40.4 x 0.85 x 0.7 $=$ 74.96 (78) South $0.9x$ 0.77 x 7.77 x 40.4 x 0.85 x 0.7 $=$ 129.43 (78) South $0.9x$ 0.77 x 6 x 40.4 x 0.85 x 0.7 $=$ 129.43 (78) South $0.9x$ 0.77 x 6 x 40.4 x 0.85 x 0.7 $=$ 129.43 (78) West $0.9x$ 0.77 x 17.16 x 19.64 x 0.85 x 0.7 $=$ 138.97 (80) West $0.9x$ 0.77 x 17.16 x 38.42 x 0.85 x 0.7 $=$ 271.85 (80) West $0.9x$ 0.77 x 17.16 x 92.28 x 0.85 x 0.7 $=$ 447.7 (80) West $0.9x$ 0.77 x 17.16 x 113.09 x 0.85 x 0.7 $=$ 819.15 (80) <	South	0.9x	0.77	x	6	x	55.42	x	0.85	x	0.7	=	137.1	(78)
South 0.9x 0.77 x 4.5 x 40.4 x 0.85 x 0.7 = 74.96 (78) South 0.9x 0.77 x 7.77 x 40.4 x 0.85 x 0.7 = 74.96 (78) South 0.9x 0.77 x 7.77 x 40.4 x 0.85 x 0.7 = 129.43 (78) South 0.9x 0.77 x 6 x 40.4 x 0.85 x 0.7 = 129.43 (78) West 0.9x 0.77 x 6 x 40.4 x 0.85 x 0.7 = 129.43 (78) West 0.9x 0.77 x 17.16 x 19.64 x 0.85 x 0.7 = 138.97 (80) West 0.9x 0.77 x 17.16 x 38.42 x 0.85 x 0.7 = 447.7 (80) West 0.	South	0.9x	0.77	x	12.08	x	40.4	x	0.85	x	0.7	=	201.22	(78)
South $0.9x$ 0.77 x 7.77 x 40.4 x 0.85 x 0.7 $=$ 129.43 (78) South $0.9x$ 0.77 x 6 x 40.4 x 0.85 x 0.7 $=$ 99.95 (78) West $0.9x$ 0.77 x 17.16 x 19.64 x 0.85 x 0.7 $=$ 138.97 (80) West $0.9x$ 0.77 x 17.16 x 19.64 x 0.85 x 0.7 $=$ 138.97 (80) West $0.9x$ 0.77 x 17.16 x 38.42 x 0.85 x 0.7 $=$ 271.85 (80) West $0.9x$ 0.77 x 17.16 x 92.28 x 0.85 x 0.7 $=$ 447.7 (80) West $0.9x$ 0.77 x 17.16 x 113.09 x 0.85 x 0.7 $=$ 800.21 (80) West $0.9x$ 0.77 x 17.16 x 115.77 x 0.85 x 0.7 $=$ 819.15 (80)	South	0.9x	0.3	x	2.73	x	40.4	x	0.85	x	0.7	=	17.72	(78)
South $0.9x$ 0.77 x 6 x 40.4 x 0.85 x 0.7 = 99.95 (78)West $0.9x$ 0.77 x 17.16 x 19.64 x 0.85 x 0.7 = 138.97 (80)West $0.9x$ 0.77 x 17.16 x 38.42 x 0.85 x 0.7 = 271.85 (80)West $0.9x$ 0.77 x 17.16 x 38.42 x 0.85 x 0.7 = 271.85 (80)West $0.9x$ 0.77 x 17.16 x 63.27 x 0.85 x 0.7 = 447.7 (80)West $0.9x$ 0.77 x 17.16 x 92.28 x 0.85 x 0.7 = 652.94 (80)West $0.9x$ 0.77 x 17.16 x 113.09 x 0.85 x 0.7 = 800.21 (80)West $0.9x$ 0.77 x 17.16 x 115.77 x 0.85 x 0.7 = 819.15 (80)	South	0.9x	0.77	x	4.5	x	40.4	x	0.85	x	0.7	=	74.96	(78)
West $0.9x$ 0.77 x 17.16 x 19.64 x 0.85 x 0.7 = 138.97 (80)West $0.9x$ 0.77 x 17.16 x 38.42 x 0.85 x 0.7 = 271.85 (80)West $0.9x$ 0.77 x 17.16 x 63.27 x 0.85 x 0.7 = 447.7 (80)West $0.9x$ 0.77 x 17.16 x 63.27 x 0.85 x 0.7 = 447.7 (80)West $0.9x$ 0.77 x 17.16 x 92.28 x 0.85 x 0.7 = 652.94 (80)West $0.9x$ 0.77 x 17.16 x 113.09 x 0.85 x 0.7 = 800.21 (80)West $0.9x$ 0.77 x 17.16 x 115.77 x 0.85 x 0.7 = 819.15 (80)	South	0.9x	0.77	x	7.77	x	40.4	x	0.85	x	0.7	=	129.43	(78)
West $0.9x$ 0.77 x 17.16 x 38.42 x 0.85 x 0.7 = 271.85 (80)West $0.9x$ 0.77 x 17.16 x 63.27 x 0.85 x 0.7 = 447.7 (80)West $0.9x$ 0.77 x 17.16 x 92.28 x 0.85 x 0.7 = 652.94 (80)West $0.9x$ 0.77 x 17.16 x 113.09 x 0.85 x 0.7 = 800.21 (80)West $0.9x$ 0.77 x 17.16 x 115.77 x 0.85 x 0.7 = 819.15 (80)West $0.9x$ 0.77 x 17.16 x 115.77 x 0.85 x 0.7 = 819.15 (80)	South	0.9x	0.77	x	6	x	40.4	x	0.85	x	0.7	=	99.95	(78)
West $0.9x$ 0.77 x 17.16 x 63.27 x 0.85 x 0.7 = 447.7 (80)West $0.9x$ 0.77 x 17.16 x 92.28 x 0.85 x 0.7 = 652.94 (80)West $0.9x$ 0.77 x 17.16 x 113.09 x 0.85 x 0.7 = 800.21 (80)West $0.9x$ 0.77 x 17.16 x 115.77 x 0.85 x 0.7 = 819.15 (80)West $0.9x$ 0.77 x 17.16 x 115.77 x 0.85 x 0.7 = 819.15 (80)	West	0.9x	0.77	x	17.16	x	19.64	x	0.85	x	0.7	=	138.97	(80)
West $0.9x$ 0.77 x 17.16 x 92.28 x 0.85 x 0.7 = 652.94 (80) West $0.9x$ 0.77 x 17.16 x 92.28 x 0.85 x 0.7 = 652.94 (80) West $0.9x$ 0.77 x 17.16 x 113.09 x 0.85 x 0.7 = 800.21 (80) West $0.9x$ 0.77 x 17.16 x 115.77 x 0.85 x 0.7 = 819.15 (80) West $0.9x$ 0.77 x 17.16 x 115.77 x 0.85 x 0.7 = 819.15 (80)	West	0.9x	0.77	x	17.16	x	38.42	x	0.85	x	0.7	=	271.85	(80)
West $0.9x$ 0.77 x 17.16 x 113.09 x 0.85 x 0.7 = 800.21 (80) West $0.9x$ 0.77 x 17.16 x 113.09 x 0.85 x 0.7 = 800.21 (80) West $0.9x$ 0.77 x 17.16 x 115.77 x 0.85 x 0.7 = 819.15 (80) West $0.9x$ 0.77 x 17.16 x 115.77 x 0.85 x 0.7 = 819.15 (80)	West	0.9x	0.77	x	17.16	×	63.27	x	0.85	x	0.7	=	447.7	(80)
West $0.9x$ 0.77 x 115.77 x 0.85 x 0.7 = 819.15 (80)	West	0.9x	0.77	x	17.16	x	92.28	x	0.85	x	0.7	=	652.94	(80)
	West	0.9x	0.77	x	17.16	x	113.09	x	0.85	x	0.7	=	800.21	(80)
West 0.9x 0.77 x 17.16 x 110.22 x 0.85 x 0.7 = 779.87 (80)	West	0.9x	0.77	x	17.16	×	115.77	x	0.85	x	0.7	=	819.15	(80)
	West	0.9x	0.77	x	17.16	x	110.22	x	0.85	x	0.7	=	779.87	(80)

West 0.95 0.77 × 17.16 × 44.66 × 0.85 × 0.77 × 630.89 (60) West 0.95 0.77 × 17.16 × 72.59 × 0.85 × 0.77 = 630.89 (60) West 0.95 0.77 × 17.16 × 24.48 × 0.85 × 0.77 = 172.28 (80) West 0.95 0.77 × 17.16 × 24.48 × 0.85 × 0.77 = 172.28 (80) West 0.95 0.77 × 17.16 × 24.48 3.88.29 21.503 24.95 178.1 109.12 177.2.8 (83) Total gains in watts, calculated for each month (83)m - samt/24m (80)m (84) (74)m (72)m (83) Total gains - internal and sold (64)m = (73)m + (83)m, watts (84)m - (73)m + (83)m, watts (84)m - (75)m + (83)m (84)m - (75)m (71)m - (72)m (84)m - (73)m - (72)m (84)m - (73)m - (72)m -				_					· —						
West 0.4 0.77 × 17.16 × 46.59 × 0.7 = 322.57 (80) West 0.8 0.77 × 17.16 × 24.49 × 0.05 × 0.7 = 322.57 (80) West 0.8 0.77 × 17.16 × 24.49 × 0.05 0.7 = 322.57 (80) West 0.8 0.77 × 17.16 × 16.15 × 0.08 0.7 = 322.57 (80) Columination of the column of t	West	0.9x	0.77	×	17.	16	×	94.68	×	0.85	_ × _	0.7	=	669.89	(80)
West 0.1 0.1 × 17.1 × 24.4 × 0.00 0.01 = 172.2 000 West 0.3 0.77 × 17.16 × 24.4 × 0.02 0.7 = 172.20 000 Solar gains in watts, calculated for each month (83)m 184.46 286.22 215.03 246.05 1701.8 1001.21 772.30 (03) Total gains - internal and solar (24)m (73)m (83)m 184.46 286.5 136.13 244.66 1001.21 772.30 (03) Total gains - internal and solar (24)m (73)m (83)m watts (84)m 184.23 286.5 1370.36 (44) Automational solar (10)m attrate during heating periods in the living area from Table 9. Tht (°C) 21 (85) Ubisation factor for gains for living area, 11, m (see Table 93) (87)m 184 193.0 23.2 20.76 20.65 20.63 20.05 186.2 (77) Temperature during heating periods in test of dwelling from Table 9. Tht (°C) 21 21 20.65 20.63 20.65 186.2		0.9x	0.77	×	17.	16	×	73.59	×	0.85	×	0.7	=	520.69	(80)
West 0.5 0.77 × 17.16 × 12.00 0.00 0.77 = 114.28 (00) Solar gains in watts, calculated for each month (63)m = \$0.66.1 174.17 22.06.1 7 114.28 (00) (63)m = \$0.66.1 174.17 22.06.4 244.65 328.62.29 2915.03 246.51 176.18 1091.21 772.36 (83) Total gains - internal and solar (64/m = (73)m + (63)m, watts (84)m = \$124.24 218.57 228.94 347.15 3917.29 3916.11 374.51 3381.26 295.513 224.16 1685.88 1370.36 (44) Temperature duing heating periods in the living area from Table 9, Th1 (°C) 21 (15) (15) (16) Wesh internal temperature in living area, 11, m (see Table 9a) (47) (47) (48) (48) (48) (48) Wesh internal temperature duing heating periods in rest of dwelling from Table 9, Th1 (°C) (21) (48) (48) (48) (48) (49)m = 19.88 19.83 0.20 0.20 0.20 (48) (48) (48) (48) (48) (West	0.9x	0.77	×	17.	16	×	45.59	x	0.85	×	0.7	=	322.57	(80)
Note Other Other <tho< td=""><td>West</td><td>0.9x</td><td>0.77</td><td>×</td><td>17.</td><td>16</td><td>x</td><td>24.49</td><td>×</td><td>0.85</td><td>x</td><td>0.7</td><td>=</td><td>173.28</td><td>(80)</td></tho<>	West	0.9x	0.77	×	17.	16	x	24.49	×	0.85	x	0.7	=	173.28	(80)
(63)m 065.4 1574.17 2236.54 2914.63 3286.29 2915.03 2468.5 1761.8 1091.21 772.36 (63) Total gains - internal and solar (84)m = (73)m + (83)m, watts (64) (64) (64) (65) (64) A Man Se24.42 1288.57 2828.87 3471.5 5917.29 3916.11 3746.1 381.26 2965.13 2244.16 1665.89 1370.36 (64) A Man Internal temporature (Leging season) Temperature during heating periods in the living area. 1n, m (see Table 9.) (65) (65) (66) Mean internal temporature in living area. 11 (follow steps 3 to 7 in Table 9.) (67) (67) (67) (67) Temperature during heating periods in rest of dwelling from Table 9. Th2 (°C) (67) (67) (67) (67) (69)m 19.88 19.99 0.37 0.74 20.93 20.90 21 21 20.65 20.63 20.05 19.62 (67) (69)m 19.88 19.91 19.91 19.92 19.82 19.82 19.81 19.91 19.91 (69) (69) (69) <td< td=""><td>West</td><td>0.9x</td><td>0.77</td><td>×</td><td>17.</td><td>16</td><td>x</td><td>16.15</td><td>x</td><td>0.85</td><td>x</td><td>0.7</td><td>=</td><td>114.28</td><td>(80)</td></td<>	West	0.9x	0.77	×	17.	16	x	16.15	x	0.85	x	0.7	=	114.28	(80)
(63)m 065.4 1574.17 2236.54 2914.63 3286.29 2915.03 2468.5 1761.8 1091.21 772.36 (63) Total gains - internal and solar (84)m = (73)m + (83)m, watts (64) (64) (64) (65) (64) A Man Se24.42 1288.57 2828.87 3471.5 5917.29 3916.11 3746.1 381.26 2965.13 2244.16 1665.89 1370.36 (64) A Man Internal temporature (Leging season) Temperature during heating periods in the living area. 1n, m (see Table 9.) (65) (65) (66) Mean internal temporature in living area. 11 (follow steps 3 to 7 in Table 9.) (67) (67) (67) (67) Temperature during heating periods in rest of dwelling from Table 9. Th2 (°C) (67) (67) (67) (67) (69)m 19.88 19.99 0.37 0.74 20.93 20.90 21 21 20.65 20.63 20.05 19.62 (67) (69)m 19.88 19.91 19.91 19.92 19.82 19.82 19.81 19.91 19.91 (69) (69) (69) <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>															
Total gains – internal and solar (84)m = (73)m + (83)m , watts	Solar g	pains in	watts, calcu	lated	for eac	h month			(83)m = S	um(74)m .	(82)m				
(#4)m= 1524.24 218.957 228.87 3471.5 3917.29 3916.11 374.51 381.28 286.13 2284.16 1665.89 1370.36 (#4) Colspan="4">Colspan="4" Colspan="4">Colspan="4" Colspan="4">Colspan="4">Colspan="4">Colspan="4">Colspan="4">Colspan="4">Colspan="4">Colspan="4">Colspan="4">Colspan="4">Colspan="4">Colspan="4">Colspan="4">Colspan="4" Colspan="4">Colspan="4" Colspan="4" Colspan="4" Colspan="4" Colspan="4" <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>2915.03</td><td>2469.5</td><td>1761.8</td><td>1091.21</td><td>772.36</td><td></td><td>(83)</td></td<>									2915.03	2469.5	1761.8	1091.21	772.36		(83)
7. Mean internal temperature (heating season) Temperature during heating periods in the living area from Table 9, Th1 (°C) 21 (86) Ulisation factor for gains for living area, h1,m (see Table 9a) (86) Ulisation factor for gains for living area, h1,m (see Table 9a) (86) Ulisation factor for gains for living area, h1,m (see Table 9a) (86) Ulisation factor for gains for living area T1 (follow steps 3 to 7 in Table 9c) (87) (87) 1 0.99 0.85 0.86 0.40 0.40 0.85 0.31 0.57 0.9 19.92 19.92 19.92 19.91 19.91 19.91 19.91 Ulisation factor for gains for rest of dwelling, h2,m (see Table 9a) (89) Wean internal temperature (for the whole dwelling) f2 (follow steps 3 to 7 in Table 9C) (90) List 1 10.02 19.37 19.27 19.87 19.82 19.82 19.82 19.82 19.84 19.08 18.65 (92) Mean internal temperature for Table 9A, here appropriate (92) (92) Mean internal temperature for Table 9A, bere appropriate (93) List for mean internal tempera	Total g	ains – i			(84)m =	= (73)m ·	+ (83)	m, watts							
Temperature during heating periods in the living area from Table 9, Th1 (°C) 21 (86) Utilisation factor for gains for living area, h1,m (see Table 9a) (66)m 1 0.39 0.95 0.85 0.86 0.48 0.35 0.40 0.50 0.93 0.99 1 (86) Mean internal temperature in living area T1 (follow steps 3 to 7 in Table 9c): (97)me 19.81 19.92 19.92 19.92 19.92 19.92 19.91 19.91 (9.9) (87) Temperature during heating periods in rest of dwelling, form Table 9, Th2 (°C). (89)me 1 0.98 0.94 0.81 0.4 0.26 0.81 0.99 1 (89) (9)me 1 0.98 0.94 0.81 0.6 0.4 0.26 0.81 0.99 1 (89) Mean internal temperature (for the whole dwelling) T2 (19.07 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.93 19.22 18.99 0.44 2.6 0.14 (91) Mean internal temperature (for the whole dwelling) = fLA	(84)m=	1524.24	2189.57 28	29.87	3471.5	3917.29	3916.	11 3745.1	3381.26	2955.13	2284.16	1655.89	1370.36		(84)
Utilisation factor for gains for living area, h1,m (see Table 9a) Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec (66) (66)m= 1 0.99 0.95 0.88 0.66 0.48 0.35 0.4 0.66 0.93 0.99 1 (66) Mean internal temperature in living area T1 (follow steps 3 to 7 in Table 9c) (87)m 19.88 19.99 20.37 20.74 20.93 20.99 21 21 20.85 20.63 20.05 19.62 (87) Temperature during heating periods in rest of dwelling from Table 9, Th2 (°C). (89)m 1 0.98 0.84 0.8 0.4 0.26 0.31 0.57 0.9 0.99 1 (89) Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c) (90) (1.4 18.08 19.08 18.64 19.08 18.65 (90) (91) (1.4 (1.4) (1	7. Me	an inter	nal tempera	iture ((heating	season)								
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Temp	erature	during heat	ing p	eriods ir	n the livi	ng are	a from Tal	ole 9, Th	1 (°C)				21	(85)
(86)m= 1 0.99 0.95 0.85 0.66 0.48 0.35 0.4 0.65 0.93 0.99 1 (86) Mean internal temperature in living area T1 (follow steps 3 to 7 in Table 9c). (87)m= 19.86 19.99 20.37 20.74 20.93 20.99 21 21 20.95 20.63 20.05 19.62 (87) Temperature during heating periods in rest of dwelling from Table 9, Th2 (°C) (89)m 19.91 19.91 19.91 19.91 19.91 19.91 19.91 19.91 19.91 19.91 (89) Utilisation factor for gains for rest of dwelling, h2 m (see Table 9a). (89) (89) (89) (89) (89) (89) (89) (89) (89) (89) (89) (89) (89) (89) (80) (89) (80) (89) (89) (80) (89) (89) (89) (89) (80) (89) (80) (80) (80) (80) (80) (80) (80) (80) (80) (80) (80) (80) (80) (80) (80) (80) (80) (80)	Utilisa	ation fac	ctor for gains	s for li	iving are	ea, h1,m	(see	Table 9a)							
Mean internal temperature in living area T1 (follow steps 3 to 7 in Table 9c) (87) Temperature during heating periods in rest of dwelling from Table 9, Th2 (°C) (88) (89) 19.9 19.91 19.91 19.92 19.92 19.92 19.91 19.92 19.82 19.81 19.91 19.91 19.92 19.82 19.81 19.91 19.91 19.92 19.82 19.81 19.91 19.92 19.82 19.81 19.91 19.92 19.82 19.81 19.91 19.92 19.82 19.82 19.83 19.92 19.82 19.82 19.83 19.92 19.83 19.92 19.83 19.92 19.83 19.92 19.83 19.92 19.83 19.92 <td></td> <td>Jan</td> <td>Feb I</td> <td>Mar</td> <td>Apr</td> <td>May</td> <td>Ju</td> <td>n Jul</td> <td>Aug</td> <td>Sep</td> <td>Oct</td> <td>Nov</td> <td>Dec</td> <td></td> <td></td>		Jan	Feb I	Mar	Apr	May	Ju	n Jul	Aug	Sep	Oct	Nov	Dec		
(87)m= 19.68 19.99 20.37 20.74 20.93 20.99 21 21 20.95 20.63 20.05 19.62 (87) Temperature during heating periods in rest of dwelling from Table 9, Th2 (*C) (89)m= 19.91 19.91 19.91 19.91 19.92 19.92 19.91 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.93 <td>(86)m=</td> <td>1</td> <td>0.99 0</td> <td>.95</td> <td>0.85</td> <td>0.66</td> <td>0.48</td> <td>0.35</td> <td>0.4</td> <td>0.65</td> <td>0.93</td> <td>0.99</td> <td>1</td> <td></td> <td>(86)</td>	(86)m=	1	0.99 0	.95	0.85	0.66	0.48	0.35	0.4	0.65	0.93	0.99	1		(86)
(87)m= 19.68 19.99 20.37 20.74 20.93 20.99 21 21 20.95 20.63 20.05 19.62 (87) Temperature during heating periods in rest of dwelling from Table 9, Th2 (*C) (89)m= 19.91 19.91 19.91 19.91 19.92 19.92 19.91 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.92 19.93 <td>Mean</td> <td>interna</td> <td>l temperatu</td> <td>re in l</td> <td>ivina ar</td> <td></td> <td></td> <td>stens 3 to 7</td> <td>r 7 in Tabl</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Mean	interna	l temperatu	re in l	ivina ar			stens 3 to 7	r 7 in Tabl						
Temperature during heating periods in rest of dwelling from Table 9, Th2 (°C) (88)m= 9.9 19.91 19.91 19.91 19.92 19.92 19.92 19.91 19.92 18.93 19.07 18.4 (93) (94			i <u>i</u>		-	i – – – –	1		1	· · · · ·	20.63	20.05	19.62		(87)
(88)ms 9.9 49.9 19.91 19.91 19.92 19.92 19.91 19.92 1												1			
Utilisation factor for gains for rest of dwelling, h2,m (see Table 9a) (89)m= 1 0.98 0.94 0.81 0.6 0.4 0.26 0.31 0.57 0.9 0.99 1 (89) Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c) (90) (1.4 10.08 18.65 (90) (90)m= 18.71 19.02 19.37 19.91 19.92 19.89 19.64 19.08 18.65 (90) (1.4 11.10 19.33 19.72 19.81 19.92 20.07 20.07 20.04 19.78 19.22 18.79 (92) Apply adjustment to the mean internal temperature from Table 4e, where appropriate (93) (93) 8 19.63 19.07 18.64 (93) St Ti to the mean internal temperature obtained at step 11 of Table 9b, so that Ti,m=(76)m and re-calculate the utilisation factor for gains, hm: (94) 1 0.98 0.93 0.8 0.6 0.4 0.26 0.31 0.57 0.89 0.99 1 (94) Useful gains, hmGm , W = (94)m x (84)m (94) 1 0.98 0.83				<u> </u>		i			i		40.04	40.04	40.04		(00)
$ \begin{array}{c} (89)m = & 1 & 0.8 & 0.94 & 0.81 & 0.6 & 0.4 & 0.26 & 0.31 & 0.57 & 0.9 & 0.99 & 1 \\ \hline \mbox{Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c) \\ (90)m = & 18.71 & 19.02 & 19.39 & 19.72 & 19.87 & 19.91 & 19.92 & 19.89 & 19.64 & 19.08 & 18.65 & (90) \\ \hline \mbox{Mean internal temperature (for the whole dwelling) = fLA x T1 + (1 - fLA) x T2 \\ (92)m = & 18.85 & 19.15 & 19.53 & 19.87 & 20.02 & 20.07 & 20.07 & 20.07 & 20.04 & 19.78 & 19.22 & 18.79 & (92) \\ \hline \mbox{Apply adjustment to the mean internal temperature from Table 4e, where appropriate \\ (93)m = & 18.7 & 19 & 19.38 & 19.72 & 19.87 & 19.92 & 19.92 & 19.89 & 19.63 & 19.07 & 18.64 & (93) \\ \hline \mbox{Barrow and the mean internal temperature obtained at step 11 of Table 9b, so that Ti,m=(76)m and re-calculate the utilisation factor for gains, hm: \\ \hline \mbox{Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec} \\ Utilisation factor for gains, hm: \\ (94)m = & 1 & 0.98 & 0.93 & 0.8 & 0.6 & 0.4 & 0.26 & 0.31 & 0.57 & 0.89 & 0.99 & 1 & (94) \\ Useful gains, hmGm, W = (94)m x (84)m \\ \hline \mbox{Gesme 1157.66 2144.47 } 2628.62 2770.95 2343.38 & 1570.07 & 98.93 & 1044.2 & 1671.6 & 2031.87 & 1634.11 & 1366.67 & (95) \\ \hline \mbox{Monthy 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) \\ \hline Heat ioss rate for mean internal temperature, Lm , W = [(39)m x [(93)m - (96)m] \\ \hline \(97)m = & 4343.29 & 4250.47 & 3876.06 & 3238.49 & 2444.32 & 1581.83 & 988.08 & 1046.67 & 1727.57 & 2699.71 & 3587.31 & 4335.79 & (97) \\ \hline \mbox{Space heating requirement for each month, kWh/month = 0.024 \times [(97)m - (95)m] \times (41)m \\ \hline \(89)m = & 202.27 & 1415.23 & 92.09 & 36.63 & 75.1 & 0 & 0 & 0 & 0 & 486.87 & 1006.3 & 2200.03 \\ \hline \mbox{Total per year (kWh/year) = Sum(98), as vertex and step and ste$	(88)m=	19.9	19.9 1	9.91	19.91	19.91	19.9	2 19.92	19.92	19.91	19.91	19.91	19.91		(00)
$\begin{array}{c} \text{Mean internal temperature in the rest of dwelling T2 (follow steps 3 to 7 in Table 9c)} \\ (90)\text{m} = 18.71 19.02 19.39 19.72 19.87 19.91 19.92 19.92 19.92 19.89 19.64 19.08 18.65 (90) \\ (90)\text{m} = 18.71 19.02 19.39 19.72 19.87 19.91 19.92 19.92 19.92 19.92 19.89 19.64 19.08 18.65 (91) \\ \text{TLA} = \text{Living area} + (4) = 0.14 (91) \\ \text{Mean internal temperature (for the whole dwelling)} = \text{fLA} \times \text{T1} + (1 - \text{fLA}) \times \text{T2} \\ (92)\text{m} = 18.85 19.15 19.53 19.87 20.02 20.07 20.07 20.07 20.04 19.78 19.22 18.79 (92) \\ \text{Apply adjustment to the mean internal temperature from Table 4e, where appropriate \\ (93)\text{m} = 18.7 19 19.38 19.72 19.87 19.92 19.92 19.92 19.93 19.63 19.07 18.64 (93) \\ \textbf{Space heating requirement} \\ \textbf{Set Ti to the mean internal temperature obtained at step 11 of Table 9b, so that Ti, m=(76)m and re-calculate the utilisation factor for gains using Table 9a \\ \hline Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec \\ Utilisation factor for gains, hm: \\ (94)\text{m} 1 0.98 0.93 0.8 0.6 0.4 0.26 0.31 0.57 0.89 0.99 1 (94) \\ Useful gains, hmGm, W = (94)m \times (84)m \\ (95)\text{m} = 1517.66 2144.47 2628.62 2770.95 2343.38 1570.07 986.93 1044.2 1671.6 2031.87 1634.11 1366.67 (95) \\ \text{Monthly average external temperature form Table 8} \\ (96)\text{m} = 4.3 4.9 6.5 8.9 11.7 14.6 16.6 16.4 14.1 10.6 7.1 4.2 (96) \\ \text{Heat loss rate for mean internal temperature, Lm, W = [(39)m \times [(93)m - (95)m] \\ (97)\text{m} = 4343.29 4250.47 3876.06 3238.49 2444.32 1581.83 980.80 1046.67 1727.57 2699.71 3587.31 4335.79 (97) \\ \text{Space heating requirement for each month, kWh/month = 0.024 \times [(97)\text{m} - (95)\text{m}] \times (41)\text{m}} \\ (89\text{m} = 210.2.7 1415.23 92.80 336.83 75.1 0 0 0 0 0 486.87 1406.3 2209.03 \\ \text{Total per year (kWh/year)} = \text{Sum}(98)_{\text{loss.32}} = 8969.52 (98) \\ \end{array}$	Utilisa	ation fac	tor for gains	s for r	est of d	welling,	h2,m	(see Table	9a)						
$ \begin{array}{c} (90)m = \hline 18.71 & 19.02 & 19.39 & 19.72 & 19.87 & 19.91 & 19.92 & 19.92 & 19.89 & 19.64 & 19.08 & 18.65 & (90) \\ \hline 1LA = Living area \div (4) = & 0.14 & (91) \\ \hline Mean internal temperature (for the whole dwelling) = fLA x T1 + (1 - fLA) x T2 \\ \hline (92)m = \hline 18.85 & 19.15 & 19.53 & 19.87 & 20.02 & 20.07 & 20.07 & 20.07 & 20.04 & 19.78 & 19.22 & 18.79 & (92) \\ \hline Apply adjustment to the mean internal temperature from Table 4e, where appropriate \\ \hline (93)m = \hline 18.7 & 19 & 19.38 & 19.72 & 19.87 & 19.92 & 19.92 & 19.92 & 19.89 & 19.63 & 19.07 & 18.64 & (93) \\ \hline \textbf{3. Space heating requirement} \\ \hline Set Ti to the mean internal temperature obtained at step 11 of Table 9b, so that Ti,m=(76)m and re-calculate the utilisation factor for gains, hm: \\ \hline (94)m = \hline 1 & 0.98 & 0.93 & 0.8 & 0.6 & 0.4 & 0.26 & 0.31 & 0.57 & 0.89 & 0.99 & 1 & (94) \\ \hline Useful gains, hmGm, W = (94)m x (84)m \\ \hline (95)m = \hline 1517.66 & 2144.47 & 2628.62 & 2770.95 & 2343.38 & 1570.07 & 986.93 & 1044.2 & 1671.6 & 2031.87 & 1634.11 & 1366.67 & (95) \\ \hline Monthly average external temperature from Table 8 \\ \hline (96)m = \hline 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) \\ \hline Heat loss rate for mean internal temperature, Lm , W = [(39)m x [(93)m - (96)m] & (97) \\ \hline Space heating requirement for each month, kWh/month = 0.024 x [(97)m - (95)m] x (41)m \\ \hline (98)m = & 2102.27 & 1415.23 & 928.09 & 36.63 & 75.1 & 0 & 0 & 0 & 0 & 496.87 & 1406.3 & 2209.03 \\ \hline Total per year (kWh/year) = Sum(98)s.r = & 8969.52 & (98) \\ \hline \end{array}$	(89)m=	1	0.98 0	.94	0.81	0.6	0.4	0.26	0.31	0.57	0.9	0.99	1		(89)
ILA = Living area \div (4) = 0.14 (91) Mean internal temperature (for the whole dwelling) = fLA x T1 + (1 - fLA) x T2 (92) (92) (92)m= 18.85 19.15 19.53 19.87 20.02 20.07 20.07 20.04 19.78 19.22 18.79 (92) Apply adjustment to the mean internal temperature from Table 4e, where appropriate (93) (93) (93) (93) (93) Set Ti to the mean internal temperature obtained at step 11 of Table 9b, so that Ti,m=(76)m and re-calculate the utilisation factor for gains using Table 9a (94) (94) Utilisation factor for gains, hm: (94) (94) (94) (95) (94) Useful gains, hmGm, W = (94)m x (84)m (95) (96) (94) (94) (94) (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 (95) (97)m= 433.29 426.47 336.83 980.08 1046.67 1727.57 2699.71 3587.31 433.579 (97) Space heating requirement for each month, kWh/month = 0.024 x [(97)m - (95)m] x ((41)m (98) <t< td=""><td>Me<mark>an</mark></td><td>interna</td><td>l temp<mark>eratu</mark></td><td>re in t</td><td>t<mark>he r</mark>est</td><td>of dwell</td><td>ng T2</td><td>(follow ste</td><td>eps 3 to</td><td>7 in Tabl</td><td>e 9<mark>c)</mark></td><td></td><td>-</td><td></td><td></td></t<>	Me <mark>an</mark>	interna	l temp <mark>eratu</mark>	re in t	t <mark>he r</mark> est	of dwell	ng T2	(follow ste	eps 3 to	7 in Tabl	e 9 <mark>c)</mark>		-		
Mean internal temperature (for the whole dwelling) = fLA x T1 + (1 - fLA) x T2 (92)m= 18.85 19.15 19.53 19.87 20.02 20.07 20.07 20.04 19.78 19.22 18.79 (92) Apply adjustment to the mean internal temperature from Table 4e, where appropriate (93)m= 18.7 19 19.38 19.72 19.87 19.92 19.92 19.89 19.63 19.07 18.64 (93) Apply adjustment to the mean internal temperature from Table 4e, where appropriate (93)m= 18.7 19 19.38 19.72 19.82 19.92 19.83 19.07 18.64 (93) Apply adjustment to the mean internal temperature obtained at step 11 of Table 9b, so that Ti,m=(76)m and re-calculate the utilisation factor for gains using Table 9a (94) Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Utilisation factor for gains, hm: (94)m= 1 0.98 0.8 0.6 0.4 0.26 0.31 0.57 0.89 0.99 1 (94) Useful gains, hmGm, W = (94)m x (84)m (95) (95)m= 151.76 214.47 26	(90)m=	18.71	19.02 19	9.39	19. <mark>7</mark> 2	19. <mark>87</mark>	19.9	1 19.92	19.92	19.89	19.64	19.08	18.65		(90)
										f	LA = Livin	ig area ÷ (4	4) =	0.14	(91)
		intorno		ra (fa	r the wh	ole dwe	llina) :	= fLA × T1	+ (1 – fL	A) × T2					
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Mean	пценна	i temperatu	euo							40.70	19.22	18.79		
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 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= 1 0.98 0.93 0.8 0.6 0.4 0.26 0.31 0.57 0.89 0.99 1 (94) Useful gains, hmGm, W = (94)m x (84)m (95)m= 1517.66 2144.47 2628.62 2770.95 2343.38 1570.07 986.93 1044.2 1671.6 2031.87 1634.11 1366.67 (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= 4343.29 4250.47 387.60 3238.49 2444.32 1581.83 988.08 1046.67 1727.57 2699.71 3587.31 4335.79 (97) Space heating re						20.02	20.0	7 20.07	20.07	20.04	19.78	10.22			(92)
Set Ti to the mean internal temperature obtained at step 11 of Table 9b, so that Ti,m=(76)m and re-calculate 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= 1 0.98 0.93 0.8 0.6 0.4 0.26 0.31 0.57 0.89 0.99 1 (94) Useful gains, hmGm, W = (94)m x (84)m (95)m= 1517.66 2144.47 2628.62 2770.95 2343.38 1570.07 986.93 1044.2 1671.6 2031.87 1634.11 1366.67 (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= 4343.29 4250.47 3876.06 328.49 2444.32 158.183 988.08 1046.67 1727.57 2699.71 3587.31 4335.79 (97) Space heating requirement for each month, kWh/month =	(92)m=	18.85	19.15 19	9.53	19.87							10.22			(92)
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= 1 0.98 0.93 0.8 0.6 0.4 0.26 0.31 0.57 0.89 0.99 1 (94) Useful gains, hmGm , W = (94)m x (84)m (95)m= $1517.66 2144.47 2628.62 2770.95 2343.38 1570.07 986.93 1044.2 1671.6 2031.87 1634.11 1366.67 (95) Monthly average external temperature from Table 8 (96)m= 4.3 4.9 6.5 8.9 11.7 14.6 16.6 16.4 14.1 10.6 7.1 4.2 (96) Heat loss rate for mean internal temperature, Lm , W = [(39)m x [(93)m- (96)m] (97)m= 4343.29 4250.47 3876.06 3238.49 2444.32 1581.83 988.08 1046.67 1727.57 2699.71 3587.31 4335.79 (97) Space heating requirement for each month, kWh/month = 0.024 x [(97)m - (95)m] x (41)m (98)m= 2102.27 1415.23 928.09 336.63 75.1 0 0 0 0 496.87 1406.3 2209.03Total per year (kWh/year) = Sum(98)1.4.8.12 = 8969.52 (98)$	(92)m= Apply	18.85 adjustr	19.15 19	9.53 nean	19.87 interna	l temper	ature	from Table	4e, whe	ere appro	opriate		18.64		
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	(92)m= Apply (93)m=	18.85 adjustr 18.7	19.15 19 nent to the 1 19 19	9.53 nean 9.38	19.87 interna	l temper	ature	from Table	4e, whe	ere appro	opriate		18.64		
Utilisation factor for gains, hm: $(94)m =$ 1 0.98 0.93 0.8 0.6 0.4 0.26 0.31 0.57 0.89 0.99 1 (94) Useful gains, hmGm, W = (94)m x (84)m (95)m= 1517.66 2144.47 2628.62 2770.95 2343.38 1570.07 986.93 1044.2 1671.6 2031.87 1634.11 1366.67 (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 = 4343.29 4250.47 3876.06 3238.49 2444.32 1581.83 988.08 1046.67 1727.57 2699.71 3587.31 4335.79 (97) Space heating requirement for each month, kWh/month = 0.024 x [(97)m - (95)m] x (41)m (98)m= 2102.27 1415.23 928.09 336.63 75.1 0 0 0 496.87 1406.3 2209.03	(92)m= Apply (93)m= 8. Spa Set T	18.85 adjustr 18.7 ace hea i to the	19.15 19 nent to the i 19 19 19 iting require mean intern	9.53 mean 9.38 ment al ten	19.87 interna 19.72	19.87 19.87	ature 19.9	from Table	4e, whe	ere appro 19.89	opriate 19.63	19.07		ulate	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	(92)m= Apply (93)m= 8. Spa Set T	18.85 adjustr 18.7 ace hea i to the	19.15 19 nent to the r 19 19 19 ting require mean intern factor for g	9.53 mean 9.38 ment al ten	19.87 interna 19.72	19.87 19.87	ature 19.9	from Table	4e, whe	o, so tha	opriate 19.63 t Ti,m=(19.07	d re-calc	ulate	
Useful gains, hmGm , W = (94)m x (84)m (95)m= $1517.66 2144.47 2628.62 2770.95 2343.38 1570.07 986.93 1044.2 1671.6 2031.87 1634.11 1366.67$ (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= $4343.29 4250.47 3876.06 3238.49 2444.32 1581.83 988.08 1046.67 1727.57 2699.71 3587.31 4335.79$ (97) Space heating requirement for each month, kWh/month = $0.024 \times [(97)m - (95)m] \times (41)m$ (98)m= $2102.27 1415.23 928.09 336.63 75.1 0 0 0 0 496.87 1406.3 2209.03$ Total per year (kWh/year) = Sum(98) _{150.12} = 8969.52 (98)	(92)m= Apply (93)m= 8. Spr Set T the ut	18.85 adjustr 18.7 ace hea i to the ilisation Jan	19.15 19 nent to the I 19 19 19 sting require mean intern factor for g Feb	9.53 mean 9.38 ment al ten ains u Mar	19.87 interna 19.72 nperatur using Ta Apr	temper 19.87 re obtair able 9a	ature 19.9 ned at	from Table 2 19.92 step 11 of	4e, whe 19.92 Table 9	o, so tha	opriate 19.63 t Ti,m=(19.07 76)m an	d re-calc	ulate	
$ \begin{array}{c} (95)m= & 1517.66 & 2144.47 & 2628.62 & 2770.95 & 2343.38 & 1570.07 & 986.93 & 1044.2 & 1671.6 & 2031.87 & 1634.11 & 1366.67 \\ \hline 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 \\ \hline Heat loss rate for mean internal temperature, Lm , W = [(39)m x [(93)m- (96)m] \\ (97)m= & 4343.29 & 4250.47 & 3876.06 & 3238.49 & 2444.32 & 1581.83 & 988.08 & 1046.67 & 1727.57 & 2699.71 & 3587.31 & 4335.79 \\ \hline Space heating requirement for each month, kWh/month = 0.024 x [(97)m - (95)m] x (41)m \\ (98)m= & 2102.27 & 1415.23 & 928.09 & 336.63 & 75.1 & 0 & 0 & 0 & 0 & 496.87 & 1406.3 & 2209.03 \\ \hline Total per year (kWh/year) = Sum(98)_{15912} = & 8969.52 \\ \end{array} $	(92)m= Apply (93)m= 8. Spa Set T the ut	18.85 adjustr 18.7 ace hea i to the ilisation Jan ation fac	19.15 19 nent to the r 19 19 19 ting require mean intern factor for g Feb I	0.53 mean 0.38 ment al ten ains u Mar	19.87 interna 19.72 nperatur using Ta Apr	l temper 19.87 re obtair able 9a May	ature 19.9 ned at	from Table 2 19.92 step 11 of n Jul	4e, whe 19.92 Table 9 Aug	o, so tha	opriate 19.63 t Ti,m=(Oct	19.07 76)m an Nov	d re-calc Dec	ulate	(93)
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 = 4343.29 4250.47 3876.06 3238.49 2444.32 1581.83 988.08 1046.67 1727.57 2699.71 3587.31 4335.79 (97) Space heating requirement for each month, kWh/month = $0.024 x [(97)m - (95)m] x (41)m$ (98)m = 2102.27 1415.23 928.09 336.63 75.1 0 0 0 496.87 1406.3 2209.03 Total per year (kWh/year) = Sum(98) ₁₅₉₁₂ = 8969.52 (98)	(92)m= Apply (93)m= 8. Spr Set T the ut Utilisa (94)m=	18.85 adjustr 18.7 ace hea i to the ilisation Jan ation fac 1	19.15 19 nent to the i 19 19 19 19 iting require mean intern factor for g Feb 1 ctor for gains 0.98 0	0.53 mean 0.38 ment al ten ains u Mar s, hm: .93	19.87 interna 19.72 nperatuu using Ta Apr : 0.8	temper 19.87 re obtair able 9a May 0.6	ature 19.9 ned at	from Table 2 19.92 step 11 of n Jul	4e, whe 19.92 Table 9 Aug	o, so tha	opriate 19.63 t Ti,m=(Oct	19.07 76)m an Nov	d re-calc Dec	ulate	(93)
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	(92)m= Apply (93)m= 8. Spa Set T the ut Utilisa (94)m= Usefu	18.85 adjustr 18.7 ace heat i to the ilisation face 1	19.15 19 nent to the instant to the insthe instant to the instant to the instant to the insthe ins	9.53 mean 9.38 ment al ten ains u Mar 93 = (94	19.87 interna 19.72 nperatur using Ta Apr : 0.8 0.8	l temper 19.87 able 9a May 0.6 4)m	ature 19.9 ned at Jui	from Table 2 19.92 step 11 of n Jul 0.26	4e, whe 19.92 Table 9 Aug 0.31	o, so tha	opriate 19.63 t Ti,m=(Oct 0.89	19.07 76)m an Nov 0.99	d re-calc Dec 1	ulate	(93)
Heat loss rate for mean internal temperature, Lm , W =[$(39)m \times [(93)m - (96)m$] (97)m= 4343.29 4250.47 3876.06 3238.49 2444.32 1581.83 988.08 1046.67 1727.57 2699.71 3587.31 4335.79 (97) Space heating requirement for each month, kWh/month = $0.024 \times [(97)m - (95)m] \times (41)m$ (98)m= 2102.27 1415.23 928.09 336.63 75.1 0 0 0 0 496.87 1406.3 2209.03 Total per year (kWh/year) = Sum(98) ₁₅₉₁₂ = 8969.52 (98)	(92)m= Apply (93)m= 8. Spi Set T the ut Utilisa (94)m= Usefu (95)m=	18.85adjustr18.7ace heai to theilisationJanation fac11gains,1517.66	19.15 19 nent to the i 19 19 19 iting require 19 mean intern 16 factor for g 16 Cor for gains 0.98 0 hmGm , W 2144.47 263	9.53 mean 9.38 ment al ten ains t Mar 93 = (94 28.62	19.87 interna 19.72 nperatur using Ta Apr : 0.8 i)m x (8- 2770.95	temper 19.87 re obtair able 9a May 0.6 4)m 2343.38	ature 19.9 ned at Jui 0.4	from Table 2 19.92 step 11 of n Jul 0.26 07 986.93	4e, whe 19.92 Table 9 Aug 0.31	o, so tha	opriate 19.63 t Ti,m=(Oct 0.89	19.07 76)m an Nov 0.99	d re-calc Dec 1	ulate	(93)
$ \begin{array}{c} (97)m = & 4343.29 & 4250.47 & 3876.06 & 3238.49 & 2444.32 & 1581.83 & 988.08 & 1046.67 & 1727.57 & 2699.71 & 3587.31 & 4335.79 & (97) \\ \hline Space heating requirement for each month, kWh/month = 0.024 \times [(97)m - (95)m] \times (41)m \\ (98)m = & 2102.27 & 1415.23 & 928.09 & 336.63 & 75.1 & 0 & 0 & 0 & 0 & 496.87 & 1406.3 & 2209.03 \\ \hline & & & & & & & & & & & \\ \hline Total per year (kWh/year) = Sum(98)_{15912} = & 8969.52 & (98) \\ \hline \end{array} $	(92)m= Apply (93)m= 8. Spa Set T the ut Utilisa (94)m= Usefu (95)m= Month	18.85 adjustr 18.7 ace heating i to the ilisation Jan ation factor 1 1000000000000000000000000000000000000	19.15 19 nent to the instruction of the instruc	9.53 mean 9.38 ment al ten ains u Mar .93 = (94 28.62 I tem	19.87 interna 19.72 nperatur using Ta Apr : 0.8 i)m x (8 2770.95 perature	temper 19.87 able 9a May 0.6 4)m 2343.38 e from Ta	ature 19.9 ned at 0.4 1570. able 8	from Table 2 19.92 step 11 of n Jul 0.26 07 986.93	 4e, whe 19.92 Table 9 Aug 0.31 1044.2 	ere appro 19.89 o, so tha Sep 0.57 1671.6	opriate 19.63 t Ti,m=(Oct 0.89 2031.87	19.07 76)m an Nov 0.99 1634.11	d re-calc Dec 1 1366.67	ulate	(93) (94) (95)
Space heating requirement for each month, kWh/month = $0.024 \times [(97)m - (95)m] \times (41)m$ (98)m= 2102.27 1415.23 928.09 336.63 75.1 0 0 0 0 496.87 1406.3 2209.03 Total per year (kWh/year) = Sum(98) ₁₅₉₁₂ = 8969.52 (98)	(92)m= Apply (93)m= 8. Spi Set T the ut Utilisa (94)m= Usefu (95)m= Month (96)m=	18.85 adjustr 18.7 ace hea i to the ilisation Jan ation fac 1 10 11 gains, 1517.66 nly aver 4.3	19.15 19 nent to the i 19 19 19 iting require mean intern factor for g Feb I ctor for gains 0.98 0 hmGm , W 2144.47 263 4.9 6	9.53 mean 9.38 ment al ten ains (Mar 93 = (94 28.62 I tem 5.5	19.87 interna 19.72 nperatur using Ta Apr : 0.8 i)m x (8 2770.95 perature 8.9	temper 19.87 re obtair able 9a May 0.6 4)m 2343.38 e from Ta 11.7	ature 19.9 ned at 0.4 1570. able 8	from Table 2 19.92 step 11 of n Jul 0.26 07 986.93 6 16.6	 4e, whe 19.92 Table 9 Aug 0.31 1044.2 16.4 	ere appro 19.89 o, so tha Sep 0.57 1671.6 14.1	2031.87 10.6	19.07 76)m an Nov 0.99 1634.11	d re-calc Dec 1 1366.67	ulate	(93) (94) (95)
$(98)m = 2102.27 \ 1415.23 \ 928.09 \ 336.63 \ 75.1 \ 0 \ 0 \ 0 \ 0 \ 496.87 \ 1406.3 \ 2209.03$ $Total per year (kWh/year) = Sum(98)_{15912} = 8969.52 $ (98)	(92)m= Apply (93)m= 8. Spa Set T the ut Utilisa (94)m= Usefu (95)m= Month (96)m= Heat	18.85 adjustr 18.7 ace heating i to the ilisation Jan ation factor 1 1317.66 nly aver 4.3 loss rate	19.15 19 nent to the i 19 19 19 iting require 19 mean intern 16 factor for g 1 ctor for gains 0 0.98 0 hmGm , W 2144.47 2144.47 263 age externa 4.9 e for mean i 1	9.53 mean 9.38 ment al ten ains u Mar 93 = (94 28.62 I tem 3.5 nterna	19.87 interna 19.72 nperatur using Ta Apr : 0.8 i)m x (8 2770.95 perature 8.9 al tempo	temper 19.87 able 9a May 0.6 4)m 2343.38 from Ta 11.7 erature,	ature 19.9 ned at 0.4 1570. able 8 14.6 Lm , \	from Table 2 19.92 step 11 of 1 Jul 0.26 07 986.93 16.6 V =[(39)m	4e, whe 19.92 Table 9 Aug 0.31 1044.2 16.4 x [(93)m	ere appro 19.89 o, so tha Sep 0.57 1671.6 14.1 – (96)m	<pre>priate 19.63 t Ti,m=(Oct 0.89 2031.87 10.6]</pre>	19.07 76)m an Nov 0.99 1634.11 7.1	d re-calc Dec 1 1366.67 4.2	ulate	(93) (94) (95) (96)
Total per year (kWh/year) = Sum(98) ₁₅₉₁₂ = 8969.52 (98)	(92)m= Apply (93)m= 8. Spi Set T the ut Utilisa (94)m= Usefu (95)m= Month (96)m= Heat (97)m=	18.85adjustr18.7ace heai to theilisationJanation fac11gains,1517.66nly aver4.3loss rate4343.29	19.15 19 nent to the i 19 19 19 iting require mean intern factor for g Feb I ctor for gains 0.98 0 hmGm , W 2144.47 26 age externa 4.9 6 e for mean i 4250.47	9.53 mean 9.38 ment al ten ains t Mar .93 = (94 28.62 I tem 5.5 nterna 76.06	19.87 interna 19.72 nperatur using Ta Apr : 0.8 2770.95 perature 8.9 al tempo 3238.49	temper 19.87 re obtair able 9a May 0.6 4)m 2343.38 e from Ta 11.7 erature, 2444.32	ature 19.9 ned at Jui 0.4 1570. able 8 14.6 Lm , V	from Table 2 19.92 step 11 of 10.26 07 986.93 16.6 V =[(39)m 83 988.08	 4e, whe 19.92 Table 9 Aug 0.31 1044.2 16.4 x [(93)m 1046.67 	ere appro 19.89 o, so tha Sep 0.57 1671.6 14.1 - (96)m 1727.57	Dpriate 19.63 t Ti,m=(Oct 0.89 2031.87 10.6] 2699.71	19.07 76)m an Nov 0.99 1634.11 7.1 3587.31	d re-calc Dec 1 1366.67 4.2	ulate	(93) (94) (95) (96)
	(92)m= Apply (93)m= 8. Spa Set T the ut Utilisa (94)m= Usefu (95)m= Month (96)m= Heat (97)m= Space	18.85 adjustr 18.7 ace hea i to the ilisation Jan ation fac 1 131 gains, 1517.66 hy aver 4.3 loss rate 4343.29 e heatin	19.15 19 nent to the i 19 19 iting require mean intern factor for g Feb I ctor for gains 0.98 0 hmGm , W 2144.47 263 age externa 4.9 4.9 6 e for mean i 4250.47 ag requirement 38	9.53 mean 9.38 ment al ten ains t var .93 = (94 28.62 I tem 5.5 nterna 76.06 ent for	19.87 interna 19.72 nperatur using Ta Apr : 0.8 i)m x (8 2770.95 perature 8.9 al tempo 3238.49 r each n	temper 19.87 re obtair able 9a May 0.6 4)m 2343.38 e from Ta 11.7 erature, 2444.32 nonth, k ¹	ature 19.9 ned at Jun 0.4 1570. able 8 14.6 Lm , \ 1581. Wh/m	from Table 2 19.92 step 11 of 1 Jul 0.26 07 986.93 5 16.6 V =[(39)m 83 988.08 onth = 0.02	 4e, whe 19.92 Table 9 Aug 0.31 1044.2 16.4 x [(93)m 1046.67 24 x [(97) 	ere appro 19.89 o, so tha Sep 0.57 1671.6 14.1 - (96)m 1727.57)m - (95	Dpriate 19.63 t Ti,m=(Oct 0.89 2031.87 10.6] 2699.71)m] x (4	19.07 76)m an Nov 0.99 1634.11 7.1 3587.31 1)m	d re-calc Dec 1 1366.67 4.2 4335.79	ulate	(93) (94) (95) (96)
Space heating requirement in kWh/m²/year 36.31 (99)	(92)m= Apply (93)m= 8. Spa Set T the ut Utilisa (94)m= Usefu (95)m= Month (96)m= Heat (97)m= Space	18.85 adjustr 18.7 ace hea i to the ilisation Jan ation fac 1 131 gains, 1517.66 hy aver 4.3 loss rate 4343.29 e heatin	19.15 19 nent to the i 19 19 iting require mean intern factor for g Feb I ctor for gains 0.98 0 hmGm , W 2144.47 263 age externa 4.9 4.9 6 e for mean i 4250.47 ag requirement 38	9.53 mean 9.38 ment al ten ains t var .93 = (94 28.62 I tem 5.5 nterna 76.06 ent for	19.87 interna 19.72 nperatur using Ta Apr : 0.8 i)m x (8 2770.95 perature 8.9 al tempo 3238.49 r each n	temper 19.87 re obtair able 9a May 0.6 4)m 2343.38 e from Ta 11.7 erature, 2444.32 nonth, k ¹	ature 19.9 ned at Jun 0.4 1570. able 8 14.6 Lm , \ 1581. Wh/m	from Table 2 19.92 step 11 of 1 Jul 0.26 07 986.93 5 16.6 V =[(39)m 83 988.08 onth = 0.02	 4e, whe 19.92 Table 9 Aug 0.31 1044.2 16.4 x [(93)m 1046.67 24 x [(97) 0 	ere appro 19.89 0, so tha Sep 0.57 1671.6 14.1 – (96)m 1727.57)m – (95 0	Dpriate 19.63 t Ti,m=(Oct 0.89 2031.87 10.6] 2699.71)m] x (4 496.87	19.07 76)m an Nov 0.99 1634.11 7.1 3587.31 1)m 1406.3	d re-calc Dec 1 1366.67 4.2 4335.79 2209.03		(93) (94) (95) (96) (97)
	(92)m= Apply (93)m= 8. Spi Set T the ut Utilisa (94)m= Usefu (95)m= Month (96)m= Heat (97)m= Space (98)m=	18.85 adjustr 18.7 ace hea i to the ilisation Jan ation fac 1 101 gains, 1517.66 nly aver 4.3 loss rate 4343.29 e heatin 2102.27	19.15 19 nent to the i 19 19 19 iting require mean intern factor for g Feb Feb I tor for gains 0.98 0.98 0 hmGm , W 2144.47 2144.47 263 age externa 4.9 4.9 6 e for mean i 4250.47 1415.23 92	9.53 mean 9.38 ment al ten ains t Mar s, hm: .93 = (94 28.62 I tem 5.5 nterna 76.06 ent for 8.09	19.87 interna 19.72 nperatur using Ta Apr : 0.8 2770.95 perature 8.9 al tempo 3238.49 r each n 336.63	l temper 19.87 re obtair able 9a May 0.6 4)m 2343.38 e from Ta 2343.38 e from Ta 11.7 erature, 2444.32 nonth, k ¹ 75.1	ature 19.9 ned at Jun 0.4 1570. able 8 14.6 Lm , \ 1581. Wh/m	from Table 2 19.92 step 11 of 1 Jul 0.26 07 986.93 5 16.6 V =[(39)m 83 988.08 onth = 0.02	 4e, whe 19.92 Table 9 Aug 0.31 1044.2 16.4 x [(93)m 1046.67 24 x [(97) 0 	ere appro 19.89 0, so tha Sep 0.57 1671.6 14.1 – (96)m 1727.57)m – (95 0	Dpriate 19.63 t Ti,m=(Oct 0.89 2031.87 10.6] 2699.71)m] x (4 496.87	19.07 76)m an Nov 0.99 1634.11 7.1 3587.31 1)m 1406.3	d re-calc Dec 1 1366.67 4.2 4335.79 2209.03		(93) (94) (95) (96) (97) (98)

9a. En	ergy re	quiremer	nts – Ind	ividual h	eating s	ystems i	ncluding	j micro-C	HP)					
•	e heati	-	4 fug									I		
				econdar	, ,,	rnentary	,	(202) = 1 -	_ (201) -				0	(201)
				nain syst				(202) = 1 - (204) =		(203)1 -			1	(202)
			-	main sys				(204) = (20	52) x [1 -	(203)] =			1	(204)
	-			ing syste ementar		a ovetor	o 9/						93.3	(206)
EIIICI	· ·	1	1	r			· ·		0		N.	Du	0	(208)
Snac	Jan e heatir		Mar	Apr alculate	May d above	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/ye	ar
Opac	-	1415.23	·`	336.63	75.1	0	0	0	0	496.87	1406.3	2209.03		
(211)n	n = {[(98) 3)m x (20	1)4)] } x 1	I 100 ÷ (20)6)									(211)
(,		1516.86	r	360.81	80.49	0	0	0	0	532.55	1507.29	2367.66		
		!						Tota	l (kWh/yea	ar) =Sum(2	211) _{15,1012}	=	9613.63	(211)
Spac	e heatir	ng fuel (s	econdar	y), kWh/	month									
		01)] } x 1	· · · ·	1		-	<u> </u>			-	-	-	l	
(215)m=	0	0	0	0	0	0	0	0 Tota		0 ar) =Sum(2	0	0		
Watar	haatin	~						TUIA			213) _{15,1012}	-	0	(215)
	heating		ter (calc	ulated al	bove)									
	225.42	198.61	208.41	186.59	182.67	161.13	154.37	171.82	171.62	19 <mark>3.4</mark> 9	204.9	219.91		
Effic <mark>ie</mark>	ncy of w	ater h <mark>ea</mark>	ater										80.2	(216)
(217) <mark>m=</mark>	89.21	88.92	88.26	86.42	82.9	80.2	80.2	80.2	80.2	87.22	88.88	<mark>8</mark> 9.28		(217)
		heating,												
. ,	252.68	m x 100 223.35	236.13	215.91	220.35	200.91	192.48	214.24	213.99	221.84	230.54	246.31		
	L			<u> </u>				Tota	I = Sum(2	19a) ₁₁₂ =			2668.72	(219)
Annua	al totals	5								k	Wh/year		kWh/year	
Space	heating	g fuel use	ed, main	system	1								9613.63	
Water	heating	fuel use	ed										2668.72	
Electri	city for	oumps, f	ans and	electric	keep-ho	t								
centr	al heatir	ng pump	:									30		(230c)
boile	r with a	fan-assis	sted flue									45		(230e)
Total e	electricit	y for the	above, l	kWh/yea	r			sum	of (230a).	(230g) =			75	(231)
	city for I	•	-										651.46	(232)
	•		– Individ	ual heati	ina svste	ems inclu	udina mi	cro-CHP						
120.	002 01	10010110	marvia		ng by sk		Ŭ							
							lergy /h/year			Emiss kg CO	ion fac 2/kWh	tor	Emissions kg CO2/yea	
Space	heating	g (main s	ystem 1)		(21	1) x			0.2	16	=	2076.54	(261)
Space	heating	g (secono	dary)			(21	5) x			0.5	19	=	0	(263)
Water	heating					(219	9) x			0.2	16	=	576.44	(264)
Space	and wa	ter heati	ng			(26	1) + (262)	+ (263) + (264) =				2652.99	(265)

Electricity for pumps, fans and electric keep-hot	(231)	x	0.519 =	38.93	(267)
Electricity for lighting	(232)	x	0.519 =	338.11	(268)
Total CO2, kg/year			sum of (265)(271) =	3030.02	(272)
Dwelling CO2 Emission Rate			(272) ÷ (4) =	12.27	(273)
EI rating (section 14)				86	(274)

			User D	etails:						
Assessor Name: Software Name:	Stroma FSA	-		Softwa	a Num are Vei	rsion:		Versic	on: 1.0.1.25	
		P	Property .	Address	: Belsize	e - 4-bed	MID			
Address :										
1. Overall dwelling dimer	ISIONS:		A	n (ma 2)		A) (a la una a (ma 2)	
Ground floor				a(m²) 121	(1a) x	Av. Hei	ignt(m)	(2a) =	Volume(m³) 290.4	(3a)
First floor					(1a) x			(2a) = (2b) =](3b)
Second floor				68			2.4]	163.2	
) · (4 h) · (4 h) · (4 h	4) . (4) (4 .		58	(1c) x	2	2.4	(2c) =	139.2	(3c)
Total floor area TFA = (1a	(1C)+(1C)+(1C)+(1C)	a)+(1e)+(1	n)	247	(4)					_
Dwelling volume					(3a)+(3b)+(3c)+(3d)+(3e)+	.(3n) =	592.8	(5)
2. Ventilation rate:										
	main heating	seconda heating	ry	other		total			m ³ per hour	
Number of chimneys	0	+ 0] + [0	=	0	X	40 =	0	(6a)
Number of open flues	0	+ 0	+	0] = [0	x	20 =	0	(6b)
Number of intermittent far	IS					4	×	10 =	40	(7a)
Number of passive vents						0	x	10 =	0	(7b)
Number of flueless gas fir	es				Ē	0	X	40 =	0	(7c)
								Air ch	nanges per hou	ır
Infiltration due to chimney	s, flu <mark>es an</mark> d fan:	s = (6a)+(6b)+(7	7a)+(7b)+(7c) =	Г	40		÷ (5) =	0.07	(8)
If a pressurisation test has be		intended, procee	ed to (17), o	otherwise o	continue fr	om (9) to (16)			_
Number of storeys in th	e dwelling (ns)								0	(9)
Additional infiltration			0.05 ([(9)	-1]x0.1 =	0	(10)
Structural infiltration: 0.3 if both types of wall are pre					•	UCTION			0	(11)
deducting areas of opening			o ino groat	or wair are	a (anoi					
If suspended wooden fl	oor, enter 0.2 (u	insealed) or 0	.1 (seale	ed), else	enter 0				0	(12)
If no draught lobby, ente	er 0.05, else ent	ter 0							0	(13)
Percentage of windows	and doors drau	ght stripped							0	(14)
Window infiltration				0.25 - [0.2	2 x (14) ÷ 1	00] =			0	(15)
Infiltration rate				(8) + (10)	+ (11) + (1	12) + (13) +	⊦ (15) =		0	(16)
Air permeability value, o			•	•	•	etre of e	nvelope	area	5	(17)
If based on air permeabilit	•								0.32	(18)
Air permeability value applies		test has been doi	ne or a deg	gree air pe	rmeability	is being us	sed		ſ	
Number of sides sheltered Shelter factor				(20) = 1 -	[0.075 x (1	[9]] =			2	(19) (20)
Infiltration rate incorporati	na shelter factor			(21) = (18		-/1			0.85	-
Infiltration rate modified for	-			(, ^ (20) -				0.27	(21)
· · · · · · · · · · · · · · · · · · ·	<u> </u>	May Jun	Jul	Aug	Sep	Oct	Nov	Dec]	
Monthly average wind spe		· 1		1	1 7				1	
	- I I	4.3 3.8	3.8	3.7	4	4.3	4.5	4.7]	
					I	-		L	J	

Wind F	actor (2	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		
Adjuste	ed infiltra	ation rat	e (allowi	ng for sh	nelter an	d wind s	speed) =	(21a) x	(22a)m					
.,	0.34	0.34	0.33	0.3	0.29	0.26	0.26	0.25	0.27	0.29	0.3	0.32		
			change i	ate for t	he appli	cable ca	ise	<u> </u>		<u> </u>				
	echanica												0	(23a)
			using Appe		, ,	, ,) = (23a)			0	(23b)
lf bala	anced with	heat rec	overy: effici	ency in %	allowing f	or in-use f	factor (fron	n Table 4h) =				0	(23c)
	balance	d mech	anical ve	ntilation	with he	at recov	ery (MVI	HR) (24a	a)m = (2)	2b)m + (23b) × [´	l – (23c)	÷ 100]	
(24a)m=	0	0	0	0	0	0	0	0	0	0	0	0		(24a)
b) If	balance	d mech	anical ve	ntilation	without	heat red	covery (N	MV) (24b	o)m = (22	2b)m + (23b)			
(24b)m=	0	0	0	0	0	0	0	0	0	0	0	0		(24b)
,			tract ven											
	, <i>,</i>	-	< (23b), t		, ``	,	· ` `	rí 🐪	ŕ	r È	ŕ			(0.4.)
(24c)m=		0	0	0	0	0	0	0	0	0	0	0		(24c)
,			on or wh en (24d)ı			•				0.51				
(24d) <mark>m=</mark>	. ,	0.56	0.55	0.54	0.54	0.53	0.53	0.5 + [(2	0.54	0.51	0.55	0.55		(24d
· ·			rate - en				L			0.04	0.00	0.00		(
(25)m=	0.56	0.56	0.55	0.54	0.54	0.53	0.53	0.53	0.54	0.54	0.55	0.55		(25)
(20)11-	0.00	0.00	0.00	0.04	0.04	0.00	0.00	0.00	0.04	0.04	0.00	0.00		(20)
3. He	at l <mark>osse</mark> :	s and he	eat l <mark>oss</mark> p	aramete	ər:							_	_	_
ELEN	1ENT	Gro		Openin	-	Net Ar		U-val		AXU		k-value kJ/m²·ł		A X k kJ/K
Doors		area	(m²)	m	ا ۲	A ,i		W/m2		(W/	N)	KJ/M²∙r		
		1				1.89	=		=	1.89				(26)
	ws Type					1.18		/[1/(1.4)+		1.56				(27)
	ws Type _					8.4		/[1/(1.4)+		11.14				(27)
	ws Type					8.4		/[1/(1.4)+		11.14				(27)
	ws Type					11.93	3 x1	/[1/(1.4)+	0.04] =	15.82				(27)
Window	ws Type	95				1.9	x1	/[1/(1.4)+	0.04] =	2.52				(27)
Window	ws Type	e 6				3.13	, <mark>х</mark> 1	/[1/(1.4)+	0.04] =	4.15				(27)
Window	ws Type	97				3.13	x1	/[1/(1.4)+	0.04] =	4.15				(27)
Window	ws Type	8 8				5.4	x1	/[1/(1.4)+	0.04] =	7.16				(27)
Window	ws Type	9				1.31	x1	/[1/(1.4)+	0.04] =	1.74				(27)
Window	ws Type	e 10				5.4	x1	/[1/(1.4)+	0.04] =	7.16				(27)
Window	ws Type	e 11				1.31		/[1/(1.4)+	0.04] =	1.74				(27)
	ws Type					4.17	่	/[1/(1.4)+		5.53				(27)
	ws Type					4.17	= .	/[1/(1.4)+						(27)
Floor										5.53	╡╷			(28)
Walls		0.00		<u></u>		121		0.13		15.73	╡╏		\dashv	
		206.		61.72	<u></u>	144.9		0.18		26.09	╡╎		\dashv	(29)
Roof 1	ryper	58	3	0		58	X	0.13	=	7.54	1			(30)

Roof Type	2	10		0		10	x	0.13	=	1.3				(30)
Roof Type	3	53		0		53	x	0.13	=	6.89				(30)
Total area	of elem	ents,	m²			448.6	6							(31)
Party wall						128.6	9 X	0	=	0			\neg	(32)
* for windows ** include the							ated using	g formula 1	/[(1/U-valu	ie)+0.04] á	as given in	paragrapl	n 3.2	
Fabric hea	t loss, V	V/K =	S (A x	U)				(26)(30)) + (32) =				138.76	(33)
Heat capad	ity Cm	= S(A	Axk)						((28)	.(30) + (32	2) + (32a).	(32e) =	40913.3	(34)
Thermal m	ass par	amet	er (TMF	• = Cm ÷	- TFA) ir	n kJ/m²K			Indica	tive Value	: Medium		250	(35)
For design as					construct	ion are not	t known pi	recisely the	e indicative	values of	TMP in Ta	able 1f		
can be used i							,							
Thermal br	-	•			• •	-	۲.						23.11	(36)
if details of the Total fabric			are not kn	own (36) =	= 0.15 x (3	1)			(33) +	(36) =			161.87	(37)
Ventilation			Iculated	l monthly	V						(25)m x (5)		101.07	(07)
Ja		eb	Mar	Apr	, May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	1	
(38)m= 109	_	8.94	108.5	106.43	106.04	104.24	104.24	103.91	104.93	106.04	106.83	107.65	4	(38)
]	
Heat transf (39)m= 271		0.82	270.37	268.3	267.92	266.11	266.11	265.78	(39)m 266.81	= (37) + (267.92	268.7	269.52	1	
(39)m= 271	.20 270	J.02	210.31	200.3	207.92	200.11	200.11	205.76			Sum(39)1		268.3	(39)
Hea <mark>t loss</mark> p	aramet	er (H	LP), W/	′m²K						= (39)m ÷		12 / 12=	200.3	(00)
(40)m= 1.	1 1	.1	1.09	1.09	1.08	1.08	1.08	1.08	1.08	1.08	1.09	1.09	1	
										Average =	Sum(40)₁.	12 /12=	1.09	(40)
Number of	days in	mon	th (Tabl	le 1a)									,	
Ja	in F	eb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(41)m= 3	1 2	28	31	<mark>3</mark> 0	31	30	31	31	30	31	30	31		(41)
4. Water h	neating	ener	gy requi	rement:								kWh/y	ear:	
Assumed o	ocupan	ncv N	I								2	06	1	(42)
if TFA >	13.9, N	= 1 +		[1 - exp	(-0.0003	849 x (TF	FA -13.9)2)] + 0.0	0013 x (⁻	TFA -13		00]	(42)
if TFA £						.,,		(· · ·					1	
Annual ave Reduce the a										se target o		6.95]	(43)
not more that		•		• •		•	•			Ū				
Ja	in F	eb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec]	
Hot water usa	ge in litre	es per o	day for ea		Vd,m = fa	ctor from T	Table 1c x						1	
(44)m= 117	.64 113	3.36	109.09	104.81	100.53	96.25	96.25	100.53	104.81	109.09	113.36	117.64]	
L										Total = Su	m(44) ₁₁₂ =		1283.36	(44)
Energy conte	nt of hot w	water L	ised - cald	culated mo	onthly = 4.	190 x Vd,r	n x nm x [OTm / 3600) kWh/mor	nth (see Ta	ables 1b, 1	c, 1d)		
(45)m= 174	.46 152	2.58	157.45	137.27	131.71	113.66	105.32	120.86	122.3	142.53	155.58	168.95		
If inclaster -	uo wota	haatir	acted	ofunction	hot	r otorocial	ontor 0 in	hover (12		Total = Su	m(45) ₁₁₂ =	-	1682.69	(45)
If instantaneo	- 1 -				i	1	1	r		-	1.		1	
(46)m= 26. Water stora		.89	23.62	20.59	19.76	17.05	15.8	18.13	18.35	21.38	23.34	25.34]	(46)
Storage vo	-		includin	ig anv so	olar or W	/WHRS	storage	within sa	ame ves	sel		0	1	(47)
U - U	···	. /		5 , , ,				2.				-	1	× · · · /

Otherw Water	/ise if no storage	stored loss:	hot wate	nk in dw er (this in oss facto	icludes i	nstantan	eous co	• •	ers) ente	er 'O' in (0	l		(48)
			m Table			,	.,					0			(49)
-				, kWh/ye	ear			(48) x (49)) =			0			(50)
			-	ylinder l		or is not	known:	. , . ,				0			()
		•		om Tabl	e 2 (kWł	n/litre/da	y)					0			(51)
		eating s from Tal	ee secti	on 4.3								_	1		(50)
			ole ∠a m Table	2h								0 0			(52) (53)
•				, kWh/ye	or			(47) x (51)) x (52) x (5	53) -			1 		
•••		54) in (5	-	,	201			(47) x (01)	/	55) =		0			(54) (55)
		, ,		or each	month			((56)m = (55) × (41)r	n		0	I		()
(56)m=	0	0	0	0	0	0	0	0	0	0	0	0			(56)
	er contains	dedicated	d solar sto	rage, (57)r	-			-	7)m = (56)i	-		-	ix H		
(57)m=	0	0	0	0	0	0	0	0	0	0	0	0			(57)
			nuol) fra									0	1		(58)
	-	•		om Table for each		59)m = (58) ÷ 36	5 x (41)	m			0	I		(00)
						, ,	,		cylinder	[•] thermo	stat)				
(59)m=	0	0	0	0	0	0	0	0	0	0	0	0			(59)
Combi		culated	for oach	month (61)m - ((60) · 26	S5 x (11)						1		
(61)m=	50.96	46.03	50.96	49.32	50.96	47.47	49.05	50.96	49.32	50.96	49.32	5 0.96			(61)
													(50)	. (C1)	(01)
	225.42	198.61	208.41	186.59	182.67	161.13	154.37	(62)M = 171.82	0.85 × (45)m + 193.49	(46)m + 204.9	(57)m + 219.91	(59)m	+ (61)m	(62)
(62)m=													1		(02)
				and/or V					' if <mark>no sola</mark> r	COntributi	on to wate	er neating)			
(auu au (63)m=		0	0		0	applies,	0 See Ap) 0	0	0	0	1		(63)
				U	U	0	0	U	Ŭ	U	U	U	I		(00)
(64)m=	225.42	ater hea ⁻ 198.61	208.41	186.59	182.67	161.13	154.37	171.82	171.62	193.49	204.9	219.91			
(04)11-	223.42	190.01	200.41	100.09	102.07	101.15	104.07	_	out from wa				22	78.93	(64)
Hoot a	aina frai	n wotor	hooting	k/M/b/m/	onth 0.26	5 / IO 0E	v (15)m							10.00]()
(65)m=	70.75	62.24	65.09	57.97	56.53	49.66	x (45)m 47.28	+ (01)II 52.93	n] + 0.8 x 52.99	60.13	+ (37)m 64.06	+ (59)m 68.92	1		(65)
							-								(00)
	. ,			. ,		ylinder is	s in the c	aweiling	or hot wa	ater is fr	om com	munity n	eating		
				and 5a)):										
Metabo			5), Wat					•		0 (1		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			(00)
(66)m=	153.15	153.15	153.15	153.15	153.15	153.15	153.15	153.15	153.15	153.15	153.15	153.15			(66)
Ũ				pendix l	· ·										
(67)m=	36.89	32.76	26.65	20.17	15.08	12.73	13.76	17.88	24	30.47	35.56	37.91	l		(67)
								,	see Tal				ı		(05)
(68)m=	413.78	418.07	407.25	384.21	355.14	327.81	309.55	305.26	316.08	339.11	368.19	395.52	l		(68)
Cookin	ig gains	(calcula	ted in A	ppendix	L, equat	ion L15	or L15a)	, also se	e Table	5					

(69)m=	38.32	38.32	38.3	32	38.32	38.32		38.32	38.32	38.	32	38.32	38.32	2 3	8.32	38.3	32		(69)
Pump	s and far	ns gains	(Tab	le 5	a)		_			I									
(70)m=	3	3	3		3	3	Т	3	3	3	3	3	3		3	3			(70)
Losse	s e.a. ev	aporatio	n (ne	aati	ve valu	es) (Ta	able	5)				ļ							
(71)m=	<u> </u>	-122.52	· ·	<u> </u>	-122.52	-122.52	_	22.52	-122.52	-122	2.52	-122.52	-122.5	2 -1	22.52	-122.	.52		(71)
Water	heating	gains (T	able	5)										•	•				
(72)m=	95.09	92.62	87.4	9	80.52	75.99	6	68.97	63.55	71.	14	73.6	80.82	2 8	8.97	92.6	63		(72)
Total	internal	gains =						(66)	m + (67)m	n + (68	B)m +	(69)m + (70)m +	(71)m	+ (72)r	n			
(73)m=	617.7	615.4	593.	33	556.85	518.15	5 4	81.46	458.8	466	.22	485.63	522.3	5 56	64.67	598.	01		(73)
6. Sc	lar gains	s:					•		,		•				·				
Solar	gains are o	alculated	using s	solar	flux from	Table 6	a anc	lassoci	iated equa	tions	to co	nvert to the	e applio	able c	orientatio	on.			
Orient		Access F	actor	-	Area			Flu			-	g_			FF			Gains	
		Table 6d			m²			Tat	ole 6a	_		able 6b		Tabl	e 6C			(W)	
North	0.9x	0.77		x	1.1	8	x	1	0.63	x		0.63	×		0.7		=	3.83	(74)
North	0.9x	0.77		x	8.4	4	x	1	0.63	x		0.63	x		0.7		=	27.3	(74)
North	0.9x	0.77		x	3.1	3	x	1	0.63	x		0.63	x		0.7		=	10.17	(74)
North	0.9x	0.77		x	5.4	4	x	1	0.63	×		0.63	x		0.7		=	17.55	(74)
North	0.9x	0.77		x	4.1	7	×	1	0.63	x		0.63	x		0.7		=	13.55	(74)
North	0.9x	0.77		x	1.1	8	x	2	20.32	x		0.63	×		0.7		=	7.33	(74)
North	0.9x	0.77		x	8.4	4	x	2	.0.32	X		0.63	x		0.7		=	52.17	(74)
North	0.9x	0.77		x	3.1	3	x	2	.0.32	x		0.63	×		0.7		=	19.44	(74)
North	0.9x	0.77		x	5.4	4	x	2	20.32	×		0.63	×		0.7		=	33.54	(74)
North	0.9x	0.77		x	4.1	7	×	2	.0.32	x		0.63	x		0.7		=	25.9	(74)
North	0.9x	0.77		x	1.1	8	x	3	4.53	x		0.63	x		0.7		=	12.45	(74)
North	0.9x	0.77		x	8.4	4	×	3	4.53	x		0.63	×		0.7		=	88.64	(74)
North	0.9x	0.77		x	3.1	3	x	3	4.53	×		0.63	x		0.7		=	33.03	(74)
North	0.9x	0.77		x	5.4	4	x	3	4.53	x		0.63	×		0.7		=	56.99	(74)
North	0.9x	0.77		x	4.1	7	x	3	4.53	x		0.63	×		0.7		=	44.01	(74)
North	0.9x	0.77		x	1.1	8	x	5	5.46	x		0.63	×		0.7		=	20	(74)
North	0.9x	0.77		x	8.4	4	x	5	5.46	x		0.63	x		0.7		=	142.39	(74)
North	0.9x	0.77		x	3.1	3	x	5	5.46	x		0.63	x		0.7		=	53.06	(74)
North	0.9x	0.77		x	5.4	4	x	5	5.46	x		0.63	x		0.7		=	91.53	(74)
North	0.9x	0.77		x	4.1	7	x	5	5.46	×		0.63	x		0.7		=	70.68	(74)
North	0.9x	0.77		x	1.1	8	x	7	4.72	x		0.63	×		0.7		=	26.94	(74)
North	0.9x	0.77		x	8.4	4	x	7	4.72	×		0.63	×		0.7		=	191.81	(74)
North	0.9x	0.77		x	3.1	3	x	7	4.72	x		0.63	x		0.7		=	71.47	(74)
North	0.9x	0.77		x	5.4	4	x	7	4.72	×		0.63	x		0.7		=	123.3	(74)
North	0.9x	0.77		x	4.1	7	x	7	4.72	×		0.63	x		0.7		=	95.22	(74)
North	0.9x	0.77		x	1.1	8	x	7	9.99	×		0.63	x		0.7		=	28.84	(74)
North	0.9x	0.77		x	8.4	4	x	7	9.99	×		0.63	x		0.7		=	205.33	(74)
North	0.9x	0.77		x	3.1	3	x	7	9.99	x		0.63	x		0.7		=	76.51	(74)

North	0.9x	0.77	۱.,			70.00	1 .	0.00	v	0.7		100	(74)
North		0.77	×	5.4	X	79.99	×	0.63	x	0.7	=	132	=
North	0.9x	0.77	X	4.17	X	79.99	X	0.63	X	0.7	=	101.93	(74)
North	0.9x	0.77	X X	1.18	x	74.68	X X	0.63	x	0.7	=	26.93	(74)
	0.9x	0.77	X	8.4	X	74.68	×	0.63	x	0.7	=	191.71	(74)
North	0.9x	0.77	X	3.13	X	74.68	X	0.63	x	0.7	=	71.43	(74)
North	0.9x	0.77	X	5.4	X	74.68	X	0.63	x	0.7	=	123.24	(74)
North	0.9x	0.77	X	4.17	X	74.68	X	0.63	x	0.7	=	95.17	(74)
North	0.9x	0.77	X	1.18	X	59.25	X	0.63	X	0.7	=	21.37	(74)
North	0.9x	0.77	X	8.4	X	59.25	X	0.63	x	0.7	=	152.09	(74)
North	0.9x	0.77	X	3.13	X	59.25	X	0.63	X	0.7	=	56.67	(74)
North	0.9x	0.77	x	5.4	X	59.25	X	0.63	x	0.7	=	97.77	(74)
North	0.9x	0.77	×	4.17	x	59.25	×	0.63	x	0.7	=	75.5	(74)
North	0.9x	0.77	×	1.18	x	41.52	x	0.63	X	0.7	=	14.97	(74)
North	0.9x	0.77	x	8.4	x	41.52	X	0.63	x	0.7	=	106.58	(74)
North	0.9x	0.77	x	3.13	x	41.52	x	0.63	x	0.7	=	39.71	(74)
North	0.9x	0.77	x	5.4	x	41.52	x	0.63	x	0.7	=	68.52	(74)
North	0.9x	0.77	x	4.17	x	41.52	x	0.63	x	0.7	=	52.91	(74)
North	0.9x	0.77	x	1.18	X	24.19	x	0.63	x	0.7	=	8.72	(74)
North	0.9x	0.77	x	8.4	х	24.19	x	0.63	x	0.7	=	62.1	(74)
North	0.9x	0.77	x	3.13	x	24.19	x	0.63	x	0.7	=	23.14	(74)
North	0.9x	0.7 <mark>7</mark>	x	5.4	x	24.19	x	0.63	x	0.7	=	39.92	(74)
North	0.9x	0.77	×	4.17	x	24.19	x	0.63	x	0.7	=	30.83	(74)
North	0.9x	0.77	x	1.18	x	13.12	×	0.63	x	0.7	=	4.73	(74)
North	0.9x	0.77	x	8.4	x	13.12	×	0.63	x	0.7	=	33.67	(74)
North	0.9x	0.77	x	3.13	x	13.12	×	0.63	x	0.7	=	12.55	(74)
North	0.9x	0.77	x	5.4	x	13.12	×	0.63	x	0.7	=	21.65	(74)
North	0.9x	0.77	x	4.17	x	13.12	×	0.63	x	0.7	=	16.72	(74)
North	0.9x	0.77	x	1.18	x	8.86	×	0.63	x	0.7	=	3.2	(74)
North	0.9x	0.77	x	8.4	x	8.86	×	0.63	x	0.7	=	22.76	(74)
North	0.9x	0.77	x	3.13	x	8.86	X	0.63	x	0.7	=	8.48	(74)
North	0.9x	0.77	x	5.4	x	8.86	×	0.63	x	0.7	=	14.63	(74)
North	0.9x	0.77	x	4.17	x	8.86	X	0.63	x	0.7	=	11.3	(74)
East	0.9x	1	x	1.31	x	19.64	X	0.63	x	0.7	=	5.51	(76)
East	0.9x	1	x	1.31	x	19.64	×	0.63	x	0.7	=	5.51	(76)
East	0.9x	1	x	1.31	x	38.42	×	0.63	x	0.7	=	10.79	(76)
East	0.9x	1	×	1.31	x	38.42	×	0.63	x	0.7	=	10.79	(76)
East	0.9x	1	×	1.31	x	63.27	×	0.63	x	0.7	=	17.77	(76)
East	0.9x	1	×	1.31	x	63.27	×	0.63	x	0.7	=	17.77	(76)
East	0.9x	1	×	1.31	x	92.28	×	0.63	x	0.7	=	25.91	(76)
East	0.9x	1	×	1.31	x	92.28	×	0.63	x	0.7	=	25.91	(76)
East	0.9x	1	x	1.31	x	113.09	x	0.63	x	0.7	=	31.75	(76)

East	0.9x	4		4.04	۱.	440.00	1 .		v	0.7	1	04.75	(76)
East		1	x	1.31	×	113.09	×	0.63	x	0.7	=	31.75	=
East	0.9x	1	X	1.31	X	115.77	X	0.63	x	0.7	=	32.5	(76)
East	0.9x	1	×	1.31	X	115.77	X X	0.63	x	0.7	=	32.5	(76)
	0.9x	1	X	1.31	×	110.22	×	0.63	x	0.7	=	30.95	(76)
East	0.9x	1	X	1.31	×	110.22	X	0.63	x	0.7	=	30.95	(76)
East	0.9x	1	X	1.31	X	94.68	X	0.63	x	0.7	=	26.58	(76)
East	0.9x	1	X	1.31	X	94.68	X	0.63	x	0.7	=	26.58	(76)
East	0.9x	1	Х	1.31	X	73.59	X	0.63	x	0.7	=	20.66	(76)
East	0.9x	1	X	1.31	X	73.59	X	0.63	x	0.7	=	20.66	(76)
East	0.9x	1	x	1.31	X	45.59	X	0.63	x	0.7	=	12.8	(76)
East	0.9x	1	x	1.31	x	45.59	X	0.63	x	0.7	=	12.8	(76)
East	0.9x	1	x	1.31	X	24.49	×	0.63	x	0.7	=	6.88	(76)
East	0.9x	1	х	1.31	x	24.49	x	0.63	x	0.7	=	6.88	(76)
East	0.9x	1	x	1.31	×	16.15	x	0.63	x	0.7	=	4.53	(76)
East	0.9x	1	х	1.31	x	16.15	x	0.63	x	0.7	=	4.53	(76)
South	0.9x	0.77	x	8.4	x	46.75	×	0.63	x	0.7	=	120.02	(78)
South	0.9x	0.3	x	1.9	×	46.75	×	0.63	x	0.7	=	10.58	(78)
South	0.9x	0.77	x	3.13	X	46.75	x	0.63	x	0.7	=	44.72	(78)
South	0.9x	0.77	x	5.4	х	46.75	x	0.63	x	0.7	=	77.16	(78)
South	0.9x	0.77	x	4.17	x	46.75	×	0.63	×	0.7	=	59.58	(78)
South	0.9x	0.77	x	8.4	X	76.57	x	0.63	x	0.7	=	196.56	(78)
South	0.9x	0.3	x	1.9	x	76.57	х	0.63	x	0.7	=	17.32	(78)
South	0.9x	0.77	x	3.13	x	76 <mark>.</mark> 57	×	0.63	x	0.7	=	73.24	(78)
South	0.9x	0.77	x	5.4	x	76.57	X	0.63	x	0.7	=	126.36	(78)
South	0.9x	0.77	x	4.17	x	76.57	×	0.63	x	0.7	=	97.58	(78)
South	0.9x	0.77	x	8.4	x	97.53	x	0.63	x	0.7	=	250.38	(78)
South	0.9x	0.3	x	1.9	x	97.53	×	0.63	x	0.7	=	22.07	(78)
South	0.9x	0.77	x	3.13	x	97.53	×	0.63	x	0.7	=	93.3	(78)
South	0.9x	0.77	x	5.4	x	97.53	×	0.63	x	0.7	=	160.96	(78)
South	0.9x	0.77	x	4.17	x	97.53	X	0.63	x	0.7	=	124.3	(78)
South	0.9x	0.77	x	8.4	x	110.23	x	0.63	x	0.7	=	282.99	(78)
South	0.9x	0.3	x	1.9	x	110.23	×	0.63	x	0.7	=	24.94	(78)
South	0.9x	0.77	x	3.13	x	110.23	×	0.63	x	0.7	=	105.45	(78)
South	0.9x	0.77	x	5.4	x	110.23	x	0.63	x	0.7	=	181.92	(78)
South	0.9x	0.77	x	4.17	x	110.23	×	0.63	x	0.7	=	140.48	(78)
South	0.9x	0.77	x	8.4	x	114.87	x	0.63	x	0.7	=	294.89	(78)
South	0.9x	0.3	x	1.9	x	114.87	×	0.63	x	0.7	=	25.99	(78)
South	0.9x	0.77	x	3.13	×	114.87	×	0.63	x	0.7	=	109.88	(78)
South	0.9x	0.77	x	5.4	×	114.87	×	0.63	x	0.7	=	189.57	(78)
South	0.9x	0.77	x	4.17	x	114.87	×	0.63	x	0.7	=	146.39	(78)
South	0.9x	0.77	x	8.4	x	110.55	x	0.63	x	0.7	=	283.79	(78)

South	о оч Г		Ι		۱		Ι		I				
	0.9x	0.3	X	1.9	X	110.55	X	0.63	x	0.7	=	25.01	(78)
South	0.9x	0.77	X	3.13	X	110.55	X	0.63	X	0.7	=	105.75	(78)
South	0.9x	0.77	Х	5.4	X	110.55	X	0.63	X	0.7	=	182.44	(78)
South	0.9x	0.77	x	4.17	x	110.55	X	0.63	x	0.7	=	140.88	(78)
South	0.9x	0.77	x	8.4	x	108.01	x	0.63	X	0.7	=	277.28	(78)
South	0.9x	0.3	x	1.9	×	108.01	x	0.63	x	0.7	=	24.44	(78)
South	0.9x	0.77	x	3.13	x	108.01	x	0.63	x	0.7	=	103.32	(78)
South	0.9x	0.77	x	5.4	x	108.01	x	0.63	x	0.7	=	178.25	(78)
South	0.9x	0.77	x	4.17	x	108.01	x	0.63	x	0.7	=	137.65	(78)
South	0.9x	0.77	x	8.4	x	104.89	x	0.63	x	0.7	=	269.28	(78)
South	0.9x	0.3	x	1.9	x	104.89	x	0.63	x	0.7	=	23.73	(78)
South	0.9x	0.77	x	3.13	x	104.89	x	0.63	x	0.7	=	100.34	(78)
South	0.9x	0.77	x	5.4	x	104.89	x	0.63	x	0.7	=	173.11	(78)
South	0.9x	0.77	x	4.17	x	104.89	x	0.63	x	0.7	=	133.68	(78)
South	0.9x	0.77	x	8.4	x	101.89	x	0.63	x	0.7	=	261.56	(78)
South	0.9x	0.3	x	1.9	x	101.89	x	0.63	x	0.7	=	23.05	(78)
South	0.9x	0.77	x	3.13	x	101.89	x	0.63	x	0.7	=	97.46	(78)
South	0.9x	0.77	x	5.4	×	101.89	х	0.63	х	0.7	=	168.14	(78)
South	0.9x	0.77	x	4.17	x	101.89	x	0.63	x	0.7	=	129.84	(78)
South	0.9x	0.77	x	8.4	х	82.59	×	0.63	x	0.7	=	2 <mark>12.01</mark>	(78)
South	0.9x	0. <mark>3</mark>	x	1.9	x	82.59	x	0.63	x	0.7	=	18.68	(78)
Sout <mark>h</mark>	0.9x	0.77	x	3.13	x	82.59	х	0.63	x	0.7	=	79	(78)
South	0.9x	0.77	x	5.4	x	82.59	x	0.63	x	0.7	=	136.29	(78)
South	0.9x	0.77	x	4.17	x	82.59	x	0.63	x	0.7	=	105.25	(78)
South	0.9x	0.77	x	8.4	x	55.42	x	0.63	x	0.7	=	142.26	(78)
South	0.9x	0.3	x	1.9	x	55.42	x	0.63	x	0.7	=	12.54	(78)
South	0.9x	0.77	x	3.13	x	55.42	x	0.63	x	0.7	=	53.01	(78)
South	0.9x	0.77	x	5.4	x	55.42	x	0.63	x	0.7	=	91.46	(78)
South	0.9x	0.77	x	4.17	x	55.42	x	0.63	x	0.7	=	70.62	(78)
South	0.9x	0.77	x	8.4	x	40.4	x	0.63	x	0.7	=	103.71	(78)
South	0.9x	0.3	x	1.9	x	40.4	x	0.63	x	0.7	=	9.14	(78)
South	0.9x	0.77	x	3.13	x	40.4	x	0.63	x	0.7	=	38.64	(78)
South	0.9x	0.77	x	5.4	x	40.4	x	0.63	x	0.7	=	66.67	(78)
South	0.9x	0.77	x	4.17	x	40.4	x	0.63	x	0.7	=	51.48	(78)
West	0.9x	0.77	x	11.93	x	19.64	x	0.63	x	0.7	=	71.61	(80)
West	0.9x	0.77	x	11.93	x	38.42	x	0.63	x	0.7	=	140.08	(80)
West	0.9x	0.77	x	11.93	x	63.27	x	0.63	x	0.7	=	230.69	(80)
West	0.9x	0.77	x	11.93	x	92.28	x	0.63	x	0.7	=	336.45	(80)
West	0.9x	0.77	x	11.93	x	113.09	x	0.63	x	0.7	=	412.33	(80)
West	0.9x	0.77	x	11.93	x	115.77	x	0.63	x	0.7	=	422.1	(80)
West	0.9x	0.77	x	11.93	x	110.22	x	0.63	x	0.7	=	401.85	(80)

	_														
West	0.9x	0.77	x	11.	93	x	9	4.68	x	0.63	×	0.7	=	345.18	(80)
West	0.9x	0.77	x	11.	93	x	7	3.59	x	0.63	x	0.7	=	268.3	(80)
West	0.9x	0.77	x	11.	93	x	4	5.59	x	0.63	×	0.7	=	166.22	(80)
West	0.9x	0.77	x	11.	93	x	2	4.49	x	0.63	×	0.7	=	89.29	(80)
West	0.9x	0.77	x	11.	93	x	1	6.15	x	0.63	x	0.7	=	58.89	(80)
Solar g	gains in	watts, cal	culated	for eac	h month	۱			(83)m =	Sum(74)m .	(82)m	-	-		
(83)m=	467.09	811.09	1152.35	1501.71	1751.31	1	769.6	1693.16	1501.9	1272.37	907.76	562.25	397.96		(83)
Total g	ains – i	nternal an	nd solar	: (84)m =	= (73)m	+ (8	83)m	, watts			-				
(84)m=	1084.79	1426.48	1745.68	2058.55	2269.46	22	251.05	2151.97	1968.1	2 1757.99	1430.11	1126.92	995.97		(84)
7. Me	an inter	nal tempe	erature	(heating	seasor	า)									
Temp	erature	during he	eating p	eriods ir	n the livi	ing	area f	rom Tab	ole 9, T	h1 (°C)				21	(85)
-		tor for gai				-									
	Jan	Feb	Mar	Apr	May	- 	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(86)m=	1	1	0.99	0.96	0.88	-	0.71	0.53	0.6	0.86	0.99	1	1		(86)
		 (<u> </u>			.						
	19.68	l tempera 19.87	20.16	20.52	ea 11 (f 20.81	-	20.96	20.99	20.98	20.87	20.47	20	19.64		(87)
(87)m=											20.47	20	19.04		(07)
		during he		i							· · · · · · · · · · · · · · · · · · ·			1	
(88)m=	20	20	20.01	20.01	20.01	2	0.02	20.02	20.02	20.02	20.01	20.01	20.01		(88)
Util <mark>isa</mark>	ation fac	tor for gai	ins for i	rest of d	welling,	h2,	,m (se	e Ta <mark>ble</mark>	9a)						
(89)m=	1	1	0.99	0.95	0.83		0.62	0.42	0.48	0.79	0.98	1	1		(89)
Mean	interna	l tempera	ture in	the rest	of dwel	ina	T2 (f	ollow ste	eps 3 to	7 in Tabl	e 9c)				
(90)m=	18.22	18.5	18.92	19.44	19.82		9.99	20.02	20.01	19.91	19.38	18.69	18.17		(90)
										f	L LA = Livi	ng area ÷ (4) =	0.14	(91)
Moon	intorno	Itomporo	turo (fo	r tha wh		مالات	a) fl	Λ	. (1						
		l tempera									19 54	18.88	18 38		(92)
		nent to the										10.00	10.00		(0-)
(93)m=	18.43	18.7	19.1	19.59	19.96	-	20.13	20.16	20.15	20.05	19.54	18.88	18.38		(93)
		iting requi		I						1		1	1		
		mean inte			re obtai	ned	l at ste	en 11 of	Table	9b so tha	t Ti m=	(76)m an	d re-calo	ulate	
		factor for		•								(* • •) • • • • •			
	Jan	Feb	Mar	Apr	Мау		Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Utilisa	ation fac	tor for ga	ins, hm	:											
(94)m=	1	1	0.98	0.94	0.83	(0.63	0.44	0.5	0.8	0.97	1	1		(94)
Usefu	ıl gains,	hmGm ,	W = (94	4)m x (8-	4)m	-					-				
(95)m=	1083.72	1420.7	1719.46	1942.55	1883.36	5 14	113.57	939.32	983.84	1397.77	1390.39	1123.72	995.33		(95)
Month	nly aver	age exteri	nal tem	perature	e from T	abl	e 8							1	
(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 mear		· · · ·				- ,	- ,]				
(97)m=	3831.8			2868.07				946.18	997.42		2394	3164.45	3821.9		(97)
	-	g requirer	1	i	i i	Wh	/mont		4 x [(9	7)m – (95)m] x (4	1		I	
(98)m=	2044.58	1556.55	1255.09	666.38	245.94		0	0	0	0	746.69		2102.97		_
									_				- 1		
									То	tal per year	(kWh/yea	ar) = Sum(9	8)15,912 =	10087.5	(98)
Space	e heatin	g requirer	ment in	kWh/m²	²/year				То	tal per year	(kWh/yea	ar) = Sum(9	(8) _{15,912} =	40.84	(98)

9a. En	ergy red	quiremer	nts – Ind	ividual h	eating sy	ystems i	ncluding	micro-C	HP)					
Space heating: Fraction of space heat from secondary/supplementary system 0 (201)														
						mentary	-	(202) = 1 -	- (201) -					4
				nain syst	. ,			(202) = 1 - (204) =		(203)] -			1	(202)
			•	main sys				(204) - (20	-, ~ [' -	(_00)] -			1 93.4	(204) (206)
				ementar		acustor	o 0/							(208)
EIIICI		r	· · ·	r			· · · · ·		0	0.1	N.	Du	0	
Snac	Jan e heatin		Mar	Apr alculate	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/yea	ar
Opac	2044.58	ř. – –	1255.09	666.38	245.94	0	0	0	0	746.69	1469.32	2102.97		
(211)m	ו 1 = {[(98)m x (20	u 4)]}x1	1 100 ÷ (20)6)		I				I			(211)
()	-	1666.54	1	1	263.31	0	0	0	0	799.45	1573.15	2251.57		
			<u> </u>				!	Tota	l (kWh/yea	ar) =Sum(2	211) _{15,1012}		10800.32	(211)
Space	e heatin	g fuel (s	econdar	y), kWh/	month									-
	-	01)] } x 1	i	1									I	
(215)m=	0	0	0	0	0	0	0	0 Tota		0	0	0		7(215)
Total (kWh/year) =Sum(215) _{15,1012} = Water heating												0	(215)	
			ter (calc	ulated a	bove)									
	225.42	198.61	208.41	186.59	182.67	161.13	154.37	171.82	171.62	193.49	204.9	219.91		
Efficie	ncy of w	ater hea	iter										80.3	(216)
(217)m=	89.28	89.13	88.81	87.98	85.8	80.3	80.3	80.3	80.3	88.12	89.03	<mark>8</mark> 9.34		(217)
		heating, m x 100												
	252.47	222.83	234.67	212.08	212.9	200.66	192.24	213.97	213.72	219.58	230.15	246.16		
								Tota	I = Sum(2 ⁻	19a) ₁₁₂ =			2651.43	(219)
Annua	al totals									k	Wh/year	•	kWh/year	-
Space	heating	fuel use	ed, main	system	1								10800.32	
Water	heating	fuel use	d										2651.43	
Electri	city for p	oumps, fa	ans and	electric	keep-ho	t								
centra	al heatir	ng pump	:									30		(230c)
boiler	with a f	an-assis	sted flue									45		(230e)
Total e	electricit	y for the	above, l	kWh/yea	r			sum	of (230a).	(230g) =			75	(231)
	city for I												651.46](232)
	•		– Individ	ual heat	ina svste	ems inclu	udina mi	cro-CHP						
120.	002 011	10010110	manna	idal ficat	ing by bic									
							e rgy /h/year			Emiss kg CO	ion fac 2/kWh	tor	Emissions kg CO2/yea	
Space	heating	(main s	ystem 1)		(21	1) x			0.2	16	=	2332.87	(261)
Space	heating	(second	dary)			(21	5) x			0.5	19	=	0	(263)
Water	heating					(219	9) x			0.2	16	=	572.71	(264)
	-	ter heati	ng			(26	1) + (262)	+ (263) + (264) =	L			2905.58	(265)

Electricity for pumps, fans and electric keep-hot	(231) x	0.519 =	38.93 (267)
Electricity for lighting	(232) x	0.519 =	338.11 (268)
Total CO2, kg/year		sum of (265)(271) =	3282.61 (272)
TER =			13.29 (273)

			User D	etails:						
Assessor Name: Software Name:	Stroma FSAP 201	2		Strom Softwa				Versic	on: 1.0.1.25	
		Р	roperty <i>i</i>	Address	Belsize	- 4-bed	End			
Address :										
1. Overall dwelling dimension	ons:									
			Area	a(m²)		Av. Hei	ght(m)	-	Volume(m ³)	-
Ground floor				121	(1a) x	2.	4	(2a) =	290.4	(3a)
First floor				68	(1b) x	2.	4	(2b) =	163.2	(3b)
Second floor				58	(1c) x	2.	4	(2c) =	139.2	(3c)
Total floor area TFA = (1a)+	(1b)+(1c)+(1d)+(1e	e)+(1n	ı) <u> </u>	247	(4)			_		-
Dwelling volume					(3a)+(3b))+(3c)+(3d)	+(3e)+	.(3n) =	592.8	(5)
2. Ventilation rate:										_
		econdar neating	у	other		total			m ³ per hour	
Number of chimneys		0] + [0] = [0	x	40 =	0	(6a)
Number of open flues	0 +	0	- +	0	ī = Г	0	×	20 =	0	(6b)
Number of intermittent fans					Ē	5	×	10 =	50	(7a)
Number of passive vents					Ē	0	x .	10 =	0	(7b)
Number of flueless gas fires					Ē	0	X	40 =	0	(7c)
								Air ch	nanges per hou	ır
Infiltration due to chimneys,	flues and fans = (6)	a)+(6b)+(7	a)+(7b)+(7c) =	Г	50		÷ (5) =	0.08](8)
If a pressurisation test has been					continue fr			. (-)	0.00	
Number of storeys in the c	dwelling (ns)								0	(9)
Additional infiltration							[(9)	-1]x0.1 =	0	(10)
Structural infiltration: 0.25	for steel or timber	frame or	0.35 foi	r masonr	y constr	uction			0	(11)
if both types of wall are prese deducting areas of openings),		ponding to	the great	er wall are	a (after					-
If suspended wooden floor		ed) or 0.	1 (seale	ed), else	enter 0				0	(12)
If no draught lobby, enter	0.05, else enter 0	,	,	,.					0	(13)
Percentage of windows ar	nd doors draught st	ripped							0	(14)
Window infiltration				0.25 - [0.2	x (14) ÷ 1	= [00			0	(15)
Infiltration rate				(8) + (10)	+ (11) + (1	2) + (13) +	(15) =		0	(16)
Air permeability value, q50), expressed in cub	oic metre	s per ho	our per s	quare m	etre of er	nvelope	area	4	(17)
If based on air permeability	value, then (18) = [(1	7) ÷ 20]+(8	3), otherwi	ise (18) = (16)				0.28	(18)
Air permeability value applies if a	a pressurisation test has	s been don	e or a deg	gree air pe	rmeability	is being us	ed			-
Number of sides sheltered									2	(19)
Shelter factor				(20) = 1 -		9)] =			0.85	(20)
Infiltration rate incorporating				(21) = (18)) x (20) =				0.24	(21)
Infiltration rate modified for n									1	
Jan Feb Ma	r Apr May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	J	
Monthly average wind speed	- 1			1		,		i	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 F	actor (2	2a)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		
Adjuste	ed infiltra	ation rat	e (allowi	ng for sh	nelter an	nd wind s	speed) =	: (21a) x	(22a)m					
	0.31	0.3	0.3	0.27	0.26	0.23	0.23	0.22	0.24	0.26	0.27	0.28		
			change i	rate for t	he appli	cable ca	ise			<u>.</u>	<u>.</u>	ـــــــــــــــــــــــــــــــــــــ		
	echanica			malia NL (O	oh) (00.	а) Г ани (()) (00-)		l	0	(23a)
			using Appe)) = (23a)		l	0	(23b)
			overy: effic	-	-								0	(23c)
a) if (24a)m=	Dalance		anical ve	ntilation 0		at recov		$\frac{HR}{0}$	a m = (2)	2b)m + (0	23D) × [*	1 - (23C)	÷ 100]	(24a)
	-		anical ve			-					-	0		(244)
(24b)m=				0				0	$\frac{1}{0}$	0	230)	0		(24b)
			tract ven		_	-		-	_		0	0		()
			k (23b), t		•	•				.5 × (23t))			
(24c)m=	0	0	0	0	0	0	0	0	0	0	0	0		(24c)
d) If	natural	ventilati	on or wh	ole hous	e positi	ve input	ventilatio	on from	I loft		<u> </u>			
,			en (24d)			•				0.5]				
(24d)m=	0.55	0.55	0.54	0.54	0.53	0.53	0.53	0.52	0.53	0.53	0.54	0.54		(24d)
Effe	ctive air	change	rate - er	i <mark>ter (</mark> 24a) or (2 <mark>4</mark> 1	o) or (24	c) or (24	ld) in bo	x (25)					
(25)m=	0.55	0.55	0.54	0.54	0.53	0.53	0.53	0.52	0.53	0.53	0.54	0.54		(25)
3. He	at losses	s and he	eat l <mark>oss</mark> p	paramete	er: 🗹								_	
ELEN		Gros		Openin		Net Ar	ea	U-val	ue	AXU		k-value		AXk
		area	(m²)	m	1 ²	А ,	m²	W/m2	2K	(W/	K)	kJ/m²∙k	< I	kJ/K
Doo <mark>rs</mark>						1.89	x	1.6	=	3.024				(26)
Windo	ws Type	- 1				1.7	x1	/[1/(1.4)+	- 0.04] =	2.25				(27)
Windo	ws Type	2				12.08	3 x1	/[1/(1.4)+	- 0.04] =	16.02				(27)
Windo	ws Type	3				12.08	3 x1	/[1/(1.4)+	- 0.04] =	16.02				(27)
Windo	ws Type	4				17.16	6 x1	/[1/(1.4)+	0.04] =	22.75				(27)
Windo	ws Type	5				2.73	x1	/[1/(1.4)+	- 0.04] =	3.62				(27)
Windo	ws Type	6				4.5	x1	/[1/(1.4)+	- 0.04] =	5.97				(27)
Windo	ws Type	7				4.5	x1	/[1/(1.4)+	- 0.04] =	5.97				(27)
Windo	ws Type	8				7.77	x1	/[1/(1.4)+	- 0.04] =	10.3	=			(27)
Windo	ws Type	9				1.89	x1	/[1/(1.4)+	- 0.04] =	2.51	\exists			(27)
Windo	ws Type	10				7.77	x1	/[1/(1.4)+	- 0.04] =	10.3	=			(27)
Windo	ws Type	11				1.89	=	/[1/(1.4)+	- 0.04] =	2.51	=			(27)
	ws Type					6		/[1/(1.4)+		7.95	╡			(27)
	ws Type					6		/[1/(1.4)+		7.95	=			(27)
Floor	, , , , , , , , , , , , , , , , , ,					121		0.11	=	13.31	╡╷			(28)
Walls		262	27	07.04										(29)
Roof T	Tvne1	263.		87.9		175.4		0.17		29.82				
	, , , , , , , , , , , , , , , , , , , ,	58	>	0		58	X	0.11	=	6.38				(30)

Roof Type2	10		0		10	x	0.11	=	1.1				(30)
Roof Type3	53		0		53	x	0.11	=	5.83	T F		\neg	(30)
Total area of e	lements	, m²			505.3	7							(31)
Party wall					72.14	t x	0	=	0				(32)
* for windows and ** include the area						ated using	g formula 1	/[(1/U-valu	ıe)+0.04] a	as given in	paragraph	3.2	
Fabric heat los							(26)(30)) + (32) =				173.57	(33)
Heat capacity	Cm = S((Axk)						((28).	(30) + (32	2) + (32a).	(32e) =	41525.3	(34)
Thermal mass	parame	ter (TMF	• = Cm ÷	- TFA) ir	n kJ/m²K			Indica	tive Value	: Medium		250	(35)
For design assess				construct	ion are noi	t known pi	recisely the	e indicative	e values of	TMP in Ta	able 1f		
can be used instead						,							(a.a.)
Thermal bridge	•	•		• •	-	1						36.32	(36)
Total fabric hea		are not kn	0001 (30) =	= 0.75 X (5	1)			(33) +	(36) =			209.89	(37)
Ventilation hea	t loss ca	alculated	monthly	ý				(38)m	= 0.33 × (25)m x (5)			` ´
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(38)m= 107.1	106.74	106.39	104.73	104.41	102.97	102.97	102.7	103.53	104.41	105.04	105.7		(38)
Heat transfer c	oefficier	nt, W/K					1	(39)m	= (37) + (3	38)m		1	
(39)m= 316.99	316.63	, 316.28	314.62	314.31	312.86	312.86	312.6	313.42	31 <mark>4.31</mark>	314.94	315. <mark>5</mark> 9		
									Average =	Sum(39)1.	₁₂ / 12=	314.62	(39)
Heat loss para								I	= (39)m ÷	(4)		1	
(40)m= 1.28	1.28	1.28	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.28	1.28	4.07	
Number of day	rs in mor	nth (Tab	le 1a)						Average =	Sum(40)₁.	12 /12=	1.27	(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)
								•				1	
4. Water heat	ing ener	rav reaui	irement:								kWh/ye	ear:	
												1	
Assumed occu if TFA > 13.9			[1 - exp	(-0.0003	849 x (TF	- A -13.9)2)] + 0.0	0013 x (⁻	TFA -13.		06		(42)
if TFA £ 13.9				(- (/ /] -	(
Annual averag Reduce the annua									se target o		6.95		(43)
not more that 125	-		• •		-	-			so target e				
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Hot water usage in	n litres per	day for ea	ach month	Vd,m = fa	ctor from T	Table 1c x	(43)					1	
(44)m= 117.64	113.36	109.09	104.81	100.53	96.25	96.25	100.53	104.81	109.09	113.36	117.64		
										m(44) ₁₁₂ =		1283.36	(44)
Energy content of				-		i	1		· · · · · · · · · · · · · · · · · · ·			1	
(45)m= 174.46	152.58	157.45	137.27	131.71	113.66	105.32	120.86	122.3	142.53	155.58	168.95	1000.00	
lf instantaneous w	ater heatii	ng at point	of use (no	hot water	r storage),	enter 0 in	boxes (46		ı otal = Su	m(45) ₁₁₂ =	=	1682.69	(45)
(46)m= 26.17	22.89	23.62	20.59	19.76	17.05	15.8	18.13	18.35	21.38	23.34	25.34		(46)
Water storage				l	1		1	I	I	I	l		
Storage volum	e (litres)	includin	ng any so	olar or W	/WHRS	storage	within sa	ame ves	sel		0		(47)

	•	-			-		litres in leous co	• •	ers) ente	er 'O' in (47)			
	storage		not wate			notantan	10000 00			51 0 111	,			
	-		eclared l	oss facto	or is kno	wn (kWł	n/day):					0	1	(48)
Tempe	erature fa	actor fro	m Table	2b								0	ĺ	(49)
			•	, kWh/ye vlinder l		or is not		(48) x (49)) =			0	j	(50)
				•		h/litre/da						0	1	(51)
	•	-	ee secti	on 4.3									-	
		from Tal		0								0	4	(52)
			m Table									0	ļ	(53)
			-	, kWh/ye	ear			(47) x (51)) x (52) x (53) =		0	4	(54)
		54) in (5		ian aaab	wa a with			((50)(0]	(55)
				or each				((56)m = (-		1	7	(==)
(56)m=	0	0	0	0	0	0	0 H11)] ÷ (50	0	0 = (56)		0	0		(56)
-										I	I			·
(57)m=	0	0	0	0	0	0	0	0	0	0	0	0		(57)
		•		om Table								0		(58)
	·						(58) ÷ 36	· · · ·						
•	-						er heatir	-	-		· ·		_	(50)
(59)m=	0	0	0	0	0	0	0	0	0	0	0	0		(59)
Combi	loss ca	culate <mark>d</mark>	for each	month (61)m =	(60) ÷ 36	65 × (41))m				_	_	
(61)m=	<mark>5</mark> 0.96	46.03	50.96	49.32	50.96	47.47	49.05	50.96	49.32	50.96	49.32	50.96		(61)
Tota <mark>l h</mark>	eat requ	uired for	water h	eating ca	alculated	for eacl	n month	(62)m =	0.85 × ((45) <mark>m +</mark>	(46)m +	(57)m +	+ (59)m + (61)m
(62)m=	225.42	198.61	208.41	<mark>186</mark> .59	182.67	161.13	154.37	171.82	171.62	19 <mark>3.4</mark> 9	204.9	219.91		(62)
Solar DH	HW input o	alculated	using App	endix G or	Appendix	H (negati	ve quantity	(enter '0)	' if <mark>no sola</mark>	r contribut	ion to wate	er heating)	
(add a	dditiona	lines if	FGHRS	and/or V	VWHRS	applies,	, see Ap	pendix C	G)	r	r	1	-	
(63)m=	0	0	0	0	0	0	0	0	0	0	0	0		(63)
Output	from w	ater hea	ter										-	
(64)m=	225.42	198.61	208.41	186.59	182.67	161.13	154.37	171.82	171.62	193.49	204.9	219.91		
								Outp	out from wa	ater heate	r (annual)₁	12	2278.93	(64)
Heat g	ains froi	n water	heating,	kWh/mo	onth 0.2	5 ´ [0.85	× (45)m	+ (61)m	n] + 0.8 x	(46)m	+ (57)m	+ (59)n	<u>ו</u>]	
(65)m=	70.75	62.24	65.09	57.97	56.53	49.66	47.28	52.93	52.99	60.13	64.06	68.92		(65)
inclu	de (57)ı	m in calo	culation of	of (65)m	only if c	ylinder is	s in the c	dwelling	or hot w	ater is fr	om com	munity l	heating	
5. Int	ernal ga	ins (see	Table 5	and 5a):									
Metabo	olic gain	s (Table	5), Wat	ts									_	
	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(66)m=	153.15	153.15	153.15	153.15	153.15	153.15	153.15	153.15	153.15	153.15	153.15	153.15]	(66)
Lightin	g gains	(calculat	ted in Ap	pendix l	L, equat	ion L9 oi	r L9a), a	lso see -	Table 5		-	-	-	
(67)m=	36.89	32.76	26.65	20.17	15.08	12.73	13.76	17.88	24	30.47	35.56	37.91]	(67)
Applia	nces gai	ns (calc	ulated in	Append	lix L, eq	uation L ⁻	13 or L1	3a), also	see Ta	ble 5			-	
(68)m=	413.78	418.07	407.25	384.21	355.14	327.81	309.55	305.26	316.08	339.11	368.19	395.52]	(68)
Cookin	ig gains	(calcula	ted in A	ppendix	L, equat	ion L15	or L15a)	, also se	e Table	5			-	

(69)m= 38.32 38.32 38.32 38.32 38.32 38.32 38.32 38.32 38.32 38.32 (69)												
Pumps and fans gains (Table 5a)												
(70)m= 3 3 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= -122.52 -122.52 -122.52 -122.52 -122.52 -122.52 -122.52 -122.52 -122.52 -122.52 -122.52 -122.52 -122.52	(71)											
Water heating gains (Table 5)												
(72)m= 95.09 92.62 87.49 80.52 75.99 68.97 63.55 71.14 73.6 80.82 88.97 92.63	(72)											
Total internal gains = $(66)m + (67)m + (68)m + (69)m + (70)m + (71)m + (72)m$												
(73)m= 617.7 615.4 593.33 556.85 518.15 481.46 458.8 466.22 485.63 522.35 564.67 598.01	(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)												
North $0.9x$ 0.77 x 1.7 x 10.63 x 0.85 x 0.7 = 7.45 (7) North $0.9x$ 0.77 x 1.7 x 10.63 x 0.85 x 0.7 = 7.45 (7)												
North 0.9x 0.77 X 12.08 X 10.63 X 0.85 X 0.7 = 52.1	96 (74)											
North 0.9x 0.77 X 4.5 X 10.63 X 0.85 X 0.7 = 19.7	73 (74)											
North 0.9x 0.77 X 7.77 X 10.63 X 0.85 X 0.7 = 34.0)7 (74)											
North 0.9x 0.77 × 6 × 10.63 × 0.85 × 0.7 = 26.	31 (74)											
North 0.9x 0.77 x 1.7 x 20.32 x 0.85 x 0.7 = 14.	24 (74)											
North 0.9x 0.77 × 12.08 × 20.32 × 0.85 × 0.7 = 101	22 (74)											
North 0.9x 0.77 x 4.5 x 20.32 x 0.85 x 0.7 = 37.	71 (74)											
North 0.9x 0.77 x 7.77 x 20.32 x 0.85 x 0.7 = 65.	11 (74)											
North 0.9x 0.77 x 6 x 20,32 x 0.85 x 0.7 = 50.3	27 (74)											
North 0.9x 0.77 x 1.7 x 34.53 x 0.85 x 0.7 = 24.	2 (74)											
North 0.9x 0.77 x 12.08 x 34.53 x 0.85 x 0.7 = 17	2 (74)											
North 0.9x 0.77 x 4.5 x 34.53 x 0.85 x 0.7 = 64.)7 <mark>(74)</mark>											
North 0.9x 0.77 x 7.77 x 34.53 x 0.85 x 0.7 = 110	63 <mark>(74)</mark>											
North 0.9x 0.77 x 6 x 34.53 x 0.85 x 0.7 = 85.4	43 (74)											
North 0.9x 0.77 x 1.7 x 55.46 x 0.85 x 0.7 = 38.4	38 (74)											
North 0.9x 0.77 x 12.08 x 55.46 x 0.85 x 0.7 = 276	27 <mark>(74)</mark>											
North 0.9x 0.77 x 4.5 x 55.46 x 0.85 x 0.7 = 102	91 <mark>(74)</mark>											
North 0.9x 0.77 x 7.77 x 55.46 x 0.85 x 0.7 = 177	.7 (74)											
North 0.9x 0.77 x 6 x 55.46 x 0.85 x 0.7 = 137	22 (74)											
North 0.9x 0.77 x 1.7 x 74.72 x 0.85 x 0.7 = 52.3	37 (74)											
North 0.9x 0.77 X 12.08 X 74.72 X 0.85 X 0.7 = 372	16 (74)											
North 0.9x 0.77 x 4.5 x 74.72 x 0.85 x 0.7 = 138	64 (74)											
North 0.9x 0.77 X 7.77 X 74.72 X 0.85 X 0.7 = 239	38 (74)											
North 0.9x 0.77 x 6 x 74.72 x 0.85 x 0.7 = 184	85 (74)											
North 0.9x 0.77 × 1.7 × 79.99 × 0.85 × 0.7 = 56.4)7 (74)											
North 0.9x 0.77 × 12.08 × 79.99 × 0.85 × 0.7 = 398	41 (74)											
North 0.9x 0.77 x 4.5 x 79.99 x 0.85 x 0.7 = 148	41 (74)											

Nom 0.8x 0.77 x 77 x 7889 x 0.85 x 0.77 = 298.0 (4) North 0.9x 0.77 x 1.7 x 74.88 x 0.86 x 0.77 = 62.38 (74) North 0.9x 0.77 x 1.208 x 7468 x 0.85 x 0.77 = 62.38 (74) North 0.9x 0.77 x 4.5 x 7468 x 0.85 x 0.77 = 138.58 (74) North 0.9x 0.77 x 1.7 x 59.25 x 0.85 x 0.77 = 145.50 (74) North 0.9x 0.77 x 4.55 x 0.85 x 0.77 = 17.3 1.7 x 59.25 x 0.85 x 0.77 = 1.41.52 1.83.5 1.7	N1 /1	r		1				,			F			-
North 0.0. 0.01 0.02 0.000 0.000 0.000 0.000 0.01 0.010 0.0	North	0.9x	0.77	x	7.77	x	79.99	×	0.85	x	0.7	=	256.26	(74)
North 0.00 0.01 × 12.00 × 1400 0.01 × 0.01 × 0.01 × 0.01 × 0.01 × 0.01 × 0.01 <th< td=""><td>North</td><td>0.9x</td><td>0.77</td><td>x</td><td>6</td><td>x</td><td>79.99</td><td>x</td><td>0.85</td><td>x</td><td>0.7</td><td>=</td><td>197.88</td><td>(74)</td></th<>	North	0.9x	0.77	x	6	x	79.99	x	0.85	x	0.7	=	197.88	(74)
North 0.0x 0.77 × 1.200	North	0.9x	0.77	x	1.7	x	74.68	x	0.85	x	0.7	=	52.35	(74)
North 0.00 0.00 1.00 1.00 0.00 <t< td=""><td>North</td><td>0.9x</td><td>0.77</td><td>x</td><td>12.08</td><td>x</td><td>74.68</td><td>X</td><td>0.85</td><td>x</td><td>0.7</td><td>=</td><td>371.96</td><td>(74)</td></t<>	North	0.9x	0.77	x	12.08	x	74.68	X	0.85	x	0.7	=	371.96	(74)
North 0.8x 0.77 × 6 × 74.88 × 0.000 × 0.77 × 1.77 × 56.25 × 0.85 × 0.77 = 114.75 (74) North 0.9x 0.77 × 1.2.08 × 59.25 × 0.85 × 0.77 = 225,11 (74) North 0.9x 0.77 × 4.5 × 59.25 × 0.85 × 0.77 = 198.982 (74) North 0.9x 0.77 × 1.7 × 59.25 × 0.85 × 0.77 = 146.56 (74) North 0.9x 0.77 × 1.7 × 41.52 × 0.85 × 0.77 = 120.679 (74) North 0.9x 0.77 × 7.77 × 14.52 × 0.85 × 0.77 = 120.679 (74	North	0.9x	0.77	x	4.5	x	74.68	×	0.85	x	0.7	=	138.56	(74)
North 0.8 0.7 × 1.7 × 592.5 × 0.85 × 0.77 × 11.7 × 592.5 × 0.85 × 0.77 = 11.53 (74) North 0.8 0.77 × 4.5 \$92.5 × 0.85 × 0.7 = 199.83 (74) North 0.8 0.77 × 7.77 × 592.5 × 0.85 × 0.7 = 199.82 (74) North 0.9 0.77 × 1.7 × 141.52 × 0.85 × 0.7 = 129.1 (74) North 0.9 0.77 × 12.08 × 141.52 × 0.85 × 0.7 = 120.679 (74) North 0.9 0.77 × 12.08 × 141.52 × 0.85 × 0.7 = 120.49 (74)	North	0.9x	0.77	x	7.77	x	74.68	x	0.85	x	0.7	=	239.25	(74)
North 0.0 0.0 0.0 0.0 0.00 0.	North	0.9x	0.77	x	6	x	74.68	×	0.85	x	0.7	=	184.75	(74)
North 0.8 0.77 x 4.5 x 50.25 x 0.85 x 0.77 x 1.00.11 (74) North 0.9 0.77 x 7.77 x 59.25 x 0.85 x 0.77 = 109.33 (74) North 0.9 0.77 x 1.7 x 41.52 x 0.85 x 0.77 = 146.58 (74) North 0.9 0.77 x 1.20.81 x 0.85 x 0.77 = 206.79 (74) North 0.9 0.77 x 4.5 x 0.85 x 0.77 = 102.71 (74) North 0.9 0.77 x 4.5 x 0.85 x 0.77 = 102.71 (74) North 0.9 0.77 x 4.5 2.4.19 x 0.85 x 0.77 x 12.6.9 (74)	North	0.9x	0.77	x	1.7	x	59.25	x	0.85	x	0.7	=	41.53	(74)
North 0.87 0.77 x 7.77 x 50.25 x 0.88 x 0.77 = 198.82 (74) North 0.98 0.77 x 6 x 59.25 x 0.85 x 0.77 = 146.58 (74) North 0.98 0.77 x 1.7 x 41.52 x 0.85 x 0.77 = 2206.79 (74) North 0.98 0.77 x 4.5 x 4.82 x 0.85 x 0.77 = 2206.79 (74) North 0.98 0.77 x 4.5 x 0.85 x 0.77 = 102.71 (74) North 0.98 0.77 x 1.7 x 24.19 x 0.85 x 0.7 = 148.88 (74) North 0.98 0.77 x 4.5 x 24.19 x 0.85 <td>North</td> <td>0.9x</td> <td>0.77</td> <td>x</td> <td>12.08</td> <td>x</td> <td>59.25</td> <td>x</td> <td>0.85</td> <td>x</td> <td>0.7</td> <td>=</td> <td>295.11</td> <td>(74)</td>	North	0.9x	0.77	x	12.08	x	59.25	x	0.85	x	0.7	=	295.11	(74)
North 0.8 0.77 x 6 x 9.25 x 0.85 x 0.77 = 14.65.68 (74) North 0.9x 0.77 x 1.7 x 41.52 x 0.85 x 0.77 = 29.1 (74) North 0.9x 0.77 x 4.5 x 41.52 x 0.85 x 0.77 = 206.79 (74) North 0.9x 0.77 x 4.5 x 41.52 x 0.85 x 0.77 = 102.71 (74) North 0.9x 0.77 x 6 x 41.52 x 0.85 x 0.77 = 102.64 (74) North 0.9x 0.77 x 1.2.08 24.19 x 0.85 x 0.77 = 120.49 (74) North 0.9x 0.77 x 1.7 24.19 x 0.85 </td <td>North</td> <td>0.9x</td> <td>0.77</td> <td>x</td> <td>4.5</td> <td>x</td> <td>59.25</td> <td>x</td> <td>0.85</td> <td>x</td> <td>0.7</td> <td>=</td> <td>109.93</td> <td>(74)</td>	North	0.9x	0.77	x	4.5	x	59.25	x	0.85	x	0.7	=	109.93	(74)
North 0.8.1 0.1 110.05 0.9 0.7 17.7 X 141.52 X 0.05 X 0.7 = 2.0.7 7.4 North 0.9X 0.77 X 12.08 X 41.52 X 0.85 X 0.7 = 2.06.79 7.4 North 0.9X 0.77 X 4.5 X 41.52 X 0.85 X 0.7 = 133.01 7.4 North 0.9X 0.77 X 6 X 41.52 X 0.85 X 0.7 = 133.01 7.4 North 0.9X 0.77 X 6 X 41.52 X 0.85 X 0.7 = 102.71 7.4 North 0.9X 0.77 X 1.7 X 24.19 X 0.85 X 0.7 = 44.88 7.4 North 0.9X 0.77 X 1.7	North	0.9x	0.77	x	7.77	x	59.25	x	0.85	x	0.7	=	189.82	(74)
North 0.8x 0.77 x 12.08 x 41.52 x 0.85 x 0.77 = 12.08 x 41.52 x 0.85 x 0.77 = 17.03 (74) North 0.9x 0.77 x 4.5 x 41.52 x 0.85 x 0.77 = 113.01 (74) North 0.9x 0.77 x 4.5 x 0.85 x 0.77 = 113.01 (74) North 0.9x 0.77 x 6 x 41.52 x 0.85 x 0.77 = 102.71 (74) North 0.9x 0.77 x 1.7 x 24.19 x 0.85 x 0.77 = 44.88 (74) North 0.9x 0.77 x 6 x 24.19 x 0.85 x 0.77 = 44.88 (74) North	North	0.9x	0.77	x	6	x	59.25	x	0.85	x	0.7	=	146.58	(74)
North 0.8x 0.77 x 4.5 x 41.52 x 0.85 x 0.77 = 20.01 (74) North 0.9x 0.77 x 7.77 x 41.52 x 0.85 x 0.77 = 113.01 (74) North 0.9x 0.77 x 7.77 x 41.52 x 0.85 x 0.77 = 113.01 (74) North 0.9x 0.77 x 7.77 X 24.19 x 0.85 x 0.77 = 116.96 (74) North 0.9x 0.77 x 4.5 x 24.19 x 0.85 x 0.77 = 44.88 (74) North 0.9x 0.77 x 7.77 X 24.19 x 0.85 x 0.77 = 59.84 (74) North 0.9x 0.77 x 1.7 x 13.12 x 0.85 x 0.77 = 65.34 (74) North	North	0.9x	0.77	x	1.7	x	41.52	×	0.85	x	0.7	=	29.1	(74)
North 0.3 0.77 × 7.77 × 1.62 × 0.85 × 0.77 = 133.01 (74) North 0.3x 0.77 × 6 × 41.52 × 0.85 × 0.77 = 133.01 (74) North 0.3x 0.77 × 6 × 41.52 × 0.85 × 0.77 = 133.01 (74) North 0.3x 0.77 × 12.08 × 24.19 × 0.85 × 0.77 = 120.49 (74) North 0.3x 0.77 × 7.77 × 24.19 × 0.85 × 0.77 = 77.5 (74) North 0.3x 0.77 × 6 × 24.19 × 0.85 × 0.7 = 59.84 (74) North 0.3x 0.77 × 1.7 13.12 ×	North	0.9x	0.77	×	12.08	x	41.52	x	0.85	x	0.7	=	206.79	(74)
North $0.3x$ 0.77 x 4.152 x 0.85 x 0.77 z 1.72 x 24.19 x 0.85 x 0.77 z 1.72 x 24.19 x 0.85 x 0.77 z 12.08 x 24.19 x 0.85 x 0.77 z 12.049 (74) North $0.9x$ 0.77 x 4.5 x 24.19 x 0.85 x 0.77 z 4.48 (74) North $0.9x$ 0.77 x 4.5 x 24.19 x 0.85 x 0.77 z 4.88 (74) North $0.9x$ 0.77 x 1.77 x 1.312 x 0.85 x 0.77 z 3.84 (74) North $0.9x$ 0.77 x 1.312 x 0.85 x 0.7 z 24.34 (74) North $0.9x$ <	North	0.9x	0.77	×	4.5	x	41.52	×	0.85	x	0.7	=	77.03	(74)
North 0.97 x 1.7 x 24.19 x 0.85 x 0.7 z 16.36 (74) North 0.98 0.77 x 1.7 x 24.19 x 0.85 x 0.7 z 16.36 (74) North 0.98 0.77 x 12.06 x 24.19 x 0.85 x 0.7 z 16.36 (74) North 0.98 0.77 x 1.5 x 24.19 x 0.85 x 0.7 z 16.38 (74) North 0.98 0.77 x 1.7 x 1.17 x 0.85 x 0.7 z 59.84 (74) North 0.98 0.77 x 1.17 x 13.12 x 0.85 x 0.7 z 24.34 (74) North 0.98 0.77 x 1.17 x 13.12 x 0.85 x 0.7 z 24.34 (74)<	North	0.9x	0.77	x	7.77	x	41.52	×	0.85	x	0.7	=	133.01	(74)
North 0.9x 0.77 x 12.08 x 24.19 x 0.085 x 0.77 = 120.49 (74) North 0.9x 0.77 x 4.5 x 24.19 x 0.85 x 0.77 = 120.49 (74) North 0.9x 0.77 x 4.5 x 24.19 x 0.85 x 0.77 = 44.88 (74) North 0.9x 0.77 x 6 x 24.19 x 0.85 x 0.77 = 77.5 (74) North 0.9x 0.77 x 1.7 x 13.12 x 0.85 x 0.77 = 59.84 (74) North 0.9x 0.77 x 1.7 x 13.12 x 0.85 x 0.77 = 24.34 (74) North 0.9x 0.77 x 1.5 x 1.3.12	North	0.9x	0.77	x	6	x	41.52	×	0.85	x	0.7	=	102.71	(74)
North 0.9x 0.77 x 4.5 x 24.19 x 0.85 x 0.77 = 44.88 (74) North 0.9x 0.77 x 7.77 x 24.19 x 0.85 x 0.77 = 7.75 (74) North 0.9x 0.77 x 6 x 24.19 x 0.85 x 0.77 = 7.75 (74) North 0.9x 0.77 x 1.7 x 13.12 x 0.85 x 0.77 = 59.84 (74) North 0.9x 0.77 x 1.5 x 13.12 x 0.85 x 0.77 = 24.34 (74) North 0.9x 0.77 x 4.5 x 13.12 x 0.85 x 0.77 = 24.34 (74) North 0.9x 0.77 x 1.7 x 8.86	North	0.9x	0.77	x	1.7	X	24.19	х	0.85	x	0.7	=	16.96	(74)
North $0.9x$ 0.77 x 7.77 x 24.19 x 0.85 x 0.7 z 7.75 (74) North $0.9x$ 0.77 x 6 x 24.19 x 0.85 x 0.7 z 59.84 (74) North $0.9x$ 0.77 x 1.7 x 13.12 x 0.85 x 0.7 z 59.84 (74) North $0.9x$ 0.77 x 1.7 x 13.12 x 0.85 x 0.7 z 59.84 (74) North $0.9x$ 0.77 x 1.5 x 13.12 x 0.85 x 0.7 z 65.34 (74) North $0.9x$ 0.77 x 4.5 x 13.12 x 0.85 x 0.7 z 24.34 (74) North $0.9x$ 0.77 x 4.5 x 13.12 x 0.85 x 0.7 z 24.34 (74) North $0.9x$ 0.77 x 1.7 x 8.86 x 0.85 x 0.7 z 24.34 (74) North $0.9x$ 0.77 x 1.7 x 8.86 x 0.85 x 0.7 z 24.5 (74) North $0.9x$ 0.77 x 1.5 x 8.86 x 0.85 x 0.7 z 24.5 (74) North<	North	0.9x	0.77	x	12.08	x	24.19	x	0.85	x	0.7	=	120.49	(74)
North 0.3x 0.77 x 6 x 24.19 x 0.85 x 0.7 z 59.84 (74) North 0.9x 0.77 x 1.7 x 13.12 x 0.85 x 0.7 = 59.84 (74) North 0.9x 0.77 x 1.7 x 13.12 x 0.85 x 0.7 = 59.84 (74) North 0.9x 0.77 x 1.2.08 x 13.12 x 0.85 x 0.7 = 65.34 (74) North 0.9x 0.77 x 4.5 x 13.12 x 0.85 x 0.7 = 24.34 (74) North 0.9x 0.77 x 1.7 x 8.86 x 0.85 x 0.7 = 24.34 (74) North 0.9x 0.77 x 1.7 x 8.86 <	North	0.9x	0.77	x	4.5	х	24.19	x	0.85	x	0.7	=	44.88	(74)
North 0.9x 0.77 x 1.7 x 13,12 x 0.85 x 0.77 = 9.2 (74) North 0.9x 0.77 x 12.08 x 13,12 x 0.85 x 0.77 = 9.2 (74) North 0.9x 0.77 x 4.5 x 13,12 x 0.85 x 0.77 = 65,34 (74) North 0.9x 0.77 x 4.5 x 13,12 x 0.85 x 0.77 = 24,34 (74) North 0.9x 0.77 x 6 x 13,12 x 0.85 x 0.7 = 24,34 (74) North 0.9x 0.77 x 6 x 13,12 x 0.85 x 0.7 = 24,34 (74) North 0.9x 0.77 x 1.7 x 8.86 x 0.85 x 0.7 = 6.21 (74) North 0.9	North	0.9x	0.77	x	7.77	x	24.19	x	0.85	x	0.7	=	77.5	(74)
North 0.9x 0.77 x 12.08 x 13.12 x 0.85 x 0.77 = 66.34 (74) North 0.9x 0.77 x 4.5 x 13.12 x 0.85 x 0.77 = 24.34 (74) North 0.9x 0.77 x 7.77 x 13.12 x 0.85 x 0.77 = 24.34 (74) North 0.9x 0.77 x 7.77 x 13.12 x 0.85 x 0.77 = 24.34 (74) North 0.9x 0.77 x 6 x 13.12 x 0.85 x 0.77 = 42.03 (74) North 0.9x 0.77 x 1.7 x 8.86 x 0.85 x 0.7 = 6.21 (74) North 0.9x 0.77 x 4.5 x 8.86 x 0.85 x 0.7 = 6.21 (74) North	North	0.9x	0.77	x	6	×	24.19	x	0.85	x	0.7	=	59.84	(74)
North 0.9x 0.77 x 4.5 x 13.12 x 0.85 x 0.77 = 24.34 (74) North 0.9x 0.77 x 7.77 x 13.12 x 0.85 x 0.77 = 24.34 (74) North 0.9x 0.77 x 7.77 x 13.12 x 0.85 x 0.77 = 24.34 (74) North 0.9x 0.77 x 6 x 13.12 x 0.85 x 0.77 = 42.03 (74) North 0.9x 0.77 x 6 x 13.12 x 0.85 x 0.77 = 44.15 (74) North 0.9x 0.77 x 1.2.08 x 8.86 x 0.85 x 0.77 = 6.21 (74) North 0.9x 0.77 x 4.5 x 8.86 x 0.85 x 0.77 = 21.93 (74) North	North	0.9x	0.77	x	1.7	x	13.12	×	0.85	x	0.7	=	9.2	(74)
North 0.9x 0.77 x 7.77 x 13.12 x 0.85 x 0.7 = 42.03 (74) North 0.9x 0.77 x 7.77 x 13.12 x 0.85 x 0.77 = 42.03 (74) North 0.9x 0.77 x 6 x 13.12 x 0.85 x 0.7 = 42.03 (74) North 0.9x 0.77 x 1.7 x 8.86 x 0.85 x 0.7 = 6.21 (74) North 0.9x 0.77 x 1.7 x 8.86 x 0.85 x 0.7 = 6.21 (74) North 0.9x 0.77 x 4.5 x 8.86 x 0.85 x 0.7 = 16.45 (74) North 0.9x 0.77 x 7.77 x 8.86 x 0.85 x 0.7 = 21.93 (74) East 0.9x	North	0.9x	0.77	x	12.08	x	13.12	×	0.85	x	0.7	=	<mark>6</mark> 5.34	(74)
North 0.9x 0.77 x 6 x 13.12 x 0.85 x 0.7 = 32.45 (74) North 0.9x 0.77 x 1.7 x 8.86 x 0.85 x 0.7 = 6.21 (74) North 0.9x 0.77 x 1.7 x 8.86 x 0.85 x 0.7 = 6.21 (74) North 0.9x 0.77 x 1.2.08 x 8.86 x 0.85 x 0.7 = 6.21 (74) North 0.9x 0.77 x 4.5 x 8.86 x 0.85 x 0.7 = 64.21 (74) North 0.9x 0.77 x 4.5 x 8.86 x 0.85 x 0.7 = 28.4 (74) North 0.9x 0.77 x 6 x 8.86 x 0.85 x 0.7 = 21.93 (74) Bast 0.9x	North	0.9x	0.77	x	4.5	x	13.12	x	0.85	x	0.7	=	24.34	(74)
North 0.9x 0.77 x 1.7 x 8.86 x 0.85 x 0.7 = 6.21 (74) North 0.9x 0.77 x 12.08 x 8.86 x 0.85 x 0.7 = 6.21 (74) North 0.9x 0.77 x 12.08 x 8.86 x 0.85 x 0.7 = 6.21 (74) North 0.9x 0.77 x 12.08 x 8.86 x 0.85 x 0.7 = 6.21 (74) North 0.9x 0.77 x 4.5 x 8.86 x 0.85 x 0.7 = 16.45 (74) North 0.9x 0.77 x 6 x 8.86 x 0.85 x 0.7 = 21.93 (74) East 0.9x 1 x 1.89 x 19.64 x 0.85 x 0.7 = 10.73 (76) East 0.9x	North	0.9x	0.77	x	7.77	x	13.12	×	0.85	x	0.7	=	42.03	(74)
North 0.9x 0.77 x 12.08 x 8.86 x 0.85 x 0.7 = 44.15 (74) North 0.9x 0.77 x 4.5 x 8.86 x 0.85 x 0.7 = 44.15 (74) North 0.9x 0.77 x 4.5 x 8.86 x 0.85 x 0.7 = 14.45 (74) North 0.9x 0.77 x 7.77 x 8.86 x 0.85 x 0.7 = 28.4 (74) North 0.9x 0.77 x 6 x 8.86 x 0.85 x 0.7 = 21.93 (74) East 0.9x 1 x 1.89 x 19.64 x 0.85 x 0.7 = 10.73 (76) East 0.9x 1 x 1.89 x 38.42 x 0.85 x 0.7 = 21 (76) East 0.9x	North	0.9x	0.77	x	6	×	13.12	×	0.85	x	0.7	=	32.45	(74)
North 0.9x 0.77 x 4.5 x 8.86 x 0.85 x 0.7 = 16.45 (74) North 0.9x 0.77 x 7.77 x 8.86 x 0.85 x 0.7 = 16.45 (74) North 0.9x 0.77 x 7.77 x 8.86 x 0.85 x 0.7 = 28.4 (74) North 0.9x 0.77 x 6 x 8.86 x 0.85 x 0.7 = 28.4 (74) East 0.9x 1 x 1.89 x 19.64 x 0.85 x 0.7 = 10.73 (76) East 0.9x 1 x 1.89 x 38.42 x 0.85 x 0.7 = 21 (76) East 0.9x 1 x 1.89 x 38.42 x 0.85 x 0.7 = 21 (76) East 0.9x 1	North	0.9x	0.77	x	1.7	x	8.86	x	0.85	x	0.7	=	6.21	(74)
North 0.9x 0.77 x 7.77 x 8.86 x 0.85 x 0.7 = 28.4 (74) North 0.9x 0.77 x 6 x 8.86 x 0.85 x 0.7 = 28.4 (74) East 0.9x 1 x 1.89 x 19.64 x 0.85 x 0.7 = 21.93 (74) East 0.9x 1 x 1.89 x 19.64 x 0.85 x 0.7 = 10.73 (76) East 0.9x 1 x 1.89 x 19.64 x 0.85 x 0.7 = 10.73 (76) East 0.9x 1 x 1.89 x 38.42 x 0.85 x 0.7 = 21 (76) East 0.9x 1 x 1.89 x 38.42 x 0.85 x 0.7 = 21 (76) East 0.9x 1	North	0.9x	0.77	x	12.08	x	8.86	x	0.85	x	0.7	=	44.15	(74)
North 0.9x 0.77 x 6 x 8.86 x 0.85 x 0.7 = 21.93 (74) East 0.9x 1 x 1.89 x 19.64 x 0.85 x 0.7 = 21.93 (74) East 0.9x 1 x 1.89 x 19.64 x 0.85 x 0.7 = 10.73 (76) East 0.9x 1 x 1.89 x 19.64 x 0.85 x 0.7 = 10.73 (76) East 0.9x 1 x 1.89 x 38.42 x 0.85 x 0.7 = 21 (76) East 0.9x 1 x 1.89 x 38.42 x 0.85 x 0.7 = 21 (76) East 0.9x 1 x 1.89 x 63.27 x 0.85 x 0.7 = 34.58 (76) East 0.9x 1	North	0.9x	0.77	×	4.5	×	8.86	×	0.85	x	0.7	=	16.45	(74)
East 0.9x 1 × 1.89 × 19.64 × 0.85 × 0.7 = 10.73 (76) East 0.9x 1 × 1.89 × 19.64 × 0.85 × 0.7 = 10.73 (76) East 0.9x 1 × 1.89 × 19.64 × 0.85 × 0.7 = 10.73 (76) East 0.9x 1 × 1.89 × 38.42 × 0.85 × 0.7 = 21 (76) East 0.9x 1 × 1.89 × 38.42 × 0.85 × 0.7 = 21 (76) East 0.9x 1 × 1.89 × 63.27 × 0.85 × 0.7 = 34.58 (76) East 0.9x 1 × 1.89 × 63.27 × 0.85 × 0.7 = 34.58 (76) East 0.9x 1	North	0.9x	0.77	x	7.77	x	8.86	×	0.85	x	0.7	=	28.4	(74)
East $0.9x$ 1x 1.89 x 19.64 x 0.85 x 0.7 = 10.73 (76) East $0.9x$ 1x 1.89 x 38.42 x 0.85 x 0.7 = 21 (76) East $0.9x$ 1x 1.89 x 38.42 x 0.85 x 0.7 = 21 (76) East $0.9x$ 1x 1.89 x 38.42 x 0.85 x 0.7 = 21 (76) East $0.9x$ 1x 1.89 x 63.27 x 0.85 x 0.7 = 34.58 (76) East $0.9x$ 1x 1.89 x 63.27 x 0.85 x 0.7 = 34.58 (76) East $0.9x$ 1x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76) East $0.9x$ 1x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76)	North	0.9x	0.77	x	6	x	8.86	×	0.85	x	0.7	=	21.93	(74)
East $0.9x$ 1× 1.89 × 38.42 × 0.85 × 0.7 = 21 (76) East $0.9x$ 1× 1.89 × 38.42 × 0.85 × 0.7 = 21 (76) East $0.9x$ 1× 1.89 × 63.27 × 0.85 × 0.7 = 21 (76) East $0.9x$ 1× 1.89 × 63.27 × 0.85 × 0.7 = 34.58 (76) East $0.9x$ 1× 1.89 × 63.27 × 0.85 × 0.7 = 34.58 (76) East $0.9x$ 1× 1.89 × 92.28 × 0.85 × 0.7 = 50.43 (76) East $0.9x$ 1× 1.89 × 92.28 × 0.85 × 0.7 = 50.43 (76)	East	0.9x	1	x	1.89	x	19.64	×	0.85	x	0.7	=	10.73	(76)
East $0.9x$ 1x 1.89 x 38.42 x 0.85 x 0.7 = 21 (76) East $0.9x$ 1x 1.89 x 63.27 x 0.85 x 0.7 = 34.58 (76) East $0.9x$ 1x 1.89 x 63.27 x 0.85 x 0.7 = 34.58 (76) East $0.9x$ 1x 1.89 x 63.27 x 0.85 x 0.7 = 34.58 (76) East $0.9x$ 1x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76) East $0.9x$ 1x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76)	East	0.9x	1	x	1.89	x	19.64	x	0.85	x	0.7	=	10.73	(76)
East $0.9x$ 1x 1.89 x 63.27 x 0.85 x 0.7 = 34.58 (76)East $0.9x$ 1x 1.89 x 63.27 x 0.85 x 0.7 = 34.58 (76)East $0.9x$ 1x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76)East $0.9x$ 1x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76)East $0.9x$ 1x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76)	East	0.9x	1	x	1.89	x	38.42	x	0.85	x	0.7	=	21	(76)
East $0.9x$ 1 x 1.89 x 63.27 x 0.85 x 0.7 = 34.58 (76) East $0.9x$ 1 x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76) East $0.9x$ 1 x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76) East $0.9x$ 1 x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76)	East	0.9x	1	×	1.89	×	38.42	×	0.85	x	0.7	=	21	(76)
East $0.9x$ 1 x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76) East $0.9x$ 1 x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76) East $0.9x$ 1 x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76)	East	0.9x	1	×	1.89	×	63.27	×	0.85	x	0.7	=	34.58	(76)
East $0.9x$ 1 x 1.89 x 92.28 x 0.85 x 0.7 = 50.43 (76)	East	0.9x	1	×	1.89	x	63.27	×	0.85	x	0.7	=	34.58	(76)
	East	0.9x	1	×	1.89	×	92.28	×	0.85	x	0.7	=	50.43	(76)
East 0.9x 1 x 1.89 x 113.09 x 0.85 x 0.7 = 61.81 (76)	East	0.9x	1	×	1.89	×	92.28	×	0.85	x	0.7	=	50.43	(76)
	East	0.9x	1	x	1.89	x	113.09	×	0.85	x	0.7	=	61.81	(76)

East ON I N ION N ION ION <thion< th=""> <thion< th=""> <thion< th=""></thion<></thion<></thion<>	East	0 0v [1	L 4 99	۱.,	440.00	1	0.05			1		
East 0.x 1.88 x 115.7 x 0.05 x 0.77 = 0.027 (h) East 0.x 1 x 1.89 x 110.22 x 0.85 x 0.77 = 0.024 (f) East 0.x 1 x 1.89 x 110.22 x 0.85 x 0.77 = 0.024 (f) East 0.x 1 x 1.89 x 446.8 x 0.85 x 0.77 = 51.74 (f) East 0.x 1 x 1.89 x 73.59 x 0.85 x 0.77 = 24.92 (f) East 0.x 1 x 1.89 x 24.49 x 0.85 x 0.77 = 24.92 (f) East 0.x 1 x 1.88 x 1.15 x 0.85 x 0		0.9x	1	X	1.89	×	113.09	×	0.85	x	0.7	=	61.81	(76)
East 0.0 1 × 1.00 × 1.00 × 0.00 × 0.07 = 0.0024 (%) East 0.3x 1 × 1.89 × 110.22 × 0.85 × 0.07 = 60.24 (%) East 0.3x 1 × 1.89 × 0.465 × 0.07 = 60.24 (%) East 0.3x 1 × 1.89 × 0.465 × 0.07 = 60.24 (%) East 0.3x 1 × 1.89 × 73.59 × 0.65 × 0.07 = 24.22 (%) East 0.3x 1 × 1.89 × 24.49 × 0.65 × 0.77 = 13.38 (%) South 0.3x 1 × 1.89 × 24.49 × 0.65 × 0.77 = <		Ļ]]		1		1				1		4
East One Image: Constraint of the constraint				1	L	1		1				1		-
East 0.2 1 × 1.12 1.12 0.12 0.05 × 0.07 = 5.174 (%) East 0.3x 1 × 1.89 × 0.468 × 0.085 × 0.07 = 5.174 (%) East 0.3x 1 × 1.89 × 0.35 × 0.07 = 0.40.22 (%) East 0.3x 1 × 1.89 × 0.455 × 0.07 = 24.492 (%) East 0.3x 1 × 1.89 × 24.49 × 0.85 × 0.77 = 24.83 (%) East 0.3x 1 × 1.89 × 16.15 × 0.85 × 0.77 = 8.83 (%) South 0.3x 0.77 × 1.675 × 0.85 × 0.77 = 23.57 (%)			1	×	1.89	X	110.22	X	0.85	X	0.7	=	60.24	4
East 0.8 1 x 1.00 2.000 x 0.01 5.1.74 (76) East 0.9x 1 x 1.89 x 73.59 x 0.85 x 0.7 = 40.22 (76) East 0.9x 1 x 1.89 x 73.59 x 0.85 x 0.7 = 40.22 (76) East 0.9x 1 x 1.89 x 65.59 x 0.85 x 0.7 = 44.22 (76) East 0.9x 1 x 1.89 x 45.59 x 0.85 x 0.7 = 13.38 (76) East 0.9x 1 x 1.89 x 16.15 x 0.85 x 0.7 = 8.83 (76) South 0.9x 0.77 x 1.208 x 46.75 x 0.85 x 0.7 = 28.27 (78) South 0.9x 0.7 x 4.5 x 6.7		L	1	X	1.89	X	110.22	X	0.85	x	0.7	=	60.24	4
East 0.00		0.9x	1	×	1.89	x	94.68	×	0.85	x	0.7	=	51.74	(76)
East 0.2 1 × 1.89 × 7.359 × 0.85 × 0.7 = 40.22 (%) East 0.9 1 × 1.89 × 45.59 × 0.85 × 0.7 = 24.92 (%) East 0.9 1 × 1.89 × 24.49 × 0.85 × 0.7 = 24.92 (%) East 0.9 1 × 1.89 × 24.49 × 0.85 × 0.7 = 13.38 (%) East 0.9 1 × 1.89 × 16.15 × 0.85 × 0.7 = 8.83 (%) South 0.9 0.77 × 1.89 × 1.615 × 0.85 × 0.7 = 8.83 (%) 0.9 0.77 × 1.615 × 0.85 × 0.7 = 8.83 (%) 0.9 0.77 × 1.675 × 0.85 × 0.7		0.9x	1	×	1.89	x	94.68	x	0.85	x	0.7	=	51.74	(76)
East 0.8 1 1.00 × 1.000 × 0.000 × 0.7 = 24.22 (76) East 0.9x 1 × 1.89 × 45.59 × 0.85 × 0.7 = 24.492 (76) East 0.9x 1 × 1.89 × 24.49 × 0.85 × 0.7 = 13.38 (76) East 0.9x 1 × 1.89 × 161.5 × 0.85 × 0.77 = 8.83 (76) South 0.9x 0.77 × 12.08 × 46.75 × 0.85 × 0.77 = 8.83 (76) South 0.9x 0.37 × 2.73 × 46.75 × 0.85 × 0.77 = 8.83 (76) South 0.9x 0.77 × 6 76.57 × 0.85 × </td <td>East</td> <td>0.9x</td> <td>1</td> <td>x</td> <td>1.89</td> <td>x</td> <td>73.59</td> <td>x</td> <td>0.85</td> <td>x</td> <td>0.7</td> <td>=</td> <td>40.22</td> <td>(76)</td>	East	0.9x	1	x	1.89	x	73.59	x	0.85	x	0.7	=	40.22	(76)
East 0.8 1 x 1.88 x 1.65 x 0.85 x 0.7 = 2.102 (76) East 0.9x 1 x 1.89 x 24.49 x 0.85 x 0.7 = 2.432 (76) East 0.9x 1 x 1.89 x 24.49 x 0.85 x 0.77 = 2.432 (76) East 0.9x 1 x 1.89 x 16.15 x 0.85 x 0.77 = 8.83 (76) South 0.9x 0.77 x 12.08 x 46.75 x 0.85 x 0.77 = 22.327 (78) South 0.9x 0.77 x 45.75 x 0.85 x 0.77 = 149.79 (78) South 0.9x 0.77 x 6 x 46.75 x 0.85 x 0.77 = 142.07 (78) 0.85 x 0.77 = 145.7 <td>East</td> <td>0.9x</td> <td>1</td> <td>x</td> <td>1.89</td> <td>x</td> <td>73.59</td> <td>X</td> <td>0.85</td> <td>x</td> <td>0.7</td> <td>=</td> <td>40.22</td> <td>(76)</td>	East	0.9x	1	x	1.89	x	73.59	X	0.85	x	0.7	=	40.22	(76)
East 0.9 1 × 1.89 × 2.4.49 × 0.85 × 0.77 = 1.3.38 (%) East 0.9 1 × 1.89 × 2.4.49 × 0.85 × 0.77 = 1.3.38 (%) East 0.9 1 × 1.89 × 1.6.15 × 0.85 × 0.77 = 8.83 (%) South 0.9 0.77 × 1.2.68 × 46.75 × 0.85 × 0.77 = 2.2.67 (%) South 0.9 0.77 × 1.46.75 × 0.85 × 0.77 = 2.0.5 (%) South 0.9 0.77 × 1.2.08 7.657 × 0.85 × 0.77 = 148.79 (%) South 0.9 0.77 × 12.08 7.657 × 0.85 × 0.77	East	0.9x	1	x	1.89	x	45.59	×	0.85	x	0.7	=	24.92	(76)
Last 0.8 1 x 1.89 x 2.4.9 x 0.05 x 0.7 = 13.38 76 East 0.9 1 x 1.89 x 16.15 x 0.85 x 0.7 = 13.38 76 East 0.9 1 x 1.89 x 16.15 x 0.85 x 0.7 = 8.83 76 South 0.9 0.77 x 12.08 x 46.75 x 0.85 x 0.7 = 232.87 78 South 0.9 0.3 x 2.7.3 x 46.75 x 0.85 x 0.7 = 686.75 78 South 0.9 0.77 x 66.75 x 0.85 x 0.7 = 186.76 78 South 0.9 0.77 x 6.75 x 0.85 x 0.7 =	East	0.9x	1	×	1.89	x	45.59	x	0.85	x	0.7	=	24.92	(76)
East 0.9x 1 x 1.89 x 16.15 x 0.9x 0.77 = 8.83 (76) East 0.9x 1 x 1.89 x 16.15 x 0.85 x 0.77 = 8.83 (76) South 0.9x 0.77 x 12.08 x 46.75 x 0.85 x 0.77 = 232.87 (78) South 0.9x 0.3 x 2.73 x 46.75 x 0.85 x 0.77 = 232.87 (78) South 0.9x 0.77 x 4.5 x 46.75 x 0.85 x 0.77 = 149.79 (78) South 0.9x 0.77 x 12.08 x 76.57 x 0.85 x 0.77 = 341.38 (78) South 0.9x 0.77 x 12.08 x 76.57 x 0.85 x 0.77 = 142.07 (78) South 0.9x </td <td>East</td> <td>0.9x</td> <td>1</td> <td>×</td> <td>1.89</td> <td>x</td> <td>24.49</td> <td>x</td> <td>0.85</td> <td>x</td> <td>0.7</td> <td>=</td> <td>13.38</td> <td>(76)</td>	East	0.9x	1	×	1.89	x	24.49	x	0.85	x	0.7	=	13.38	(76)
East 0.8x 1 x 1.89 x 16.15 x 0.85 x 0.77 = 8.83 (76) South 0.9x 0.77 x 12.08 x 46.75 x 0.85 x 0.77 = 223.87 (78) South 0.9x 0.3 x 2.73 x 46.75 x 0.85 x 0.77 = 232.87 (78) South 0.9x 0.77 x 4.5 x 46.75 x 0.85 x 0.77 = 149.79 (78) South 0.9x 0.77 x 6 x 46.75 x 0.85 x 0.7 = 116.67 (78) South 0.9x 0.77 x 12.08 x 76.57 x 0.85 x 0.7 = 381.38 (78) South 0.9x 0.77 x 12.08 x 76.57 x 0.85 x 0.7 = 142.07 (78) South <td>East</td> <td>0.9x</td> <td>1</td> <td>x</td> <td>1.89</td> <td>x</td> <td>24.49</td> <td>×</td> <td>0.85</td> <td>x</td> <td>0.7</td> <td>=</td> <td>13.38</td> <td>(76)</td>	East	0.9x	1	x	1.89	x	24.49	×	0.85	x	0.7	=	13.38	(76)
South 0.32 0.77 × 1.208 × 0.63 × 0.77 = 232.87 (78) South $0.5x$ 0.33 × 2.73 × 46.75 × 0.865 × 0.77 = 232.87 (78) South $0.5x$ 0.77 × 4.55 × 46.75 × 0.855 × 0.77 = 149.79 (78) South $0.5x$ 0.77 × 7.777 × 46.75 × 0.855 × 0.77 = 149.79 (78) South $0.9x$ 0.77 × 12.08 × 76.57 × 0.85 × 0.77 = 33.58 (79) South $0.9x$ 0.77 × 12.08 × 76.57 × 0.85 × 0.77 = 149.70 (78) 50.45 0.77 = 149.77 78 50.45 0.77 = 149.27 (78) 50.45 0.77	East	0.9x	1	x	1.89	x	16.15	x	0.85	x	0.7	=	8.83	(76)
South 0.3x 0.3x 2.73 x 46.75 x 0.85 x 0.77 = 20.55 (78) South 0.5x 0.77 x 4.5 x 46.75 x 0.85 x 0.77 = 149.79 (78) South 0.5x 0.77 x 7.77 x 46.75 x 0.85 x 0.77 = 149.79 (78) South 0.9x 0.77 x 6 x 76.57 x 0.85 x 0.77 = 115.67 (78) South 0.9x 0.3 x 2.73 x 76.57 x 0.85 x 0.77 = 142.07 (78) South 0.9x 0.77 x 4.5 x 76.57 x 0.85 x 0.77 = 142.07 (78) South 0.9x 0.77 x 6 x 76.57 x	East	0.9x	1	×	1.89	x	16.15	x	0.85	x	0.7	=	8.83	(76)
South $0.9x$ 0.77 x 4.5 x 46.75 x 0.86 x 0.71 x 66.75 78 South $0.9x$ 0.77 x 77.7 x 46.75 x 0.85 x 0.71 = 149.79 773 South $0.9x$ 0.77 x 66 46.75 x 0.85 x 0.71 = 149.79 773 South $0.9x$ 0.77 x 12.08 76.57 x 0.865 x 0.71 = 381.38 778 South $0.9x$ 0.77 x 4.5 76.57 x 0.855 x 0.71 $= 142.07 78 South 0.9x 0.77 x 76.57 x 0.855 x 0.7 = 245.31 778 381.38 778 385.3x 0.7 = 245.31 78 50.45 0.77 = 245.31 778 50.7 50.85 0$	South	0.9x	0.77	×	12.08	x	46.75	x	0.85	x	0.7	=	232.87	(78)
South $0.9x$ 0.77 x 7.77 x 46.75 x 0.85 x 0.7 z 115.67 (78) South $0.9x$ 0.77 x 6 x 6.75 x 0.85 x 0.7 z 115.67 (79) South $0.9x$ 0.77 x 12.08 x 76.57 x 0.85 x 0.7 z 381.38 (79) South $0.9x$ 0.77 x 4.5 76.57 x 0.85 x 0.7 z 33.68 (79) South $0.9x$ 0.77 x 7.657 x 0.85 x 0.7 z 45.31 (78) South $0.9x$ 0.77 x 12.08 97.53 x 0.85 x 0.7 z 42.78 (78) South $0.9x$ 0.77 x 45.5 $y7.53$ x 0.85 x 0.7 z	South	0.9x	0.3	×	2.73	x	46.75	x	0.85	x	0.7	=	20.5	(78)
South 0.9x 0.77 x 6 x 46.75 x 0.85 x 0.7 = 115.67 (78) South 0.9x 0.77 x 12.08 x 76.57 x 0.85 x 0.7 = 381.38 (78) South 0.9x 0.3 x 2.73 x 76.57 x 0.85 x 0.7 = 381.38 (78) South 0.9x 0.77 x 4.5 x 76.57 x 0.85 x 0.7 = 142.07 (78) South 0.9x 0.77 x 7.77 x 76.57 x 0.85 x 0.7 = 142.07 (78) South 0.9x 0.77 x 6 x 76.57 x 0.85 x 0.7 = 485.82 (78) South 0.9x 0.77 x 12.08 x 97.53 x 0.85 x 0.7 = 142.78 (78) South	Sout <mark>h</mark>	0.9x	0.77	x	4.5	X	46.75	x	0.85	x	0.7	=	86.75	(78)
South 0.97 × 12.08 × 76.57 × 0.85 × 0.77 = 381.38 (78) South 0.90 0.3 × 2.73 × 76.57 × 0.85 × 0.77 = 381.38 (78) South 0.90 0.77 × 76.57 × 0.85 × 0.77 = 142.07 (78) South 0.90 0.77 × 76.57 × 0.85 × 0.77 = 142.07 (78) South 0.90 0.77 × 6 × 76.57 × 0.855 × 0.77 = 142.07 (78) South 0.90 0.77 × 6 × 76.57 × 0.855 × 0.77 = 148.43 (78) South 0.90 0.77 × 12.08 × 97.53 × 0.85 × 0.77 = 42.78 (78) South 0.90 0.77 × 17.77 <	Sout <mark>h</mark>	0.9x	0.77	x	7.77	x	46.75	x	0.85	x	0.7	=	149.79	(78)
South $0.9x$ 0.3 x 2.73 x 76.57 x 0.86 x 0.7 z 33.58 (78) South $0.9x$ 0.77 x 4.5 x 76.57 x 0.85 x 0.7 z 142.07 (78) South $0.9x$ 0.77 x 7.77 x 76.57 x 0.85 x 0.7 z 142.07 (78) South $0.9x$ 0.77 x 7.77 x 76.57 x 0.85 x 0.7 z 245.31 (78) South $0.9x$ 0.77 x 12.08 x 97.53 x 0.85 x 0.7 z 485.82 (78) South $0.9x$ 0.77 x 4.5 x 97.53 x 0.85 x 0.7 z 42.78 (78) South $0.9x$ 0.77 x 4.5 x 97.53 x 0.85 x 0.7 z 42.78 (78) South $0.9x$ 0.77 x 7.77 x 97.53 x 0.85 x 0.7 z $44.2.78$ (78) South $0.9x$ 0.77 x 110.23 x 0.85 x 0.7 z 44.35 (78) South $0.9x$ 0.77 x 4.5 x 110.23 x 0.85 x 0.7 z z z South $0.9x$	Sout <mark>h</mark>	0.9x	0.77	x	6	х	46.75	×	0.85	x	0.7	=	115.67	(78)
South $0.9x$ 0.77 x 4.5 x $76,57$ x 0.85 x 0.7 = 142.07 (78) South $0.9x$ 0.77 x 7.77 x $76,57$ x 0.85 x 0.7 = $245,31$ (78) South $0.9x$ 0.77 x 6 x $76,57$ x 0.85 x 0.7 = $245,31$ (78) South $0.9x$ 0.77 x 6 x $76,57$ x 0.85 x 0.7 = $245,31$ (78) South $0.9x$ 0.77 x 12.08 x $97,53$ x 0.85 x 0.7 = $42,78$ (78) South $0.9x$ 0.77 x 4.5 x $97,53$ x 0.85 x 0.7 = $42,78$ (78) South $0.9x$ 0.77 x 4.5 x $97,53$ x 0.85 x 0.7 = $42,78$ (78) South $0.9x$ 0.77 x 7.77 x $97,53$ x 0.85 x 0.7 = $241,3$ (78) South $0.9x$ 0.77 x 6 $77,53$ x 0.85 x 0.7 = $241,3$ (78) South $0.9x$ 0.77 x 12.08 x $110,23$ x 0.85 x 0.7 = $244,54$ (78) South $0.9x$ 0.77 x 6 x $110,23$ x <t< td=""><td>Sout<mark>h</mark></td><td>0.9x</td><td>0.77</td><td>×</td><td>12.08</td><td>x</td><td>76.57</td><td>x</td><td>0.85</td><td>x</td><td>0.7</td><td>=</td><td>381.38</td><td>(78)</td></t<>	Sout <mark>h</mark>	0.9x	0.77	×	12.08	x	76.57	x	0.85	x	0.7	=	381.38	(78)
South $0.9x$ 0.77 x 7.77 x 76.57 x 0.85 x 0.7 z 245.31 (78) South $0.9x$ 0.77 x 6 x 76.57 x 0.85 x 0.7 z 189.43 (78) South $0.9x$ 0.77 x 12.08 x 97.53 x 0.85 x 0.7 z 485.82 (78) South $0.9x$ 0.3 x 2.73 x 97.53 x 0.85 x 0.7 z 42.78 (78) South $0.9x$ 0.77 x 4.5 x 97.53 x 0.85 x 0.7 z 42.78 (78) South $0.9x$ 0.77 x 4.5 x 97.53 x 0.85 x 0.7 z 42.78 (78) South $0.9x$ 0.77 x 7.77 x 97.53 x 0.85 x 0.7 z 48.35 (78) South $0.9x$ 0.77 x 12.08 x 110.23 x 0.85 x 0.7 z 48.35 (78) South $0.9x$ 0.77 x 4.5 x 110.23 x 0.85 x 0.7 z 244.34 (78) South $0.9x$ 0.77 x 4.5 x 110.23 x 0.85 x 0.7 z z z <tr< td=""><td>Sout<mark>h</mark></td><td>0.9x</td><td>0.3</td><td>x</td><td>2.73</td><td>x</td><td>76.57</td><td>x</td><td>0.85</td><td>x</td><td>0.7</td><td> =</td><td><mark>3</mark>3.58</td><td>- (78)</td></tr<>	Sout <mark>h</mark>	0.9x	0.3	x	2.73	x	76.57	x	0.85	x	0.7	=	<mark>3</mark> 3.58	- (78)
South0.9x0.77x6x76.57x0.85x0.7=189.43(78)South0.9x0.77x12.08x97.53x0.85x0.7=485.82(78)South0.9x0.3x2.73x97.53x0.85x0.7=42.78(78)South0.9x0.77x4.5x97.53x0.85x0.7=42.78(78)South0.9x0.77x4.5x97.53x0.85x0.7=42.78(78)South0.9x0.77x7.77x97.53x0.85x0.7=180.97(78)South0.9x0.77x7.77x97.53x0.85x0.7=241.3(78)South0.9x0.77x6x97.53x0.85x0.7=241.3(78)South0.9x0.77x12.08x110.23x0.85x0.7=244.35(78)South0.9x0.77x4.5x110.23x0.85x0.7=245.44(78)South0.9x0.77x4.5x110.23x0.85x0.7=245.44(78)South0.9x0.77x6x1	Sout <mark>h</mark>	0.9x	0.77	x	4.5	x	76 <mark>.</mark> 57	×	0.85	x	0.7	=	142.07	(78)
South $0.9x$ 0.77 x 12.08 x 97.53 x 0.85 x 0.7 $=$ 448.62 (78) South $0.9x$ 0.3 x 2.73 x 97.53 x 0.85 x 0.7 $=$ 442.78 (78) South $0.9x$ 0.3 x 2.73 x 97.53 x 0.85 x 0.7 $=$ 442.78 (78) South $0.9x$ 0.77 x 4.5 x 97.53 x 0.85 x 0.7 $=$ 442.78 (78) South $0.9x$ 0.77 x 4.5 x 97.53 x 0.85 x 0.7 $=$ 241.3 (78) South $0.9x$ 0.77 x 6 x 97.53 x 0.85 x 0.7 $=$ 241.3 (78) South $0.9x$ 0.77 x 6 x 97.53 x 0.85 x 0.7 $=$ 241.3 (78) South $0.9x$ 0.77 x 10.23 x 0.85 x 0.7 $=$ 204.54 (78) South $0.9x$ 0.77 x 4.5 x 110.23 x 0.85 x 0.7 $=$ 204.54 (78) South $0.9x$ 0.77 x 6 x 110.23 x 0.85 x 0.7 $=$ 204.54 (78) South $0.9x$	Sout <mark>h</mark>	0.9x	0.77	x	7.77	x	76.57	x	0.85	x	0.7	=	2 <mark>45.31</mark>	(78)
South $0.9x$ 0.3 x 2.73 x 97.53 x 0.85 x 0.7 = 42.78 (78) South $0.9x$ 0.77 x 4.5 x 97.53 x 0.85 x 0.7 = 180.97 (78) South $0.9x$ 0.77 x 4.5 x 97.53 x 0.85 x 0.7 = 180.97 (78) South $0.9x$ 0.77 x 7.77 x 97.53 x 0.85 x 0.7 = 241.3 (78) South $0.9x$ 0.77 x 6 x 97.53 x 0.85 x 0.7 = 241.3 (78) South $0.9x$ 0.77 x 6 x 97.53 x 0.85 x 0.7 = 241.3 (78) South $0.9x$ 0.77 x 12.08 x 110.23 x 0.85 x 0.7 = 48.35 (78) South $0.9x$ 0.77 x 4.5 x 110.23 x 0.85 x 0.7 = 204.54 (78) South $0.9x$ 0.77 x 6 x 110.23 x 0.85 x 0.7 = 272.72 (78) South $0.9x$ 0.77 x 6 x 110.23 x 0.85 x 0.7 = 572.17 (78) South $0.9x$ 0.77 x 12.08 x 114.87 <t< td=""><td>South</td><td>0.9x</td><td>0.77</td><td>x</td><td>6</td><td>x</td><td>76.57</td><td>x</td><td>0.85</td><td>x</td><td>0.7</td><td>=</td><td>189.43</td><td>(78)</td></t<>	South	0.9x	0.77	x	6	x	76.57	x	0.85	x	0.7	=	189.43	(78)
South $0.9x$ 0.77 x 4.5 x 97.53 x 0.85 x 0.7 $=$ 180.97 (78) South $0.9x$ 0.77 x 7.77 x 97.53 x 0.85 x 0.7 $=$ 312.48 (78) South $0.9x$ 0.77 x 7.77 x 97.53 x 0.85 x 0.7 $=$ 312.48 (78) South $0.9x$ 0.77 x 6 x 97.53 x 0.85 x 0.7 $=$ 241.3 (78) South $0.9x$ 0.77 x 12.08 x 110.23 x 0.85 x 0.7 $=$ 549.08 (78) South $0.9x$ 0.77 x 110.23 x 0.85 x 0.7 $=$ 244.3 (78) South $0.9x$ 0.77 x 4.5 x 110.23 x 0.85 x 0.7 $=$ 204.54 (78) South $0.9x$ 0.77 x 7.77 x 110.23 x 0.85 x 0.7 $=$ 204.54 (78) South $0.9x$ 0.77 x 7.77 x 110.23 x 0.85 x 0.7 $=$ 272.72 (78) South $0.9x$ 0.77 x 110.23 x 0.85 x 0.7 $=$ 572.17 (78) South $0.9x$ 0.7	South	0.9x	0.77	x	12.08	x	97.53	x	0.85	x	0.7	=	485.82	(78)
South 0.9x 0.77 x 7.77 x 97.53 x 0.85 x 0.77 = 312.48 (78) South 0.9x 0.77 x 6 x 97.53 x 0.85 x 0.77 = 312.48 (78) South 0.9x 0.77 x 6 x 97.53 x 0.85 x 0.77 = 241.3 (78) South 0.9x 0.77 x 12.08 x 110.23 x 0.85 x 0.77 = 549.08 (78) South 0.9x 0.3 x 2.73 x 110.23 x 0.85 x 0.77 = 549.08 (78) South 0.9x 0.77 x 4.5 x 110.23 x 0.85 x 0.77 = 204.54 (78) South 0.9x 0.77 x 6 x 110.23 x 0.85 x 0.77 = 353.17 (78) South<	South	0.9x	0.3	×	2.73	x	97.53	x	0.85	x	0.7	=	42.78	(78)
South 0.9x 0.77 x 6 x 97.53 x 0.85 x 0.7 = 241.3 (78) South 0.9x 0.77 x 12.08 x 110.23 x 0.85 x 0.7 = 549.08 (78) South 0.9x 0.3 x 2.73 x 110.23 x 0.85 x 0.7 = 549.08 (78) South 0.9x 0.3 x 2.73 x 110.23 x 0.85 x 0.7 = 48.35 (78) South 0.9x 0.77 x 4.5 x 110.23 x 0.85 x 0.7 = 204.54 (78) South 0.9x 0.77 x 7.77 x 110.23 x 0.85 x 0.7 = 353.17 (78) South 0.9x 0.77 x 6 x 110.23 x 0.85 x 0.7 = 272.72 (78) South	South	0.9x	0.77	×	4.5	x	97.53	x	0.85	x	0.7	=	180.97	(78)
South $0.9x$ 0.77 x 12.08 x 110.23 x 0.85 x 0.7 = 549.08 (78) South $0.9x$ 0.3 x 2.73 x 110.23 x 0.85 x 0.7 = 48.35 (78) South $0.9x$ 0.77 x 4.5 x 110.23 x 0.85 x 0.7 = 204.54 (78) South $0.9x$ 0.77 x 4.5 x 110.23 x 0.85 x 0.7 = 204.54 (78) South $0.9x$ 0.77 x 7.77 x 110.23 x 0.85 x 0.7 = 272.72 (78) South $0.9x$ 0.77 x 6 x 110.23 x 0.85 x 0.7 = 272.72 (78) South $0.9x$ 0.77 x 12.08 x 114.87 x 0.85 x 0.7 = 572.17 (78) South $0.9x$ 0.77 x 4.5 x 114.87 x 0.85 x 0.7 = 213.14 (78) South $0.9x$ 0.77 x 7.77 x 114.87 x 0.85 x 0.7 = 284.19 (78) South $0.9x$ 0.77 x 6 x 114.87 x 0.85 x 0.7 = 284.19 (78) South $0.9x$ 0.77 x 6 x 1	South	0.9x	0.77	×	7.77	x	97.53	x	0.85	x	0.7	=	312.48	(78)
South 0.9x 0.3 x 2.73 x 110.23 x 0.85 x 0.7 = 48.35 (78) South 0.9x 0.77 x 4.5 x 110.23 x 0.85 x 0.77 = 204.54 (78) South 0.9x 0.77 x 4.5 x 110.23 x 0.85 x 0.7 = 204.54 (78) South 0.9x 0.77 x 7.77 x 110.23 x 0.85 x 0.7 = 204.54 (78) South 0.9x 0.77 x 7.77 x 110.23 x 0.85 x 0.7 = 272.72 (78) South 0.9x 0.77 x 12.08 x 114.87 x 0.85 x 0.7 = 572.17 (78) South 0.9x 0.77 x 12.08 x 114.87 x 0.85 x 0.7 = 50.38 (78) S	South	0.9x	0.77	×	6	x	97.53	×	0.85	x	0.7	=	241.3	(78)
South $0.9x$ 0.77 \times 4.5 \times 110.23 \times 0.85 \times 0.7 $=$ 204.54 (78) South $0.9x$ 0.77 \times 7.77 \times 110.23 \times 0.85 \times 0.7 $=$ 353.17 (78) South $0.9x$ 0.77 \times 7.77 \times 110.23 \times 0.85 \times 0.7 $=$ 353.17 (78) South $0.9x$ 0.77 \times 6 \times 110.23 \times 0.85 \times 0.7 $=$ 272.72 (78) South $0.9x$ 0.77 \times 12.08 \times 114.87 \times 0.85 \times 0.7 $=$ 572.17 (78) South $0.9x$ 0.77 \times 12.08 \times 114.87 \times 0.85 \times 0.7 $=$ 50.38 (78) South $0.9x$ 0.77 \times 4.5 \times 114.87 \times 0.85 \times 0.7 $=$ 213.14 (78) South $0.9x$ 0.77 \times 7.77 \times 114.87 \times 0.85 \times 0.7 $=$ 284.19 (78) South $0.9x$ 0.77 \times 6 \times 114.87 \times 0.85 \times 0.7 $=$ 284.19 (78) South $0.9x$ 0.77 \times 6 \times 114.87 \times 0.85 \times 0.7 $=$ 284.19 $(7$	South	0.9x	0.77	x	12.08	x	110.23	×	0.85	x	0.7	=	549.08	(78)
South $0.9x$ 0.77 x 7.77 x 110.23 x 0.85 x 0.7 = 353.17 (78) South $0.9x$ 0.77 x 6 x 110.23 x 0.85 x 0.7 = 272.72 (78) South $0.9x$ 0.77 x 6 x 110.23 x 0.85 x 0.7 = 272.72 (78) South $0.9x$ 0.77 x 12.08 x 114.87 x 0.85 x 0.7 = 572.17 (78) South $0.9x$ 0.3 x 2.73 x 114.87 x 0.85 x 0.7 = 50.38 (78) South $0.9x$ 0.77 x 4.5 x 114.87 x 0.85 x 0.7 = 213.14 (78) South $0.9x$ 0.77 x 7.77 x 114.87 x 0.85 x 0.7 = 243.14 (78) South $0.9x$ 0.77 x 7.77 x 114.87 x 0.85 x 0.7 = 284.19 (78) South $0.9x$ 0.77 x 6 x 114.87 x 0.85 x 0.7 = 284.19 (78)	South	0.9x	0.3	×	2.73	x	110.23	x	0.85	x	0.7	=	48.35	(78)
South $0.9x$ 0.77 x 6 x 110.23 x 0.85 x 0.7 $=$ 272.72 (78) South $0.9x$ 0.77 x 12.08 x 114.87 x 0.85 x 0.7 $=$ 572.17 (78) South $0.9x$ 0.3 x 2.73 x 114.87 x 0.85 x 0.7 $=$ 572.17 (78) South $0.9x$ 0.3 x 2.73 x 114.87 x 0.85 x 0.7 $=$ 50.38 (78) South $0.9x$ 0.77 x 4.5 x 114.87 x 0.85 x 0.7 $=$ 213.14 (78) South $0.9x$ 0.77 x 7.77 x 114.87 x 0.85 x 0.7 $=$ 284.03 (78) South $0.9x$ 0.77 x 6 x 114.87 x 0.85 x 0.7 $=$ 284.19 (78)	South	0.9x	0.77	x	4.5	x	110.23	×	0.85	x	0.7	=	204.54	(78)
South $0.9x$ 0.77 x 12.08 x 114.87 x 0.85 x 0.7 $=$ 572.17 (78) South $0.9x$ 0.3 x 2.73 x 114.87 x 0.85 x 0.7 $=$ 50.38 (78) South $0.9x$ 0.77 x 4.5 x 114.87 x 0.85 x 0.7 $=$ 213.14 (78) South $0.9x$ 0.77 x 7.77 x 114.87 x 0.85 x 0.7 $=$ 213.14 (78) South $0.9x$ 0.77 x 7.77 x 114.87 x 0.85 x 0.7 $=$ 368.03 (78) South $0.9x$ 0.77 x 6 x 114.87 x 0.85 x 0.7 $=$ 284.19 (78)	South	0.9x	0.77	x	7.77	x	110.23	×	0.85	x	0.7	=	353.17	(78)
South $0.9x$ 0.3 x 2.73 x 114.87 x 0.85 x 0.7 $=$ 50.38 (78) South $0.9x$ 0.77 x 4.5 x 114.87 x 0.85 x 0.7 $=$ 213.14 (78) South $0.9x$ 0.77 x 7.77 x 114.87 x 0.85 x 0.7 $=$ 213.14 (78) South $0.9x$ 0.77 x 7.77 x 114.87 x 0.85 x 0.7 $=$ 368.03 (78) South $0.9x$ 0.77 x 6 x 114.87 x 0.85 x 0.7 $=$ 284.19 (78) South $0.9x$ 0.77 x 6 x 114.87 x 0.85 x 0.7 $=$ 284.19 (78)	South	0.9x	0.77	x	6	x	110.23	x	0.85	x	0.7	=	272.72	(78)
South $0.9x$ 0.77 x 4.5 x 114.87 x 0.85 x 0.7 $=$ 213.14 (78) South $0.9x$ 0.77 x 7.77 x 114.87 x 0.85 x 0.7 $=$ 213.14 (78) South $0.9x$ 0.77 x 7.77 x 114.87 x 0.85 x 0.7 $=$ 368.03 (78) South $0.9x$ 0.77 x 6 x 114.87 x 0.85 x 0.7 $=$ 284.19 (78) South $0.9x$ 0.77 x 6 x 114.87 x 0.85 x 0.7 $=$ 284.19 (78)	South	0.9x	0.77	×	12.08	x	114.87	x	0.85	x	0.7	=	572.17	(78)
South $0.9x$ 0.77 x 7.77 x 114.87 x 0.85 x 0.7 = 368.03 (78) South $0.9x$ 0.77 x 6 x 114.87 x 0.85 x 0.7 = 368.03 (78) South $0.9x$ 0.77 x 6 x 114.87 x 0.85 x 0.7 = 284.19 (78) South $0.9x$ 0.77 x 6 x 114.87 x 0.85 x 0.7 = 284.19 (78)	South	0.9x	0.3	×	2.73	x	114.87	×	0.85	x	0.7	=	50.38	(78)
South $0.9x$ 0.77 x 6 x 114.87 x 0.85 x 0.7 = 284.19 (78)	South	0.9x	0.77	×	4.5	x	114.87	×	0.85	x	0.7	=	213.14	(78)
	South	0.9x	0.77	×	7.77	×	114.87	×	0.85	x	0.7	=	368.03	(78)
	South	0.9x	0.77	×	6	x	114.87	×	0.85	x	0.7	=	284.19	(78)
$0.3x \qquad 0.7 \qquad x \qquad 12.08 \qquad x \qquad 110.55 \qquad x \qquad 0.85 \qquad x \qquad 0.7 \qquad = \qquad 550.64 \qquad (78)$	South	0.9x	0.77	x	12.08	x	110.55	×	0.85	x	0.7	=	550.64	(78)

South 0.9x 0.3 x 2.73 x 110.55 x 0.85 x 0	0.7 = 48.48 (78)
	9.7 = 205.12 (78)
	3.7 = 354.18 (78)
	9.7 = 273.5 (78)
	9.7 = 538.01 (78)
	9.7 = 47.37 (78)
	9.7 = 200.42 (78)
	9.7 = 346.05 (78)
	9.7 = 267.22 (78)
	9.7 = 522.48 (78)
	9.7 = 46 (78)
	9.7 = 194.63 (78)
	9.7 = 336.07 (78)
	.7 = 259.51 (78)
	.7 = 507.49 (78)
South 0.9x 0.3 x 2.73 x 101.89 x 0.85 x 0	.7 = 44.68 (78)
South 0.9x 0.77 x 4.5 x 101.89 x 0.85 x 0	.7 = 189.05 (78)
South 0.9x 0.77 x 7.77 x 101.89 x 0.85 x (.7 = 326.43 (78)
South 0.9x 0.77 x 6 x 101.89 x 0.85 x 0	.7 = 252.07 (78)
South 0.9x 0.77 x 12.08 x 82.59 x 0.85 x 0	0.7 = 4 <mark>11.36</mark> (78)
South 0.9x 0.3 x 2.73 x 82.59 x 0.85 x 0	.7 = 36.22 (78)
South 0.9x 0.77 x 4.5 x 82.59 x 0.85 x 0	.7 = 153.24 (78)
South 0.9x 0.77 x 7.77 x 82.59 x 0.85 x 0	.7 = 264.59 (78)
South 0.9x 0.77 x 6 x 82.59 x 0.85 x 0	.7 = 2 <mark>04.32</mark> (78)
South 0.9x 0.77 x 12.08 x 55.42 x 0.85 x 0	.7 = 276.03 (78)
South 0.9x 0.3 x 2.73 x 55.42 x 0.85 x (0)	.7 = 24.3 (78)
South 0.9x 0.77 x 4.5 x 55.42 x 0.85 x 0	.7 = 102.83 (78)
South 0.9x 0.77 x 7.77 x 55.42 x 0.85 x 0	9.7 = 177.55 (78)
South 0.9x 0.77 x 6 x 55.42 x 0.85 x 0	.7 = 137.1 (78)
South 0.9x 0.77 x 12.08 x 40.4 x 0.85 x 0	.7 = 201.22 (78)
South 0.9x 0.3 x 2.73 x 40.4 x 0.85 x 0	0.7 = 17.72 (78)
South 0.9x 0.77 x 4.5 x 40.4 x 0.85 x 0	.7 = 74.96 (78)
South 0.9x 0.77 x 7.77 x 40.4 x 0.85 x 0	.7 = 129.43 (78)
South 0.9x 0.77 x 6 x 40.4 x 0.85 x 0	.7 = 99.95 (78)
West 0.9x 0.77 x 17.16 x 19.64 x 0.85 x 0	.7 = 138.97 (80)
West 0.9x 0.77 x 17.16 x 38.42 x 0.85 x 0	.7 = 271.85 (80)
West 0.9x 0.77 x 17.16 x 63.27 x 0.85 x 0	.7 = 447.7 (80)
West 0.9x 0.77 x 17.16 x 92.28 x 0.85 x 0	.7 = 652.94 (80)
West 0.9x 0.77 x 17.16 x 113.09 x 0.85 x 0	.7 = 800.21 (80)
West 0.9x 0.77 x 17.16 x 115.77 x 0.85 x 0	.7 = 819.15 (80)
West 0.9x 0.77 x 17.16 x 110.22 x 0.85 x 0	.7 = 779.87 (80)

West 0.9													
	0.77	x	17.	16	x	94.68	×	0.85	×	0.7	=	669.89	(80)
West 0.9	0.77	x	17.	16	x	73.59	x	0.85	x	0.7	=	520.69	(80)
West 0.9	0.77	x	17.	16	x	45.59	x	0.85	x	0.7	=	322.57	(80)
West 0.9	0.77	x	17.	16	x	24.49	x	0.85	x	0.7	=	173.28	(80)
West 0.9	0.77	x	17.	16	x	16.15	x	0.85	x	0.7	=	114.28	(80)
Solar gains i	n watts, calc	ulated	for eac	h month	-		(83)m = S	um(74)m .	(82)m		_		
(83)m= 906.5	4 1574.17 2	236.54	2914.65	3399.14	3434.6	3286.29	2915.03	2469.5	1761.8	1091.21	772.36		(83)
Total gains -	- internal and	d solar	(84)m =	= (73)m ·	+ (83)r	m, watts							
(84)m= 1524.3	24 2189.57 2	829.87	3471.5	3917.29	3916.1	1 3745.1	3381.26	2955.13	2284.16	1655.89	1370.36		(84)
7. Mean int	ernal tempe	ature	(heating	season)		•	· ·		-			
	e during hea		` ·		·	a from Tal	ole 9. Th	1 (°C)			1	21	(85)
•	actor for gain	•••			•			(-)					
Jar	<u> </u>	Mar	Apr	May	Jur		Aug	Sep	Oct	Nov	Dec		
(86)m= 1	0.99	0.96	0.86	0.69	0.5	0.37	0.42	0.68	0.93	0.99	1		(86)
									0.00	0.00			()
	nal temperat	i	-	r È	î .		1	<u> </u>		1			(07)
(87)m= 19.6	19.91	20.3	20.69	20.91	20.98	3 21	20.99	20.94	20.58	19.98	19.54		(87)
Temperatu	e during hea	ating p	eriods ir	n rest of	dwelli	ng from Ta	able 9, T	h2 (°C)		_			
(88)m= 19.8	5 19.86	19.86	19. <mark>86</mark>	19.86	19.87	7 19.87	19.87	19.87	19.86	19.86	19.86		(88)
Utilisation f	actor for gain	s for r	est of d	welling.	h2.m (see Table	9a)						
(89)m= 1	0.98	0.94	0.82	0.62	0.42		0.32	0.59	0.91	0.99	1		(89)
						/faller							
(90)m= 18.5	hal temperat	19.28	19.64	01 dweili 19.81	19.86	<u>`</u>	19.87	19.84	e 9c) 19.55	18.98	18.53		(90)
(90)11= 10.5	10.9	19.20	19.04	19.01	19.00	19.07	19.07	19.04	9.55	10.90	10.00		(30)
								f	$ \Delta - $ ivir	$n area \pm la$	1) -	0.4.4	(01)
								f	LA = Livir	ig area ÷ (4	4) =	0.14	(91)
	nal temperat						<u>`</u>	A) × T2		ig area ÷ (4	4) =	0.14]
	nal temperat						+ (1 – fL 20.03	A) × T2	LA <mark>= Livir</mark> 19.7	ng area ÷ (4 19.12	4) = 18.67	0.14	(91) (92)
(92)m= 18.73 Apply adjus	3 19.04 stment to the	19.42 mean	19.79 interna	19.97 I temper	20.02 ature f	2 20.03 rom Table	20.03 4e, whe	A) × T2 19.99 ere appro	19.7 opriate	19.12	18.67	0.14	(92)
(92)m= 18.73 Apply adjus (93)m= 18.58	19.04 stment to the 18.89	19.42 mean 19.27	19.79	19.97	20.02	2 20.03 rom Table	20.03	A) × T2	19.7		, 	0.14]
(92)m= 18.73 Apply adjus (93)m= 18.58 8. Space he	319.04atment to the318.89ating require	19.42 mean 19.27 ement	19.79 interna 19.64	19.97 temper 19.82	20.02 ature f 19.87	2 20.03 From Table 7 19.88	20.03 4e, whe 19.88	A) × T2 19.99 ere appro 19.84	19.7 opriate 19.55	19.12	18.67 18.52		(92)
(92)m= 18.73 Apply adjus (93)m= 18.56 8. Space h Set Ti to th	319.04atment to the318.89ating requirea mean inter	19.42 mean 19.27 ement nal ten	19.79 interna 19.64 nperatu	19.97 I temper 19.82 re obtair	20.02 ature f 19.87	2 20.03 From Table 7 19.88	20.03 4e, whe 19.88	A) × T2 19.99 ere appro 19.84	19.7 opriate 19.55	19.12	18.67 18.52		(92)
(92)m= 18.73 Apply adjus (93)m= 18.54 8. Space he Set Ti to th the utilisatio	319.04atment to the318.89ating requireating requi	19.42 mean 19.27 ement nal ten gains u	19.79 interna 19.64 nperatur using Ta	19.97 I temper 19.82 re obtair able 9a	20.02 ature f 19.87 ned at	2 20.03 from Table 7 19.88 step 11 of	20.03 4e, whe 19.88 Table 9	A) × T2 19.99 ere appro 19.84 b, so tha	19.7 opriate 19.55 t Ti,m=(19.12 18.97 76)m an	18.67 18.52 d re-calc		(92)
(92)m= 18.73 Apply adjus (93)m= 18.53 8. Space h Set Ti to th the utilisatio Jar	3 19.04 atment to the 3 18.89 eating require atment interpretent atment for factor for Feb	19.42 mean 19.27 ement nal ten gains u Mar	19.79 interna 19.64 nperatur using Ta Apr	19.97 I temper 19.82 re obtair	20.02 ature f 19.87	2 20.03 from Table 7 19.88 step 11 of	20.03 4e, whe 19.88	A) × T2 19.99 ere appro 19.84	19.7 opriate 19.55	19.12	18.67 18.52		(92)
(92)m= 18.73 Apply adjus (93)m= 18.54 8. Space he Set Ti to the the utilisation Jar Utilisation f	19.04 atment to the atment to the ating require eating require e mean inter on factor for actor for gain	19.42 mean 19.27 ement nal ten gains t Mar	19.79 interna 19.64 nperatur using Ta Apr	19.97 I temper 19.82 re obtair able 9a May	20.02 ature f 19.87 ned at	2 20.03 from Table 7 19.88 step 11 of 1 Jul	20.03 4e, whe 19.88 Table 9 Aug	A) × T2 19.99 ere appro 19.84 b, so tha Sep	19.7 opriate 19.55 t Ti,m=(Oct	19.12 18.97 76)m an Nov	18.67 18.52 d re-calc Dec		(92) (93)
(92)m= 18.73 Apply adjus (93)m= 18.53 8. Space he Set Ti to th the utilisation Jar Utilisation f (94)m= 1	3 19.04 atment to the 3 18.89 eating require ating require 0.98	19.42 mean 19.27 ement nal ten gains t Mar ns, hm 0.93	19.79 interna 19.64 nperatur using Ta Apr : 0.81	19.97 I temper 19.82 re obtair able 9a May 0.62	20.02 ature f 19.87 ned at	2 20.03 from Table 7 19.88 step 11 of 1 Jul	20.03 4e, whe 19.88 Table 9	A) × T2 19.99 ere appro 19.84 b, so tha	19.7 opriate 19.55 t Ti,m=(19.12 18.97 76)m an	18.67 18.52 d re-calc		(92)
(92)m= 18.73 Apply adjus (93)m= 18.54 8. Space he Set Ti to the the utilisation Jar Utilisation f (94)m= 1 Useful gain	3 19.04 attment to the 3 18.89 aating require e mean inter on factor for actor for gain 0.98 s, hmGm , V	19.42 mean 19.27 ement nal ten gains (Mar ns, hm 0.93 V = (94	19.79 interna 19.64 nperatur using Ta Apr : 0.81 4)m x (8-	19.97 I temper 19.82 re obtair able 9a May 0.62 4)m	20.02 ature f 19.87 ned at Jur 0.42	2 20.03 from Table 7 19.88 step 11 of 1 Jul 0.27	20.03 4 4e, whe 19.88 Table 9 Aug 0.32	A) × T2 19.99 ere appro 19.84 b, so tha Sep 0.58	19.7 ppriate 19.55 t Ti,m=(Oct 0.9	19.12 18.97 76)m an Nov	18.67 18.52 d re-calc Dec 1		(92) (93)
(92)m= 18.73 Apply adjus (93)m= 18.53 8. Space he Set Ti to the the utilisation (94)m= 1 Useful gain (95)m= 1517.3	319.04atment to the318.89ating requirating requirating requirating requirating requirating requirating requirating requirating requir0ating requir0ating requir0.98s, hmGm , V522145.79	19.42 mean 19.27 ement nal ten gains (Mar ns, hm 0.93 V = (94 640.29	19.79 interna 19.64 nperatur using Ta Apr : 0.81 i)m x (8- 2815.95	19.97 I temper 19.82 re obtair able 9a May 0.62 4)m 2418.01	20.02 ature f 19.87 ned at Jur 0.42	2 20.03 from Table 7 19.88 step 11 of 1 Jul 0.27	20.03 4e, whe 19.88 Table 9 Aug	A) × T2 19.99 ere appro 19.84 b, so tha Sep	19.7 opriate 19.55 t Ti,m=(Oct	19.12 18.97 76)m an Nov	18.67 18.52 d re-calc Dec		(92) (93)
(92)m= 18.73 Apply adjus (93)m= 18.54 8. Space ho Set Ti to the the utilisation (94)m= 1 Useful gain (95)m= 1517.4 Monthly av	3 19.04 atment to the 3 18.89 aating require e mean inter on factor for actor for gain 0.98 s, hmGm , V 52 2145.79 2 arage extern	19.42 mean 19.27 ement nal ten gains ten Mar Mar 0.93 V = (94) 640.29 al tem	19.79 interna 19.64 nperatur using Ta Apr : 0.81 i)m x (8- 2815.95 perature	19.97 I temper 19.82 re obtair able 9a May 0.62 4)m 2418.01	20.02 ature f 19.87 ned at Jur 0.42 1631.9	2 20.03 7 Table 7 19.88 step 11 of 1 Jul 0.27 96 1023.73	20.03 4 4e, whe 19.88 Table 9 Aug 0.32 1083.34	A) × T2 19.99 ere appro 19.84 b, so tha Sep 0.58 1725.56	19.7 ppriate 19.55 t Ti,m=(Oct 0.9 2047.33	19.12 18.97 76)m an Nov 0.99 1634.43	18.67 18.52 d re-calc Dec 1 1366.53		(92) (93) (94) (95)
(92)m= 18.73 Apply adjus (93)m= 18.53 8. Space h Set Ti to th the utilisation (94)m= 1 Useful gain (95)m= 1517.3 Monthly av (96)m= 4.3	3 19.04 atment to the 3 18.89 ating requir ating requir	19.42 mean 19.27 ement nal ten gains (Mar ns, hm 0.93 $V = (94)$ 640.29 al tem 6.5	19.79 interna 19.64 nperatuu using Ta Apr : 0.81 i)m x (8- 2815.95 perature 8.9	19.97 I temper 19.82 re obtair able 9a May 0.62 4)m 2418.01 e from Ta 11.7	20.02 ature f 19.87 ned at Jur 0.42 1631.9 able 8 14.6	2 20.03 from Table 7 19.88 step 11 of 1 Jul 0.27 96 1023.73 16.6	20.03 4e, whe 19.88 Table 9 Aug 0.32 1083.34 16.4	A) × T2 19.99 ere appro 19.84 b, so tha Sep 0.58 1725.56	19.7 opriate 19.55 t Ti,m=(Oct 0.9 2047.33 10.6	19.12 18.97 76)m an Nov	18.67 18.52 d re-calc Dec 1		(92) (93)
(92)m= 18.73 Apply adjus (93)m= 18.54 8. Space ho Set Ti to the the utilisation f (94)m= 1 Useful gain (95)m= 1517.3 Monthly av (96)m= 4.3 Heat loss ra	3 19.04 atment to the 3 18.89 aating requir a mean inter a factor for actor for gain 0.98 s, hmGm , V 52 2145.79 arage extern 4.9	19.42mean 19.27 ementnal tengains (Marns, hm 0.93 $V = (94)$ 640.29 al tem 6.5 international term	19.79 interna 19.64 nperatur using Ta Apr : 0.81 t)m x (8- 2815.95 perature 8.9 al tempe	19.97 I temper 19.82 re obtair able 9a May 0.62 4)m 2418.01 2418.01 a from Ta 11.7 erature,	20.02 ature f 19.87 ned at Jur 0.42 1631.9 able 8 14.6 Lm , V	2 20.03 from Table 7 19.88 step 11 of 10.27 06 1023.73 16.6 V =[(39)m	20.03 4 4e, whe 19.88 Table 9 Aug 0.32 1083.34 16.4 x [(93)m	A) × T2 19.99 ere appro 19.84 b, so tha Sep 0.58 1725.56 14.1 – (96)m	19.7 ppriate 19.55 t Ti,m=(Oct 0.9 2047.33 10.6]	19.12 18.97 76)m an Nov 0.99 1634.43 7.1	18.67 18.52 d re-calc Dec 1 1366.53 4.2		(92) (93) (94) (95) (96)
(92)m= 18.73 Apply adjus (93)m= 18.53 8. Space h Set Ti to th the utilisation (94)m= 1 Useful gain (95)m= 1517.3 Monthly av (96)m= 4.3 Heat loss ra (97)m= 4527.3	3 19.04 atment to the 3 18.89 ating requir 0.98 s, hmGm , V 52 2145.79 ate for mean 38 4430.32	19.42 mean 19.27 ement nal ten gains (Mar ns, hm 0.93 V = (94 640.29 al tem 6.5 intern 040.01	19.79 interna 19.64 nperatur using Ta Apr : 0.81 i)m x (8- 2815.95 perature 8.9 al tempo 3378.39	19.97 I temper 19.82 re obtair able 9a May 0.62 4)m 2418.01 2418.01 c from Ta 11.7 erature, 2551.79	20.02 ature f 19.87 ned at Jur 0.42 1631.9 14.6 Lm , V 1649.1	2 20.03 rom Table 7 19.88 step 11 of 1 Jul 0.27 96 1023.73 16.6 V =[(39)m 12 1025.52	20.03 4e, whe 19.88 Table 9 Aug 0.32 1083.34 16.4 x [(93)m 1087.08	A) × T2 19.99 ere appro 19.84 b, so tha Sep 0.58 1725.56 14.1 – (96)m 1800.4	19.7 opriate 19.55 t Ti,m=(Oct 0.9 2047.33 10.6] 2811.93	19.12 18.97 76)m and Nov 0.99 1634.43 7.1 3738.3	18.67 18.52 d re-calc Dec 1 1366.53		(92) (93) (94) (95)
(92)m= 18.73 Apply adjus (93)m= 18.53 8. Space h Set Ti to th the utilisation (94)m= 1 Useful gain (95)m= 1517.3 Monthly av (96)m= 4.3 Heat loss ra (97)m= 4527.3	3 19.04 atment to the 3 18.89 ating requir ating requir a mean inter ating requir actor for gain 0.98 s, hmGm , V 52 2145.79 ate for mean 38 4430.32 4	19.42 mean 19.27 ement nal ten gains (Mar ns, hm 0.93 V = (94 640.29 al tem 6.5 intern 040.01	19.79 interna 19.64 nperatur using Ta Apr : 0.81 i)m x (8- 2815.95 perature 8.9 al tempe 3378.39	19.97 I temper 19.82 re obtair able 9a May 0.62 4)m 2418.01 2418.01 c from Ta 11.7 erature, 2551.79	20.02 ature f 19.87 ned at Jur 0.42 1631.9 14.6 Lm , V 1649.1	2 20.03 rom Table 7 19.88 step 11 of 1 Jul 0.27 96 1023.73 16.6 V =[(39)m 12 1025.52	20.03 4e, whe 19.88 Table 9 Aug 0.32 1083.34 16.4 x [(93)m 1087.08	A) × T2 19.99 ere appro 19.84 b, so tha Sep 0.58 1725.56 14.1 – (96)m 1800.4	19.7 opriate 19.55 t Ti,m=(Oct 0.9 2047.33 10.6] 2811.93	19.12 18.97 76)m an Nov 0.99 1634.43 7.1 3738.3 1)m	18.67 18.52 d re-calc Dec 1 1366.53 4.2		(92) (93) (94) (95) (96)
(92)m= 18.73 Apply adjus (93)m= 18.54 8. Space ho Set Ti to the the utilisation f (94)m= 1 Useful gain (95)m= 1517.3 Monthly av (96)m= 4.3 Heat loss ra (97)m= 4527.3 Space heat	3 19.04 atment to the 3 18.89 ating requir ating requir a mean inter ating requir actor for gain 0.98 s, hmGm , V 52 2145.79 ate for mean 38 4430.32 4	19.42mean 19.27 ementnal tengains tMarns, hm 0.93 $V = (94)$ 640.29 al tem 6.5 intern 040.01 nent for	19.79 interna 19.64 nperatur using Ta Apr : 0.81 i)m x (8- 2815.95 perature 8.9 al tempe 3378.39 r each n	19.97 I temper 19.82 re obtair able 9a May 0.62 4)m 2418.01 2418.01 2418.01 c from Ta 11.7 erature, 2551.79 nonth, k ¹	20.02 ature f 19.87 ned at Jur 0.42 1631.9 able 8 14.6 Lm , V 1649.1	$\begin{array}{c c} \hline 2 & 20.03 \\ \hline rom Table \\ \hline 19.88 \\ \hline 19.88 \\ \hline 19.88 \\ \hline 0.27 \\ \hline 0.27 \\ \hline 0.27 \\ \hline 0.27 \\ \hline 0.27 \\ \hline 0.27 \\ \hline 0.27 \\ \hline 0.27 \\ \hline 1023.73 \\ \hline 16.6 \\ \hline V = [(39)m \\ \hline 12 & 1025.52 \\ \hline 0nth = 0.02 \\ \hline \end{array}$	20.03 4e, whe 19.88 Table 9 Aug 0.32 1083.34 16.4 x [(93)m 1087.08 24 x [(97 0	A) × T2 19.99 ere appro 19.84 b, so that Sep 0.58 1725.56 14.1 - (96)m 1800.4)m - (95) 0	19.7 opriate 19.55 t Ti,m=(Oct 0.9 2047.33 10.6] 2811.93)m] x (4 568.86	19.12 18.97 76)m and Nov 0.99 1634.43 7.1 3738.3 1)m 1514.79	18.67 18.52 d re-calc Dec 1 1366.53 4.2 4520.67 2346.68	ulate	(92) (93) (94) (95) (96) (97)
(92)m= 18.73 Apply adjus (93)m= 18.53 8. Space h Set Ti to th the utilisation (94)m= 1 Useful gain (95)m= 1517.3 Monthly av (96)m= 4.3 Heat loss ra (97)m= 4527.3 Space heat (98)m= 2239.3	3 19.04 atment to the 3 18.89 ating requir ating requir a mean inter ating requir actor for gain 0.98 s, hmGm , V 52 2145.79 ate for mean 38 4430.32 4	19.42 mean 19.27 ement nal ten gains (Mar ns, hm 0.93 $V = (94)$ 640.29 al tem 6.5 intern 040.01 nent for 041.39	19.79 interna 19.64 nperatur using Ta Apr : 0.81 i)m x (8- 2815.95 perature 8.9 al tempe 3378.39 r each n 404.95	19.97 I temper 19.82 re obtair able 9a May 0.62 4)m 2418.01 2418.01 2418.01 2551.79 nonth, k ¹ 99.53	20.02 ature f 19.87 ned at Jur 0.42 1631.9 able 8 14.6 Lm , V 1649.1	$\begin{array}{c c} \hline 2 & 20.03 \\ \hline rom Table \\ \hline 19.88 \\ \hline 19.88 \\ \hline 19.88 \\ \hline 0.27 \\ \hline 0.27 \\ \hline 0.27 \\ \hline 0.27 \\ \hline 0.27 \\ \hline 0.27 \\ \hline 0.27 \\ \hline 0.27 \\ \hline 1023.73 \\ \hline 16.6 \\ \hline V = [(39)m \\ \hline 12 & 1025.52 \\ \hline 0nth = 0.02 \\ \hline \end{array}$	20.03 4e, whe 19.88 Table 9 Aug 0.32 1083.34 16.4 x [(93)m 1087.08 24 x [(97 0	A) × T2 19.99 ere appro 19.84 b, so tha Sep 0.58 1725.56 14.1 - (96)m 1800.4)m - (95)	19.7 opriate 19.55 t Ti,m=(Oct 0.9 2047.33 10.6] 2811.93)m] x (4 568.86	19.12 18.97 76)m and Nov 0.99 1634.43 7.1 3738.3 1)m 1514.79	18.67 18.52 d re-calc Dec 1 1366.53 4.2 4520.67 2346.68		(92) (93) (94) (95) (96)

9a. En	ergy re	quiremer	nts – Ind	ividual h	eating s	ystems i	ncluding	g micro-C	CHP)					
•	e heati	•	at frame -	0000de	10100-1-	monter	0.01010						2	
	-			econdary		rnentary	•	(202) = 1 -	_ (201) _				0	(201)
				nain syst				(202) = 1 - (204) =		(202)] _			1	(202)
			U	main sys				(204) = (2	02) x [1 –	(203)] =			1	(204)
	-	•		ing syste			. 0/						93.3	(206)
ETTICI	-	1	1	ementar			r					_	0	(208)
Snoo	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/ye	ar
Spac	2239.34	<u>1</u>	1041.39	alculate	99.53) 0	0	0	0	568.86	1514.79	2346.68		
(211)m				100 ÷ (20				Ů	Ŭ			2010100		(211)
(211)11		1645.45	1	<u> </u>	106.68	0	0	0	0	609.71	1623.57	2515.2		(211)
			<u> </u>			ļ	I	Tota	l (kWh/yea	ar) =Sum(2	1 211) _{15,1012}	F	10450.96	(211)
Spac	e heatir	ng fuel (s	econdar	y), kWh/	month									
	· · · · ·	01)] } x 1	00 ÷ (20)8)		i		i		i	1	i		
(215)m=	0	0	0	0	0	0	0	0	0	0	0	0		-
	Total (kWh/year) =Sum(215) _{15,1012} =											0	(215)	
	heating		tor (oolo	ulated al	hours									
Output	225.42		208.41	186.59	182.67	161.13	154.37	171.82	171.62	19 <mark>3.4</mark> 9	204.9	219.91		
Efficie	ncy of w	/ater hea	ater										80.2	(216)
(217)m=	8 <mark>9.27</mark>	89.02	88.44	86.85	83.49	80.2	80.2	80.2	80.2	87.5	88.97	89.34		(217)
		heating,										-		
	n = (64) 252.51)m x 100 223.12) ÷ (217) 235.65)m 214.84	218.79	200.91	192.48	214.24	213.99	221.12	230.31	246.16		
(I = Sum(2				2664.11	(219)
Annua	al totals	5								k	Wh/year	•	kWh/year	
Space	heating	g fuel use	ed, main	system	1								10450.96	
Water	heating	fuel use	ed										2664.11	7
Electri	city for	oumps, f	ans and	electric	keep-ho	t								_
centra	al heatir	ng pump	:									30		(230c)
		fan-assis										45		(230e)
				kWh/yea	r			sum	of (230a).	(230g) =			75	(231)
	city for I	•		ittinii you	•					(0,			651.46	(232)
	•		_ Individ	lual hoati	ing evet	ome inclu	udina mi	cro-CHE)				001.40	
12a. CO2 emissions – Individual heating systems including micro-CHP														
							lergy /h/year			Emiss kg CO	ion fac 2/kWh	tor	Emissions kg CO2/yea	
Space heating (main system 1) (211) x 0.216 =											2257.41	(261)		
Space heating (secondary) (215) x $0.519 =$										0	(263)			
Water	heating					(21	9) x			0.2	16	=	575.45	(264)
Space	/ater heating (219) x 0.216 = pace and water heating (261) + (262) + (263) + (264) =											2832.86	(265)	

Electricity for pumps, fans and electric keep-hot	(231)	x	0.519	=	38.93	(267)
Electricity for lighting	(232)	x	0.519	=	338.11	(268)
Total CO2, kg/year			sum of (265)(271) =		3209.89	(272)
Dwelling CO2 Emission Rate			(272) ÷ (4) =		13	(273)
EI rating (section 14)					85	(274)

			User D	Details:						
Assessor Name: Software Name:	Stroma FSAF	-		Softwa	a Num are Vei	rsion:		Versio	on: 1.0.1.25	
		ŀ	roperty	Address	: Beisize	e - 4-bed	End			
Address :	veiene:									
1. Overall dwelling dimer	1510115.		۸ro	a(m²)			abt(m)		Volume(m ³)	
Ground floor				a(III-) 121	(1a) x	Av. Hei	<u>.4</u>	(2a) =	290.4	(3a)
First floor					1					_
Second floor				68	(1b) x		.4	(2b) =	163.2	(3b)
	\ . / 4 L \ . / 4 - \ . / 4 -	1) . (4 -) . (4		58	(1c) x	2	.4	(2c) =	139.2	(3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1c	1)+(1e)+(1	n)	247	(4)					_
Dwelling volume					(3a)+(3b))+(3c)+(3d))+(3e)+	.(3n) =	592.8	(5)
2. Ventilation rate:									<u> </u>	
	main heating	seconda heating	ry	other		total			m ³ per hour	
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 fan	s					4	× '	10 =	40	(7a)
Number of passive vents						0	x '	10 =	0	(7b)
Number of flueless gas fire	es					0	X	40 =	0	(7c)
								Air ch	nanges per ho	ur
Infiltration due to chimney	s, flu <mark>es a</mark> nd fans	s = (6a) + (6b) + (6b)	7a)+(7b)+((7c) =	T	40		÷ (5) =	0.07	(8)
If a pressurisation test has be	en ca <mark>rried o</mark> ut or is	intended, procee	ed to (17),	otherwise o	continue fr	om (9) to (16)			_
Number of storeys in the	e dwelling (ns)								0	(9)
Additional infiltration							[(9)	-1]x0.1 =	0	(10)
Structural infiltration: 0.2					•	uction			0	(11)
if both types of wall are pre deducting areas of opening			o ine grea	ler wall are	a (aller					
If suspended wooden flo	oor, enter 0.2 (u	insealed) or 0).1 (seale	ed), else	enter 0				0	(12)
If no draught lobby, ente	er 0.05, else ent	er 0							0	(13)
Percentage of windows	and doors drau	ght stripped							0	(14)
Window infiltration				0.25 - [0.2	2 x (14) ÷ 1	= [00			0	(15)
Infiltration rate				(8) + (10)	+ (11) + (1	12) + (13) +	· (15) =		0	(16)
Air permeability value, c	50, expressed i	in cubic metro	es per ho	our per s	quare m	etre of e	nvelope	area	5	(17)
If based on air permeabilit	y value, then (1	8) = [(17) ÷ 20]+	(8), otherw	rise (18) = ((16)				0.32	(18)
Air permeability value applies		test has been do	ne or a de	gree air pe	rmeability	is being us	ed			-
Number of sides sheltered	1			(20) - 1	[0.075 x (1	10)1 -			2	(19)
Shelter factor						[5]] =			0.85	(20)
Infiltration rate incorporation	-			(21) = (18) x (20) =				0.27	(21)
Infiltration rate modified fo		speed May Jun	Jul	Aug	Sep	Oct	Nov	Dec]	
		- 1		I Aug	l geh		INUV	Dec	l	
Monthly average wind spe (22)m= 5.1 5 4	<u> </u>	4.3 3.8	3.8	3.7	4	4.3	4.5	4.7	1	
	4.4	J.J J.O	5.0	3.7		4.5	4.0	4.1	l	

Wind F	actor (2	2a)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		
Adjuste	ed infiltra	ation rat	e (allowi	ng for sh	nelter an	d wind s	speed) =	(21a) x	(22a)m					
,	0.34	0.34	0.33	0.3	0.29	0.26	0.26	0.25	0.27	0.29	0.3	0.32		
			change i	rate for t	he appli	cable ca	ise	ļ	1	<u> </u>	<u> </u>	لــــــــــــــــــــــــــــــــــــ		
	echanica											ļ	0	
			using Appe		, ,	, ,				o) = (23a)		ļ	0	(23b)
			overy: effici	-	-							l	0	(23c)
			anical ve			I	1	1	ŕ	1	1	ri í	÷ 100]	<i>(</i> ,
(24a)m=	0	0	0	0	0	0	0	0	0	0	0	0		(24a)
,			anical ve				1	1	ŕ	r í	, 1			
(24b)m=	0	0	0	0	0	0	0	0	0	0	0	0		(24b)
'			tract ven							E (00k				
	, <i>,</i>		< (23b), t	```	, ``	,	r È	rí 🐪	ŕ	r È	ŕ			(24c)
(24c)m=		0	0	0	0	0	0	0	0	0	0	0		(240)
,			on or whe en (24d)			•				0.51				
(24d) <mark>m=</mark>	. ,	0.56	0.55	0.54	0.54	0.53	0.53	0.53	0.54	0.54	0.55	0.55		(24d
			rate - en				L							
(25)m=	0.56	0.56	0.55	0.54	0.54	0.53	0.53	0.53	0.54	0.54	0.55	0.55		(25)
			eat l <mark>oss</mark> p											
ELEN		Gro: area		Openin m	-	Net Ar A ,r		U-val W/m2		A X U (W/		k-value kJ/m²-k		A X k kJ/K
Doors		urou	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			1.89		1		1.89				(26)
Windo	ws Type	1				1.18	=	L/[1/(1.4)+	0.04] =	1.56	=			(27)
Windov	ws Type	2				8.4		/[1/(1.4)+	0.04] =	11.14	=			(27)
	ws Type					8.4		/[1/(1.4)+	0.04] =	11.14	\exists			(27)
	ws Type					11.93	 3 x1	/[1/(1.4)+	0.04] =	15.82	\exists			(27)
	ws Type					1.9		/[1/(1.4)+		2.52	=			(27)
	ws Type					3.13	_ .	/[1/(1.4)+		4.15	=			(27)
	ws Type					3.13	<u> </u>	/[1/(1.4)+		4.15	\exists			(27)
	ws Type					5.4		/[1/(1.4)+		7.16	\exists			(27)
	ws Type					1.31	<u> </u>	/[1/(1.4)+		1.74	\dashv			(27)
	ws Type					5.4		/[1/(1.4)+		7.16	\exists			(27)
	ws Type						<u> </u>	/[1/(1.4)+			\exists			(27)
	ws Type					1.31	<u> </u>	/[1/(1.4)+		1.74	\exists			
	ws Type ws Type					4.17	<u> </u>	/[1/(1.4)+		5.53	\exists			(27)
Floor	из туре	10				4.17				5.53				(27)
						121	X	0.13	=	15.73				(28)
Walls		263.		61.72	2	201.6	5 ×	0.18	=	36.3			ļĻ	(29)
Roof 7	iype1	58	3	0		58	x	0.13	=	7.54				(30)

Roof Type2	10		0		10	x	0.13	=	1.3				(30)
Roof Type3	53		0		53	x	0.13	=	6.89				(30)
Total area of el	ements	, m²			505.3	7							(31)
Party wall					72.14	x	0	=	0				(32)
* for windows and ** include the area						ated using	formula 1	/[(1/U-valu	ιe)+0.04] ε	as given in	paragraph	1 3.2	
Fabric heat los	s, W/K =	= S (A x	U)				(26)(30)	+ (32) =				148.97	(33)
Heat capacity (Cm = S(Axk)						((28).	(30) + (32	2) + (32a).	(32e) =	45461.3	(34)
Thermal mass	parame	ter (TMF	P = Cm ÷	- TFA) ir	n kJ/m²K			Indica	tive Value	: Medium		250	(35)
For design assess can be used instea				construct	ion are not	t known pr	ecisely the	e indicative	e values of	TMP in Ta	able 1f		
Thermal bridge	es : S (L	x Y) cal	culated u	using Ap	pendix ł	<						25.97	(36)
if details of therma	l bridging	are not kn	own (36) =	= 0.15 x (3	1)								
Total fabric hea									(36) =			174.94	(37)
Ventilation hea							1	. ,	· · · · ·	25)m x (5)	1	1	
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		(0.0)
(38)m= 109.39	108.94	108.5	106.43	106.04	104.24	104.24	103.91	104.93	106.04	106.83	107.65]	(38)
Heat transfer c					· · · · · ·			i	= (37) + (3			,	
(39)m= 284.33	283.88	283.44	281.37	280.98	279.18	279.18	278.84	279.87	280.98	281.76	282.58		
Hea <mark>t loss</mark> para	meter (H	ILP). W/	′m²K						Average = = (39)m ÷	Sum(39)₁. (4)	12 /12=	281.37	(39)
(40)m= 1.15	1.15	1.15	1.14	1.14	1.13	1.13	1.13	1.13	1.14	1.14	1.14		
									I Average =	Sum(40)₁.	₁₂ /12=	1.14	(40)
Number of day	s in mor	nth (Tab	le 1a)										
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
(41)m= 31	28	31	<mark>3</mark> 0	31	30	31	31	30	31	30	31		(41)
4. Water heat	ing ener	gy requi	rement:								kWh/ye	ear:	
Assumed occu	pancy, I	N								3.	06	1	(42)
if TFA > 13.9		+ 1.76 x	[1 - exp	(-0.0003	849 x (TF	A -13.9)2)] + 0.0	0013 x (TFA -13.			1	
if TFA £ 13.9 Annual average		ter usar	ne in litre	os ner da	av Vd av	erane –	(25 x N)	+ 36		100	6.95	1	(43)
Reduce the annua	l average	hot water	, usage by {	5% if the a	lwelling is	designed	· /		se target o		5.95	J	(43)
not more that 125	litres per p	person per	ˈday (all w	ater use, l	hot and co	ld)		-			-		
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Hot water usage in	i litres per	day for ea	ach month	Vd,m = fa	ctor from 1	Table 1c x	r .	r	1		r	1	
(44)m= 117.64	113.36	109.09	104.81	100.53	96.25	96.25	100.53	104.81	109.09	113.36	117.64		
Energy content of	hot water	used - cale	culated mo	onthly $= 4$.	190 x Vd,r	n x nm x D)))))))))))))))))))			m(44) ₁₁₂ = ables 1b, 1		1283.36	(44)
(45)m= 174.46	152.58	157.45	137.27	131.71	113.66	105.32	120.86	122.3	142.53	155.58	168.95		
lf instantaneous wa	ater heatir	ng at point	of use (no	hot water	r storage),	enter 0 in	boxes (46		Total = Su	m(45) ₁₁₂ =	-	1682.69	(45)
(46)m= 26.17							_					•	
	22.89	23.62	20.59	19.76	17.05	15.8	18.13	18.35	21.38	23.34	25.34		(46)
Water storage Storage volume	loss:						I		I	23.34	25.34]	(46)

Otherw Water	/ise if no storage	stored loss:	hot wate	nk in dw er (this in oss facto	icludes i	nstantan	eous co	• •	ers) ente	er 'O' in (0	l		(48)
			m Table			,	.,					0			(49)
-				, kWh/ye	ear			(48) x (49)) =			0			(50)
			-	ylinder l		or is not	known:	. , . ,				0			()
		•		om Tabl	e 2 (kWł	n/litre/da	y)					0			(51)
		eating s from Tal	ee sectio	on 4.3								_	1		(50)
			ole ∠a m Table	2h								0 0			(52) (53)
•				, kWh/ye	or			(47) x (51)) x (52) x (5	53) -			1 		
•••		54) in (5	-	,	201			(47) x (01)	/	55) =		0			(54) (55)
		, ,		or each	month			((56)m = (55) × (41)r	n		0	I		()
(56)m=	0	0	0	0	0	0	0	0	0	0	0	0			(56)
	er contains	dedicated	d solar sto	rage, (57)r	-			-	7)m = (56)i	-		-	ix H		
(57)m=	0	0	0	0	0	0	0	0	0	0	0	0			(57)
			nuol) fra									0	1		(58)
	-	•		om Table for each		59)m = (58) ÷ 36	5 x (41)	m			0	I		(00)
						, ,	,		cylinder	[•] thermo	stat)				
(59)m=	0	0	0	0	0	0	0	0	0	0	0	0			(59)
Combi		culated	for oach	month (61)m - 1	(60) · 26	S5 x (11)						1		
(61)m=	50.96	46.03	50.96	49.32	50.96	47.47	49.05	50.96	49.32	50.96	49.32	5 0.96			(61)
													(50)	. (C1)	(01)
	225.42	198.61	208.41	186.59	182.67	161.13	154.37	(62)M = 171.82	0.85 × (45)m + 193.49	(46)m + 204.9	(57)m + 219.91	(59)m	+ (61)m	(62)
(62)m=													1		(02)
				and/or V					if <mark>no sol</mark> ar ב)	COntributi	on to wate	er neating)			
(auu au (63)m=		0	0		0	applies,	0 See Ap) 0	0	0	0	1		(63)
				U	U	0	0	U	Ŭ	U	U	U	I		(00)
(64)m=	225.42	ater hea ⁻ 198.61	208.41	186.59	182.67	161.13	154.37	171.82	171.62	193.49	204.9	219.91			
(04)11-	223.42	190.01	200.41	100.09	102.07	101.15	104.07	_	out from wa				22	78.93	(64)
Hoot a	aina frai	n wotor	hooting	k/M/b/m/	onth 0.26	5 / IO 0E	v (15)m							10.00]()
(65)m=	70.75	62.24	65.09	57.97	56.53	49.66	x (45)m 47.28	+ (01)II 52.93	n] + 0.8 x 52.99	60.13	+ (37)m 64.06	+ (59)m 68.92	1		(65)
							-								(00)
	. ,			. ,		ylinder is	s in the c	aweiling	or hot wa	ater is fr	om com	munity n	eating		
				and 5a)):										
Metabo			5), Wat					•		0 (_	1		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			(00)
(66)m=	153.15	153.15	153.15	153.15	153.15	153.15	153.15	153.15	153.15	153.15	153.15	153.15			(66)
Ũ				pendix l	· ·										
(67)m=	36.89	32.76	26.65	20.17	15.08	12.73	13.76	17.88	24	30.47	35.56	37.91	l		(67)
								,	see Tal				ı		(05)
(68)m=	413.78	418.07	407.25	384.21	355.14	327.81	309.55	305.26	316.08	339.11	368.19	395.52	l		(68)
Cookin	ig gains	(calcula	ted in A	ppendix	L, equat	ion L15	or L15a)	, also se	e Table	5					

(69)m=	38.32	38.32	38.3	32	38.32	38.32		38.32	38.32	38.	32	38.32	38.32	2 3	8.32	38.3	32		(69)
Pump	s and far	ns gains	(Tab	le 5	a)		_			I									
(70)m=	3	3	3		3	3	Т	3	3	3	3	3	3		3	3			(70)
Losse	s e.a. ev	aporatio	n (ne	aati	ve valu	es) (Ta	able	5)				ļ		_					
(71)m=	<u> </u>	-122.52	· ·	<u> </u>	-122.52	-122.52	_	22.52	-122.52	-122	2.52	-122.52	-122.5	2 -1	22.52	-122.	.52		(71)
Water	heating	gains (T	able	5)										•	•				
(72)m=	95.09	92.62	87.4	9	80.52	75.99	6	68.97	63.55	71.	14	73.6	80.82	2 8	8.97	92.6	63		(72)
Total	internal	gains =						(66)	m + (67)m	n + (68	B)m +	(69)m + (70)m +	(71)m	+ (72)r	n			
(73)m=	617.7	615.4	593.	33	556.85	518.15	5 4	81.46	458.8	466	.22	485.63	522.3	5 56	64.67	598.	01		(73)
6. Sc	lar gains	s:					•		,		•				·				
Solar	gains are o	alculated	using s	solar	flux from	Table 6	a anc	lassoci	iated equa	tions	to co	nvert to the	e applio	able c	orientatio	on.			
Orient		Access F	actor	-	Area			Flu			-	g_			FF			Gains	
		Table 6d			m²			Tat	ole 6a	_		able 6b		Tabl	e 6C			(W)	
North	0.9x	0.77		x	1.1	8	x	1	0.63	x		0.63	×		0.7		=	3.83	(74)
North	0.9x	0.77		x	8.4	4	x	1	0.63	x		0.63	x		0.7		=	27.3	(74)
North	0.9x	0.77		x	3.1	3	x	1	0.63	x		0.63	x		0.7		=	10.17	(74)
North	0.9x	0.77		x	5.4	4	x	1	0.63	×		0.63	x		0.7		=	17.55	(74)
North	0.9x	0.77		x	4.1	7	×	1	0.63	x		0.63	x		0.7		=	13.55	(74)
North	0.9x	0.77		x	1.1	8	x	2	20.32	x		0.63	×		0.7		=	7.33	(74)
North	0.9x	0.77		x	8.4	4	x	2	.0.32	x		0.63	x		0.7		=	52.17	(74)
North	0.9x	0.77		x	3.1	3	x	2	.0.32	x		0.63	×		0.7		=	19.44	(74)
North	0.9x	0.77		x	5.4	4	x	2	20.32	×		0.63	×		0.7		=	33.54	(74)
North	0.9x	0.77		x	4.1	7	×	2	.0.32	x		0.63	x		0.7		=	25.9	(74)
North	0.9x	0.77		x	1.1	8	x	3	4.53	x		0.63	x		0.7		=	12.45	(74)
North	0.9x	0.77		x	8.4	4	×	3	4.53	x		0.63	×		0.7		=	88.64	(74)
North	0.9x	0.77		x	3.1	3	x	3	4.53	×		0.63	x		0.7		=	33.03	(74)
North	0.9x	0.77		x	5.4	4	x	3	4.53	x		0.63	×		0.7		=	56.99	(74)
North	0.9x	0.77		x	4.1	7	x	3	4.53	x		0.63	×		0.7		=	44.01	(74)
North	0.9x	0.77		x	1.1	8	x	5	5.46	x		0.63	×		0.7		=	20	(74)
North	0.9x	0.77		x	8.4	4	x	5	5.46	x		0.63	x		0.7		=	142.39	(74)
North	0.9x	0.77		x	3.1	3	x	5	5.46	x		0.63	x		0.7		=	53.06	(74)
North	0.9x	0.77		x	5.4	4	x	5	5.46	x		0.63	x		0.7		=	91.53	(74)
North	0.9x	0.77		x	4.1	7	x	5	5.46	x		0.63	x		0.7		=	70.68	(74)
North	0.9x	0.77		x	1.1	8	x	7	4.72	x		0.63	×		0.7		=	26.94	(74)
North	0.9x	0.77		x	8.4	4	x	7	4.72	×		0.63	×		0.7		=	191.81	(74)
North	0.9x	0.77		x	3.1	3	x	7	4.72	x		0.63	x		0.7		=	71.47	(74)
North	0.9x	0.77		x	5.4	4	x	7	4.72	×		0.63	x		0.7		=	123.3	(74)
North	0.9x	0.77		x	4.1	7	x	7	4.72	×		0.63	x		0.7		=	95.22	(74)
North	0.9x	0.77		x	1.1	8	x	7	9.99	x		0.63	x		0.7		=	28.84	(74)
North	0.9x	0.77		x	8.4	4	x	7	9.99	×		0.63	x		0.7		=	205.33	(74)
North	0.9x	0.77		x	3.1	3	x	7	9.99	x		0.63	x		0.7		=	76.51	(74)

North	0.9x	0.77	۱.,			70.00	1 .	0.00	v	0.7		100	(74)
North		0.77	×	5.4	X	79.99	×	0.63	x	0.7	=	132	=
North	0.9x	0.77	X	4.17	X	79.99	X	0.63	X	0.7	=	101.93	(74)
North	0.9x	0.77	X X	1.18	x	74.68	X X	0.63	x	0.7	=	26.93	(74)
	0.9x	0.77	X	8.4	X	74.68	×	0.63	x	0.7	=	191.71	(74)
North	0.9x	0.77	X	3.13	X	74.68	×	0.63	x	0.7	=	71.43	(74)
North	0.9x	0.77	X	5.4	X	74.68	X	0.63	x	0.7	=	123.24	(74)
North	0.9x	0.77	X	4.17	X	74.68	X	0.63	x	0.7	=	95.17	(74)
North	0.9x	0.77	X	1.18	X	59.25	X	0.63	X	0.7	=	21.37	(74)
North	0.9x	0.77	X	8.4	x	59.25	X	0.63	X	0.7	=	152.09	(74)
North	0.9x	0.77	X	3.13	X	59.25	X	0.63	X	0.7	=	56.67	(74)
North	0.9x	0.77	x	5.4	X	59.25	X	0.63	x	0.7	=	97.77	(74)
North	0.9x	0.77	×	4.17	x	59.25	×	0.63	x	0.7	=	75.5	(74)
North	0.9x	0.77	×	1.18	x	41.52	x	0.63	X	0.7	=	14.97	(74)
North	0.9x	0.77	x	8.4	x	41.52	X	0.63	x	0.7	=	106.58	(74)
North	0.9x	0.77	x	3.13	x	41.52	x	0.63	x	0.7	=	39.71	(74)
North	0.9x	0.77	x	5.4	x	41.52	x	0.63	x	0.7	=	68.52	(74)
North	0.9x	0.77	x	4.17	x	41.52	x	0.63	x	0.7	=	52.91	(74)
North	0.9x	0.77	x	1.18	X	24.19	x	0.63	x	0.7	=	8.72	(74)
North	0.9x	0.77	x	8.4	х	24.19	x	0.63	x	0.7	=	62.1	(74)
North	0.9x	0.77	x	3.13	x	24.19	x	0.63	x	0.7	=	23.14	(74)
North	0.9x	0.7 <mark>7</mark>	×	5.4	x	24.19	x	0.63	x	0.7	=	39.92	(74)
North	0.9x	0.77	×	4.17	x	24.19	x	0.63	x	0.7	=	30.83	(74)
North	0.9x	0.77	x	1.18	x	13.12	×	0.63	x	0.7	=	4.73	(74)
North	0.9x	0.77	x	8.4	x	13.12	×	0.63	x	0.7	=	33.67	(74)
North	0.9x	0.77	x	3.13	x	13.12	×	0.63	x	0.7	=	12.55	(74)
North	0.9x	0.77	x	5.4	x	13.12	×	0.63	x	0.7	=	21.65	(74)
North	0.9x	0.77	x	4.17	x	13.12	×	0.63	x	0.7	=	16.72	(74)
North	0.9x	0.77	x	1.18	x	8.86	×	0.63	x	0.7	=	3.2	(74)
North	0.9x	0.77	x	8.4	x	8.86	×	0.63	x	0.7	=	22.76	(74)
North	0.9x	0.77	x	3.13	x	8.86	X	0.63	x	0.7	=	8.48	(74)
North	0.9x	0.77	x	5.4	x	8.86	x	0.63	x	0.7	=	14.63	(74)
North	0.9x	0.77	x	4.17	x	8.86	X	0.63	x	0.7	=	11.3	(74)
East	0.9x	1	x	1.31	x	19.64	X	0.63	x	0.7	=	5.51	(76)
East	0.9x	1	x	1.31	x	19.64	×	0.63	x	0.7	=	5.51	(76)
East	0.9x	1	x	1.31	x	38.42	×	0.63	x	0.7	=	10.79	(76)
East	0.9x	1	×	1.31	x	38.42	×	0.63	x	0.7	=	10.79	(76)
East	0.9x	1	×	1.31	x	63.27	×	0.63	x	0.7	=	17.77	(76)
East	0.9x	1	×	1.31	x	63.27	×	0.63	x	0.7	=	17.77	(76)
East	0.9x	1	×	1.31	x	92.28	×	0.63	x	0.7	=	25.91	(76)
East	0.9x	1	×	1.31	x	92.28	×	0.63	x	0.7	=	25.91	(76)
East	0.9x	1	x	1.31	x	113.09	x	0.63	x	0.7	=	31.75	(76)

East	0.9x	4		4.04	۱.	440.00	1 .		v	0.7	1	04.75	(76)
East		1	x	1.31	×	113.09	×	0.63	x	0.7	=	31.75	=
East	0.9x	1	X	1.31	X	115.77	X	0.63	x	0.7	=	32.5	(76)
East	0.9x	1	×	1.31	X	115.77	X X	0.63	x	0.7	=	32.5	(76)
	0.9x	1	X	1.31	×	110.22	×	0.63	x	0.7	=	30.95	(76)
East	0.9x	1	X	1.31	×	110.22	×	0.63	x	0.7	=	30.95	(76)
East	0.9x	1	X	1.31	X	94.68	X	0.63	x	0.7	=	26.58	(76)
East	0.9x	1	X	1.31	X	94.68	X	0.63	x	0.7	=	26.58	(76)
East	0.9x	1	Х	1.31	X	73.59	X	0.63	x	0.7	=	20.66	(76)
East	0.9x	1	X	1.31	X	73.59	X	0.63	x	0.7	=	20.66	(76)
East	0.9x	1	x	1.31	X	45.59	X	0.63	x	0.7	=	12.8	(76)
East	0.9x	1	x	1.31	x	45.59	X	0.63	x	0.7	=	12.8	(76)
East	0.9x	1	x	1.31	X	24.49	×	0.63	x	0.7	=	6.88	(76)
East	0.9x	1	х	1.31	x	24.49	x	0.63	x	0.7	=	6.88	(76)
East	0.9x	1	x	1.31	×	16.15	x	0.63	x	0.7	=	4.53	(76)
East	0.9x	1	х	1.31	x	16.15	x	0.63	x	0.7	=	4.53	(76)
South	0.9x	0.77	x	8.4	x	46.75	×	0.63	x	0.7	=	120.02	(78)
South	0.9x	0.3	x	1.9	×	46.75	×	0.63	x	0.7	=	10.58	(78)
South	0.9x	0.77	x	3.13	X	46.75	x	0.63	x	0.7	=	44.72	(78)
South	0.9x	0.77	x	5.4	х	46.75	x	0.63	x	0.7	=	77.16	(78)
South	0.9x	0.77	x	4.17	x	46.75	×	0.63	×	0.7	=	59.58	(78)
South	0.9x	0.77	x	8.4	X	76.57	x	0.63	x	0.7	=	196.56	(78)
South	0.9x	0.3	x	1.9	x	76.57	х	0.63	x	0.7	=	17.32	(78)
South	0.9x	0.77	x	3.13	x	76 <mark>.</mark> 57	×	0.63	x	0.7	=	73.24	(78)
South	0.9x	0.77	x	5.4	x	76.57	X	0.63	x	0.7	=	126.36	(78)
South	0.9x	0.77	x	4.17	x	76.57	×	0.63	x	0.7	=	97.58	(78)
South	0.9x	0.77	x	8.4	x	97.53	x	0.63	x	0.7	=	250.38	(78)
South	0.9x	0.3	x	1.9	x	97.53	×	0.63	x	0.7	=	22.07	(78)
South	0.9x	0.77	x	3.13	x	97.53	×	0.63	x	0.7	=	93.3	(78)
South	0.9x	0.77	x	5.4	x	97.53	×	0.63	x	0.7	=	160.96	(78)
South	0.9x	0.77	x	4.17	x	97.53	X	0.63	x	0.7	=	124.3	(78)
South	0.9x	0.77	x	8.4	x	110.23	x	0.63	x	0.7	=	282.99	(78)
South	0.9x	0.3	x	1.9	x	110.23	×	0.63	x	0.7	=	24.94	(78)
South	0.9x	0.77	x	3.13	x	110.23	×	0.63	x	0.7	=	105.45	(78)
South	0.9x	0.77	x	5.4	x	110.23	x	0.63	x	0.7	=	181.92	(78)
South	0.9x	0.77	x	4.17	x	110.23	×	0.63	x	0.7	=	140.48	(78)
South	0.9x	0.77	x	8.4	x	114.87	x	0.63	x	0.7	=	294.89	(78)
South	0.9x	0.3	x	1.9	x	114.87	×	0.63	x	0.7	=	25.99	(78)
South	0.9x	0.77	x	3.13	×	114.87	×	0.63	x	0.7	=	109.88	(78)
South	0.9x	0.77	x	5.4	×	114.87	×	0.63	x	0.7	=	189.57	(78)
South	0.9x	0.77	x	4.17	x	114.87	×	0.63	x	0.7	=	146.39	(78)
South	0.9x	0.77	x	8.4	x	110.55	x	0.63	x	0.7	=	283.79	(78)

South	о оч Г		Ι		۱		Ι		I				
	0.9x	0.3	X	1.9	X	110.55	X	0.63	x	0.7	=	25.01	(78)
South	0.9x	0.77	X	3.13	X	110.55	X	0.63	X	0.7	=	105.75	(78)
South	0.9x	0.77	Х	5.4	X	110.55	X	0.63	X	0.7	=	182.44	(78)
South	0.9x	0.77	x	4.17	x	110.55	X	0.63	x	0.7	=	140.88	(78)
South	0.9x	0.77	х	8.4	x	108.01	x	0.63	X	0.7	=	277.28	(78)
South	0.9x	0.3	x	1.9	x	108.01	x	0.63	x	0.7	=	24.44	(78)
South	0.9x	0.77	x	3.13	x	108.01	x	0.63	x	0.7	=	103.32	(78)
South	0.9x	0.77	x	5.4	x	108.01	x	0.63	x	0.7	=	178.25	(78)
South	0.9x	0.77	x	4.17	x	108.01	x	0.63	x	0.7	=	137.65	(78)
South	0.9x	0.77	x	8.4	x	104.89	x	0.63	x	0.7	=	269.28	(78)
South	0.9x	0.3	x	1.9	x	104.89	x	0.63	x	0.7	=	23.73	(78)
South	0.9x	0.77	x	3.13	x	104.89	x	0.63	x	0.7	=	100.34	(78)
South	0.9x	0.77	x	5.4	x	104.89	x	0.63	x	0.7	=	173.11	(78)
South	0.9x	0.77	x	4.17	x	104.89	x	0.63	x	0.7	=	133.68	(78)
South	0.9x	0.77	x	8.4	x	101.89	x	0.63	x	0.7	=	261.56	(78)
South	0.9x	0.3	x	1.9	x	101.89	x	0.63	x	0.7	=	23.05	(78)
South	0.9x	0.77	x	3.13	x	101.89	x	0.63	x	0.7	=	97.46	(78)
South	0.9x	0.77	x	5.4	×	101.89	х	0.63	х	0.7	=	168.14	(78)
South	0.9x	0.77	x	4.17	x	101.89	x	0.63	x	0.7	=	129.84	(78)
South	0.9x	0.77	x	8.4	х	82.59	×	0.63	x	0.7	=	2 <mark>12.01</mark>	(78)
South	0.9x	0. <mark>3</mark>	x	1.9	x	82.59	x	0.63	x	0.7	=	18.68	(78)
Sout <mark>h</mark>	0.9x	0.77	x	3.13	x	82.59	х	0.63	x	0.7	=	79	(78)
South	0.9x	0.77	x	5.4	x	82.59	x	0.63	x	0.7	=	136.29	(78)
South	0.9x	0.77	x	4.17	x	82.59	x	0.63	x	0.7	=	105.25	(78)
South	0.9x	0.77	x	8.4	x	55.42	x	0.63	x	0.7	=	142.26	(78)
South	0.9x	0.3	x	1.9	x	55.42	x	0.63	x	0.7	=	12.54	(78)
South	0.9x	0.77	x	3.13	x	55.42	x	0.63	x	0.7	=	53.01	(78)
South	0.9x	0.77	x	5.4	x	55.42	x	0.63	x	0.7	=	91.46	(78)
South	0.9x	0.77	x	4.17	x	55.42	x	0.63	x	0.7	=	70.62	(78)
South	0.9x	0.77	x	8.4	x	40.4	x	0.63	x	0.7	=	103.71	(78)
South	0.9x	0.3	x	1.9	x	40.4	x	0.63	x	0.7	=	9.14	(78)
South	0.9x	0.77	x	3.13	x	40.4	x	0.63	x	0.7	=	38.64	(78)
South	0.9x	0.77	x	5.4	x	40.4	x	0.63	x	0.7	=	66.67	(78)
South	0.9x	0.77	x	4.17	x	40.4	x	0.63	x	0.7	=	51.48	(78)
West	0.9x	0.77	x	11.93	x	19.64	x	0.63	x	0.7	=	71.61	(80)
West	0.9x	0.77	x	11.93	x	38.42	x	0.63	x	0.7	=	140.08	(80)
West	0.9x	0.77	x	11.93	x	63.27	x	0.63	x	0.7	=	230.69	(80)
West	0.9x	0.77	x	11.93	x	92.28	x	0.63	x	0.7	=	336.45	(80)
West	0.9x	0.77	x	11.93	x	113.09	x	0.63	x	0.7	=	412.33	(80)
West	0.9x	0.77	x	11.93	x	115.77	x	0.63	x	0.7	=	422.1	(80)
West	0.9x	0.77	x	11.93	x	110.22	x	0.63	x	0.7	=	401.85	(80)

West						r				—				
10/~~+	0.9x	0.77	×	11.	93	×	94.68	×	0.63	×	0.7	=	345.18	(80)
West	0.9x	0.77	X	11.	93	×	73.59	x	0.63	×	0.7	=	268.3	(80)
West	0.9x	0.77	X	11.	93	x	45.59	x	0.63	×	0.7	=	166.22	(80)
West	0.9x	0.77	x	11.	93	×	24.49	x	0.63	x	0.7	=	89.29	(80)
West	0.9x	0.77	x	11.	93	x	16.15	x	0.63	×	0.7	=	58.89	(80)
Solar g	jains in	watts, cal	culated	for eac	h month	1		(83)m	= Sum(74)m	(82)m	-	_		
(83)m=	467.09	811.09	1152.35	1501.71	1751.31	17	769.6 1693.	.16 150	1.9 1272.37	907.76	562.25	397.96		(83)
Total g	ains – i	nternal ar	nd solar	. (84)m =	= (73)m	+ (8	33)m , watt	S						
(84)m=	1084.79	1426.48	1745.68	2058.55	2269.46	22	51.05 2151.	.97 1968	.12 1757.99	1430.11	1126.92	995.97		(84)
7. Me	an inter	nal tempe	erature	(heating	seasor	י ו)	·	-	-	-	-			
				```		<i>´</i>	area from ⁻	Table 9.	Th1 (°C)				21	(85)
		-	• •			-	e Table 9		( - )					
•	Jan	Feb	Mar	Apr	May	T T	Jun Ju	<u> </u>	ig Sep	Oct	Nov	Dec		
(86)m=	1	1	0.99	0.97	0.89	-	0.73 0.56	_	<u> </u>	0.99	1	1		(86)
									Į		I			
		<u> </u>			,	1	w steps 3 t	- I	- i - '	00.40	10.04	40.57		(87)
(87)m=	19.61	19.8	20.1	20.46	20.77	2	0.94 20.9	9 20.9	20.85	20.42	19.94	19.57		(07)
Temp				i			elling from	_		_				
(88)m=	19.96	19.96	19.96	19.97	19.97	1	9.98 19.9	8 19.9	19.97	19.97	19.97	19.97		(88)
Util <mark>isa</mark>	ation fac	ctor for ga	ins for r	rest of d	welling,	h2,	m (see Ta	ole 9a)						
(89)m=	1	1	0.99	0.95	0.84	C	0.64 0.43	3 0.5	0.81	0.98	1	1		(89)
Mean	interna	l tempera	ture in	the rest	of dwell	ina	T2 (follow	steps 3	to 7 in Tab	ole 9c)				
(90)m=	18.08	18.37	18.8	19.33	19.74	<b>T</b>	9.94 19.9	<u> </u>		19.28	18.57	18.04		(90)
										fLA = Livir	ng area ÷ (•	4) =	0.14	(91)
Moon	interne	Itomporo	turo (fo	r tha wh		مالات	π) fl Λ	та. (а	fl A) Tr	,				]
wear	mema	itempera							- fLA) × T2		18 77	18.26		(92)
1	18.3		18 98	1949	14 84					10.40	10.77	10.20		
(92)m=		18.58								onriate			I	(0-)
(92)m= Apply	adjustr	18.58 nent to th	e mean	interna	tempei	ratu	re from Ta	ble 4e,	where app	1	18.77	18.26		
(92)m= Apply (93)m=	adjustr 18.3	18.58 nent to th 18.58	e mean 18.98	interna 19.49		ratu		ble 4e,	where app	ropriate 19.45	18.77	18.26		(93)
(92)m= Apply (93)m= 8. Spa	adjustr 18.3 ace hea	18.58 nent to th 18.58 ting requi	e mean 18.98 rement	interna 19.49	tempei 19.89	ratu 2	re from Ta 0.08 20.1	ble 4e, [•] 2 20. •	where appi	19.45	1		ulate	
(92)m= Apply (93)m= 8. Spa Set Ti	adjustr 18.3 ace hea to the	18.58 nent to th 18.58 ting requi	e mean 18.98 rement ernal ter	n interna 19.49 mperatu	19.89 re obtail	ratu 2	re from Ta 0.08 20.1	ble 4e, [•] 2 20. •	where app	19.45	1		ulate	
(92)m= Apply (93)m= 8. Spa Set Ti	adjustr 18.3 ace hea to the	18.58 nent to th 18.58 ting requi mean inte	e mean 18.98 rement ernal ter	n interna 19.49 mperatu	19.89 re obtail	ratu 21	re from Ta 0.08 20.1	ble 4e, 2 20. of Tabl	where appl 1 19.99 e 9b, so the	19.45	1		ulate	
(92)m= Apply (93)m= 8. Spa Set Ti the ut	adjustr 18.3 ace hea i to the ilisation Jan	18.58 nent to th 18.58 ting requi mean inte factor for	e mean 18.98 rement ernal ter gains Mar	n interna 19.49 mperatu using Ta Apr	temper 19.89 re obtair able 9a	ratu 21	re from Ta 0.08 20.1 at step 11	ble 4e, v 2 20. of Tabl	where appi 1 19.99 e 9b, so the	19.45 at Ti,m=(	76)m an	d re-calc	ulate	
(92)m= Apply (93)m= 8. Spa Set Ti the ut	adjustr 18.3 ace hea i to the ilisation Jan	18.58nent to th18.58ting requimean intefactor forFeb	e mean 18.98 rement ernal ter gains Mar	n interna 19.49 mperatu using Ta Apr	temper 19.89 re obtair able 9a		re from Ta 0.08 20.1 at step 11	ble 4e, v 2 20. of Tabl	where appl 1 19.99 e 9b, so the ug Sep	19.45 at Ti,m=(	76)m an	d re-calc	ulate	
(92)m= Apply (93)m= 8. Spa Set Tri the ut Utilisa (94)m=	adjustr 18.3 ace hea i to the ilisation Jan ation fac	18.58       nent to th       18.58       ting requi       mean inte       factor for       Feb       tor for ga	e mean 18.98 rement ernal ter gains Mar ins, hm 0.99	n interna 19.49 mperatu using Ta Apr : 0.95	temper 19.89 re obtain ble 9a May 0.84		re from Ta 0.08 20.1 at step 11 Jun Ju	ble 4e, v 2 20. of Tabl	where appl 1 19.99 e 9b, so the ug Sep	19.45 at Ti,m=(	76)m an	d re-calc Dec	ulate	(93)
(92)m= Apply (93)m= 8. Spa Set Ti the ut Utilisa (94)m= Usefu	adjustr 18.3 ace hea i to the ilisation Jan ation fac 1 gains,	18.58         nent to th         18.58         ting requi         mean inte         factor for         factor for ga         1         hmGm , 1	e mean 18.98 rement ernal ter gains Mar ins, hm 0.99 W = (94	n interna 19.49 mperatu using Ta Apr : 0.95	temper 19.89 re obtain ble 9a May 0.84 4)m		re from Ta 0.08 20.1 at step 11 Jun Ju	ble 4e, 1 2 20.1 of Tabl I Au 5 0.5	where appl 1 19.99 e 9b, so the ug Sep	19.45 at Ti,m=( Oct 0.97	76)m an Nov	d re-calc Dec	ulate	(93)
(92)m= Apply (93)m= 8. Spa Set Tri the ut Utilisa (94)m= Usefu (95)m=	adjustr 18.3 ace hea i to the ilisation Jan ation fac 1 l gains, 1083.64	18.58         nent to th         18.58         iting requi         mean inte         factor for         Feb         ctor for ga         1         hmGm , 1	e mean 18.98 rement ranal ter gains Mar ins, hm 0.99 W = (94 1720.09	n interna 19.49 mperatu using Ta Apr : 0.95 4)m x (8- 1949.12	temper 19.89 re obtain ble 9a May 0.84 4)m 1908.67	ratu 2 ned	re from Ta 0.08 20.1 at step 11 Jun Ju 0.65 0.44 54.45 971.9	ble 4e, 1 2 20.1 of Tabl I Au 5 0.5	where applies           1         19.99           2         9b, so the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second	19.45 at Ti,m=( Oct 0.97	76)m an Nov	d re-calc Dec	ulate	(93)
(92)m= Apply (93)m= 8. Spa Set Tri the ut Utilisa (94)m= Usefu (95)m=	adjustr 18.3 ace hea i to the ilisation Jan ation fac 1 l gains, 1083.64	18.58nent to th18.58ting requimean interfactor forFebctor for ga1hmGm ,1420.6	e mean 18.98 rement ranal ter gains Mar ins, hm 0.99 W = (94 1720.09	n interna 19.49 mperatu using Ta Apr : 0.95 4)m x (8- 1949.12	temper 19.89 re obtain ble 9a May 0.84 4)m 1908.67	ratu 2 ned 14 able	re from Ta 0.08 20.1 at step 11 Jun Ju 0.65 0.44 54.45 971.9	ble 4e, 1 2 20.1 of Tabl I Au 5 0.5 97 1016	where applies           1         19.99           1         19.99           1         9b, so the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of the set of	19.45 at Ti,m=( Oct 0.97	76)m an Nov	d re-calc Dec	ulate	(93)
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9a. En	ergy rec	quiremer	nts – Indi	ividual h	eating sy	/stems i	ncluding	micro-C	HP)					
-	e heatii	-	+ fram	<b></b>	10	m o = 1 = -							2	
		ace hea				mentary	-	(202) = 1 -	- (201) -				0	(201)
		bace hea						(202) = 1 - (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) = (204) =		(203)] -			1	(202)
		tal heatii main spa	-	-				(204) - (20		(200)] -			1 93.4	(204)
		seconda		• •		n evetor	n %						93.4	(208)
LINCE				<b>I</b>			· · · · ·	۸	<b>S a a</b>	Oct	Nex	Dee		
Spac	Jan e heatin	Feb g require	Mar ement (c	Apr alculate	May d above	Jun	Jul	Aug	Sep	Oct	Nov	Dec	kWh/yea	ar
epuo	2155.64	1654.34	1352.8	741.94	292.17	0	0	0	0	813.47	1557.97	2214.62		
(211)m	ר ח = {[(98	)m x (20	4)] } x 1	00 ÷ (20	)6)		1							(211)
. ,	2307.96	1771.24	1448.39	794.37	312.81	0	0	0	0	870.96	1668.07	2371.11		
								Tota	l (kWh/yea	ar) =Sum(2	211) _{15,1012}	=	11544.92	(211)
•		g fuel (s		• ·	month									
		01)] } x 1		08) 0	0	0	0	0	0	0	0	0	l	
(215)m=	0	0	0	U	U	0	0	-	-	-	0 215) _{15.1012}	-	0	(215)
Wator	heating	r							,, you	, Cam(2	· · · / 15,1012		U	
		ater hea	ter (calc	ulated al	bove)									
	225.42	198.61	208.41	186.59	182.67	161.13	154.37	171.82	171.62	193.49	204.9	219.91		_
		ater hea											80.3	(216)
(217)m=	L	89.2	88.91	88.17	86.23	80.3	80.3	80.3	80.3	88.27	89.1	<mark>8</mark> 9.38		(217)
		heating, m x 100												
	252.33	222.66	234.41	211.62	211.85	200.66	192.24	213.97	213.72	219.21	229.97	246.03		
								Tota	I = Sum(21	19a) ₁₁₂ =			2648.67	(219)
	al totals									k	Wh/year		kWh/year	-
-	-	fuel use		system	1								11544.92	ļ
Water	heating	fuel use	d										2648.67	
Electri	city for p	oumps, fa	ans and	electric	keep-ho	t								
centra	al heatir	ng pump:	:									30		(230c)
boiler	with a f	an-assis	ted flue									45		(230e)
Total e	electricit	y for the	above, l	kWh/yea	r			sum	of (230a).	(230g) =			75	(231)
Electri	city for I	ighting											651.46	(232)
	•	issions -	– Individ	ual <u>heat</u> i	ing syste	ems <u>inclu</u>	udin <u>a mi</u>	cro- <u>CHP</u>						
							<b>ergy</b> /h/year			Emiss kg CO	<b>ion fac</b> 2/kWh	tor	Emissions kg CO2/yea	
Space	heating	(main s	ystem 1	)		(211	1) x			0.2	16	=	2493.7	(261)
Space	heating	(second	dary)			(21	5) x			0.5	19	=	0	(263)
Water	heating					(219	9) x			0.2		=	572.11	(264)
Space	and wa	ter heati	ng			(26	1) + (262)	+ (263) + (	264) =	L			3065.82	(265)

Electricity for pumps, fans and electric keep-hot	(231) x	0.519 =	38.93	(267)
Electricity for lighting	(232) x	0.519 =	338.11	(268)
Total CO2, kg/year		sum of (265)(271) =	3442.85	(272)
TER =			13.94	(273)