

Lifecycle CO₂ Analysis and Sustainability case for demolition 134 Greencroft Gardens

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Executive Summary 134 Greencroft Gardens Lifecycle CO₂ Analysis

Brief and Findings

There are two key elements to the brief:

1. To consider the case for reuse and demolition from both a feasibility and sustainability viewpoint:

Pages 7-10 details Camden's guidance (CPG) on Energy efficiency and Adaptation, chapter 9: Re-use and Resource efficiency - and the key reasons why the existing dwelling can't be retained. The proposed new dwelling will make a positive impact in terms of carbon emissions, efficient use of floor space, lifespan and more.

2. To consider the impact in terms of Life-cycle carbon emissions for three scenarios, over 60 years – key findings are below:

- Scenario 1 Keeping the existing building and decorating
- Scenario 2 Refurbishing the existing and extending
- Scenario 3 New Build traditional construction

	CO ₂ embodied	CO ₂ In-Use	CO ₂ per m ²	CO ₂ Overall
1. Existing	8,266	407,121	3,364	415,387
2. Refurb	117,898	287,988	1,741	405,886
3. New	133,358	55,921	831	189,279

- The study concludes the new build, scenario 3, has lower carbon emissions, emitting less than half of the existing or the refurbishment scenario CO₂ emissions, over a 60-year lifecycle.
- The floor areas of the proposed new build and refurbishment are similar, with a 15,460 KgCO₂ saving the existing structure – a relatively small saving compared to in-use savings.
- The existing has minimal embodied emissions due to no initial works, but **very high in-use emissions**, particularly for a small property.
- When analysed on a **Kg CO₂ per m² basis**, the refurb is better than the existing and new build demonstrates its impressive carbon efficiency.
- The new build scenario can be considered a much more sustainable home from a long-term carbon emission point of view.
- The proposed new build dwelling is of an exemplary standard and will:
 - Save approx. 876,000 litres of water over 60 years.
 - Create a more efficient useable space
 - Be a healthier and lighter space for people to live.
 - Have better accessibility,
 - Will last much longer than a refurbishment in the future and;
 - Smaller, custom sites are in line with targets of London Plan
- The existing building has some age-related structural and damp issues.
- The new build scenario 3 will use 20% materials from the demolition of the existing building, as recommended by Camden Council. This will include some brick façades and crushed aggregate in the substructure (which is composed on of 70% overall recycled materials)
- New build scenario 3 surpasses the London plan targets on carbon emissions, notably 35% beyond Part L building regulations CO₂ levels, with the property meeting an 82.33% reduction in CO2 over Part L.
- If looked at further than 60 years into the future, the carbon saving of Scenario 3 would continue to increase, due to low carbon emissions in the proposed.

Key findings

Introduction 134 Greencroft Gardens Lifecycle CO₂ Analysis

Introduction	Green Tiger Sustainability has been appointed to analyse the case for demolition of the existing and building a more efficient new house at 134 Greencroft Gardens, in Camden. This is achieved through comparison of the lifecycle carbon emission impact between existing, refurbished and the proposed demolition and new build scenarios.		
Aim	This document aims to:		
	 Understand of the property can be re-used or retained. Where it cannot, make a case for demolition and re-development – from both practical and sustainability viewpoints. 		
	 Analyse the impact of Life-cycle carbon emissions for three scenarios at 134 Greencroft Gardens, this environmental impact will be measured over 60 years in KgCO₂ and KgCO₂ per metre square: 		
	 Scenario 1 – As existing 		
	 Scenario 2 – Refurbishment and extension 		
	 Scenario 3 - New build 		
Methodology	The methodology used in this report has been clearly defined and the data used has been attributed to the source.		
	Fundamentals of whole life carbon (WLC) standards ISO14044 and BS EN 15978 have been followed in this report and the software used is FCBS CARBON.		
	All stages of the building lifecycle are taken into account from A1 – D, as defined by the RICS. Energy use figures are derived from SAP 10 and input into FCBS CARBON.		
	The software uses factors derived from the Inventory of Carbon and Energy (ICE) database and Environmental Product Declarations (EPDs).		
	The three scenarios have information relating to the development such as architectural drawings, consultant reports and official Part L 2021 documentation. The drawings are provided in the application.		
	A breakdown of the data input for each case study is provided, as well as a further breakdown of the carbon factors relating to materials and SAP results are provided in Appendix 1.		
	Specifications of the dwellings analysed are not finalised at this early development stage. Where we have made assumptions, we have assumed the worst-case value.		

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Introduction	In addition to overall Lifecycle Carbon emissions investigated in this report, a case for demolition and redevelopment is made where the existing house is problematic to upgrade to a satisfactory standard - and benefits in size, occupant accessibility, occupant health and wider development sustainability of a new build outweigh existing or refurbishment options.		
Current dwelling	The current dwelling cannot be upgraded to a satisfactory standard from a practical or longevity point of view. The existing property was built around 1897, with numerous extensions, and is approximately 126 years old. Whilst some pre-war dwellings stand longer, the life expectancy of a property such as this is 60 years (BRE).		
	The properties layout is highly inefficient in terms of useable floorspace and circulation, with most of the property being added piecemeal over time. There is a recording history of concerns regarding subsidence since 1992 with, numerous structural cracks still visible after action having been taken. A new property would be able to design for future increase chance of subsidence through climate change. Progressive damp and leaks are an ongoing concern. If the property could not be redeveloped, the home-owner has little incentive to upgrade the current dwelling, keeping emissions high. This is investigated in more detail on the next page.		
Alignment with Policy on emissions	Minor development new builds in Camden should meet a carbon emission target of 19% beyond building regulations Part L – under the policy CC1. London Plan guidance for development is also preferred (35% beyond Part L).		
	A refurbishment and extension of the existing dwelling would need to meet Part L building regulations in terms of energy, which are much lower than the standard of a new build meeting the London Plan requirements. As demonstrated in the long-term CO_2 analysis in this report, the new build will go far beyond building regulations and the London Plan guidance, reaching 82.33% carbon savings beyond Part L standards, in keeping with the borough's wider aims.		
Water use	The dwelling is required to meet building regulations of 110 litres/person/day, but will go beyond and target 100 litres/person/day. Based on 4 people living in the dwelling this could lead to 876,000 litres of water saved over 60 years in the new build scenario. Note that this is based on standard fittings (WCs, Bath, Shower, taps and washing machine / dishwasher only).		
Local Employment	The design team are committed to employing local firms to carry out works if planning permission on the proposed new build is granted. Although small, this will add to local economic growth and employment opportunities.		
A Better dwelling	The proposed dwelling will be an exemplar sustainable development for the local area- see the Design and Access Statement for further design details.		
	The proposed new build scenario will incorporate more internal, making better use of the building footprint, with a much healthier amount of natural light and a higher air change rate in the dwelling - contributing to better occupant health. The new dwelling will have a spacious design, surpassing all M4 access requirements, it will be much more efficient and stand for much longer, making a positive impact in terms of carbon emissions, water and access. Furthermore, renewables, live energy display devices, low-energy lights and appliances, composting facilities, rainwater collection and a 'net-greening' effect on the site as a whole, with better drainage and ecological value.		



Reuse and Resource Efficiency Greencroft Gardens

Introduction

The proposed development aims to optimise resource efficiency and use circular economy principles. The Camden Council 'Demolition Guide' has been followed and Section 9 of Energy efficiency CPG (Jan 2021) will be addressed in this section to investigate if the existing property can be retained.

The guidance notes that a condition and feasibility assessment and Development options assessment be undertaken, in addition to the Whole Life Carbon assessment in this report.

Existing Building	The current property operator as an average size 2	
	 The current property operates as an average size 2 	
uses	bedroom Victorian dwelling.	
	- The properties layout is highly inefficient in terms of	
	useable floorspace and circulation, with most of the	
	property being added piecemeal over time.	
	 There is a recording history of concerns regarding 	
	subsidence since 1992 with, numerous structural	
	cracks still visible after action having been taken.	
	 The property is poorly insulated and has draughts. 	
	 Brick is very old and in some poor condition. 	
Servicing	 Standard Gas boiler and radiator distribution network. 	
	In need of upgrading.	
	 No renewables or alternative energy sources. 	
	 Mains water at standard pressure. 	
Technical	 Upgrades – Full insulation to floors, walls, roof and 	
Review	replacement windows/doors required to reach Part L	
	for existing buildings.	
	- Material audit and estimate of embodied carbon -	
	Structural cracks, from local tree, will worsen with	
	increased surface water run-off from climate change.	
	Foundations are old and for further loading on the	
	site, new foundations are required. For embodied	
	carbon, see page 12 & 13 of this report.	
	- Energy performance of facade - extremely poor -	
	uninsulated 126-year-old solid brick, 1.7 u-value with	
	signs of progressive damp and structural cracks.	
	- SBEM - N/A as this is a residential building	
	- Air Tightness / thermal bridging – poor - assumed to	
	be worst possible in all energy modelling calculations	
	undertaken, as it is uninsulated solid brick.	
	- Condensation Analysis – High – the property will	
	potentially have serious condensation and moisture	
	issues when insulating solid brick.	
Site Capacity	- The site is capable to have a new highly efficient family	

Condition and Feasibility assessment



Reuse and Resource Efficiency Greencroft Gardens

Development Options

The aim of the proposed development is to:

- 1. Eliminate the dwellings subsidence issue
- 2. Create a better laid out, quality family home
- 3. Deliver an ultra low-carbon dwelling

The following development types will be assessed and with regards to the above:

Refit

With a refit, none of the above development aims can be met.

Refurbish

A highly sustainable refurbishment would allow the property to become low carbon, however, further floorspace would be lost insulating the existing dwelling to levels required. Furthermore, a refurbishment would not remodel or importantly, it would not solve the subsidence issue.

Substantial refurbishment and extension

A substantial refurbishment and extension would allow the development to become low carbon AND create a better and more useable family space, through re-modelling and extending the dwelling. However, this proposal would not also allow for new foundations to solve the sites subsidence – and retaining 126-year-old elements, that may have been compromised, is also not considered practical.

Reclaim and recycle

The option of demolition, re-laying new high-recycled content foundations and building a new dwelling would allow for all the development aims above to be met. The property can solve subsidence issues at the root cause, create a highly efficient exemplary low-carbon dwelling, a better family space and a produce a dwelling that will last for much longer than retaining options. In this option at least 95% of demolition waste will be re-used in the new dwelling or recycle for useful purposes off site, prioritising use on site at all opportunities. A pre-demolition audit of materials will be undertaken. A Lifecycle Carbon (WLC) assessment has been prepared as part of this report to compare options of retaining existing, refurbish/extending and building a new dwelling.

The demolition and reclaim / re-use option appears to be the preferable route to meet all development goals.



Reuse and Resource Efficiency Greencroft Gardens

The proposed development that will incorporate measures to improve the resource efficiency and reduce waste through each stage of the development's life:

Design	Measures	Comment
	Energy efficiency building design	The proposal aims to design highly energy efficient building by incorporation passive design measures and renewables (Air source heat pump) Refer to page 11 of this report
	Material efficiency	The reuse of existing materials from the demolition of existing buildings (Brick walls, brickwork, floors) - Crushed and used as aggregate in new development. Low impact insulation throughout (EPS, Rockwool, Cellulose).
		At least 20% of the total value of materials used should derive from recycled and reused content in the products and materials selected (and divert the remainder from landfill.
		Steel and concrete will have a high recycled content (70% concrete)
Construction	Minimise the use of resources (energy, water, land)	Monitor the water and energy consumption and report the equivalent carbon emissions.
	Resource efficiency	Pre-demolition audit to be carried out and target benchmark of \leq 11.1 tonnes of construction waste per 100m2.
	Minimise waste generation	Reusable packing solutions with key product manufacturers will be explored at the earliest opportunity. Solutions may include flat pallets, bulk bags, steel stillages and returnable cable drums;
		Pre-fabrication of materials/elements wherever possible.
	Diversion of waste from landfill	Construction waste – minimum 80% diversion from landfill rate;
		Demolition waste – 95% diversion from landfill rate.
	Sustainable Sourcing	All timber used in the development will come from a legal Source (FSC Scheme).
		At least 80% of the building materials will be responsibly sourced and will use suppliers who can provide an EMS certificate or equivalent.
		Materials rated with an A or B in the BRE Green Guide to Specification will be preferred.
Operations	Maintenance	Implement a good maintenance/ repair strategy to maximise life of materials
		Always consider repair before replacement
		When replacements required select high durability materials with low maintenance requirements
End of Life	Deconstruction	Design for deconstruction and reuse of materials. Divert waste from landfill (via reuse, recycling or recovery)
		Demolition and construction waste - 95% to reuse, recycling, recovery

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Proposed Waste and Materials Sustainability Greencroft Gardens

Introduction	Local Camden and London Plan planning policy states that both construction waste and operational waste should be minimised. Furthermore 'The Circular Economy' method of pre-planning how materials will be re-used so to reduce waste and in-turn the need for virgin building materials. Therefore, the site aims to practice both the Waste Hierarchy and the principles of the circular economy, within both the design and construction of the development. In addition, a site waste management plan will be implemented to ensure minimal waste on site. Also, Considerate Contractors scheme will be joined, to implement measures which seek to avoid environmental pollution including dust, noise, water etc. Further Resource Efficiency chart throughout development on the next page.		
Prevention / Reduction on-site	 The project will use standard sizes and quantities of materials, and plan ahead to reduce off cuts. Cellulose insulation derived from re-used card will be used, where possible Over-ordering will be kept to a minimum through detailed quantity surveying as part of the SWMP requirements. Deliveries will be arranged to match work stages, to avoid materials being stored on site longer than necessary. All storage areas on site will be safe, secure and weatherproof. A site induction will aim to brief the construction team on minimising rework from errors and poor workmanship. 		
Site Waste	 The design team and construction team will procure: A pre-demolition audit, A Sustainable Procurement Plan, A bespoke Site Waste Management Plan, Target to divert minimum 95% of construction waste and 95% of the demolition/excavation waste from going into the landfill. 20% of demolition waste re-used in the new property (as aggregate) The benchmark target for a resource efficiency of 13.3m³ (or 11.1 tonnes) of waste per 100m² of GIA. 		
Materials Sustainability	The dwelling, wherever possible, will use BRE Green Guide 'A' rated materials and manufacturers will be chosen that can demonstrate their products are sustainably sourced and manufactured. All Timber used will be FSC or PEFC certified timber. All concrete, steel and windows		
Waste Hierarchy	used in the development will be ISO1400	Ji certificu.	
	Stages	Includes	
	Prevention	Using less material in design and manufacture. Keeping products for longer; re-use. Using less hazardous material.	
	Preparing for re-use 🔶	Checking, cleaning, repairing, refurbishing, repair, whole items or spare parts.	
	Recycling -	Turning waste into a new substance or product including composting if it meets quality protocols.	
	Other recovery	Including anaerobic digestion, incineration with energy recovery, gasification and pyrolysis which produce energy (fuels, heat and power) and materials from waste; some backfilling operations.	
	Disposal 🚽	Landfill and incineration without energy recovery.	

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Proposed Energy Strategy Greencroft Gardens

Recommendation	The energy strategy for the proposed scheme is to target advanced energy efficiency fabric measures, utilizing mechanical ventilation with heat recovery (MVHR) and a highly efficient Air Source Heat Pump as the main heating and DHW system, alongside 4 kWp Solar Photovoltaics (PV) supplying clean energy.
	The proposal is to build using advanced fabric standards, surpassing Part L 2021 requirements. The thermal performance targets of the dwellings are as follows: U-Values of 0.12 W/m2K for the ground floor, 0.10 W/m2K for the roof, 0.15 W/m2K for walls and high performance double and triple-glazed windows of 1.0 W/m2K (average across site). A maximum air permeability of 3 m3/m2/hr at 50 pa, is targeted, and to be achieved on site. Thermal bridging will be designed out with an average Y-value of 0.05.
	Full MVHR ventilation will surpass Part F requirements. Overheating will be designed out through overhangs, shading and higher G-value glazing, in addition to MVHR.
CO2 Savings Summary	The baseline carbon emissions for the scheme are 4,009 kgCO2/yr . Following implementation of measures within this report; a total saving of 3,312 kgCO2/yr will be made, a 82.33% overall carbon reduction, far surpassing the 19% CO2 sabing detailed in the Energy Efficiency CPG. These measures include:
	- Be Lean (6.2% savings over baseline): Energy efficiency measures to improve the building fabric and services: U-Values 0.15 for walls, 0.10 for roof, 0.12 for the ground floor and 1.0 for windows - in W/m2K, low air tightness (maximum of 3 m3/m2/hr at 50 Pa), advanced thermal bridging at an average Y-value of 0.05.
	 Be Clean (0% savings over Lean case); No further savings through the use of heat networks are planned.
	 Be Green (81% savings over Lean/Clean case): Low carbon heating and hot water through an Air Source Heat Pump and renewable electricity via 4kWp solar Photovoltaics (PV) – pictured below.

Part L 2021

The scheme will meet Building Regulations (Part L 2021) and subsequent revisions.







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Background	Life Cycle Analysis (LCA) or Whole Life Carbon (WLC) is a methodology for assessing the environmental performance of a product (i.e. building) over its life cycle, often referred to as cradle-to-grave analysis. The term cradle in this project refers to the extraction of raw materials. For the purpose of this report the Life Cycle will be from 'cradle' to 60 years of building operation, as the focus of the report is on the embodied carbon in the finished building and a defined time of operation. Building operation (RIBA section B6) beyond 60 years has not been taken into account. However, end of life and reuse and end stages (RIBA WLC section D) have been accounted for in the software. LCA can be measured in terms of energy or carbon emissions. All data in this report refers to carbon emissions throughout all processes.
Scenario 1 – Existing building	 The existing dwelling at 134 Greencroft Gardens was built around 1897. It is a two-bedroom dwelling. In this scenario, the property is maintained as existing with figures derived from drawings and SAP 'appendix S' u-values, based on the properties age, as follows: Walls insulated to U-value of 1.7 Floor insulated to U-value of 1.2 Roof insulated to U-value of 2.3 Windows with U-value of 4.2 Boiler to minimum 84% efficient and 250-litre tank Overall floor area: 123m²
Scenario 2 – Refurbishing and extending existing	 The refurbishment and extension scenario at 134 Greencroft Gardens incorporates a larger space, with front and rear extensions and full refurbishment. The following is a summary and energy modelling input values: Extensions to rear Re-modelling throughout New roof area / new windows U-values: Walls – 0.18 and 0.30 / Roof 0.16 / Floor 0.18 / Windows 1.4 average Highly efficient new gas boiler w/underfloor heating & rads mix Overall floor area: 233m²
Scenario 3 – Demolition and new build.	 The proposed new build '134 Greencroft Gardens' will incorporate a larger and more functional space. A targeted 20% recycled content of the demolition used in the new build. The new structure will include new foundations and be of traditional build, with timber used for all partition and stud walls and best practice levels of fabric efficiency. An air Source Heat Pump will supply heat and hot water and solar PV will supply clean electricity. The following is a summary of works and energy modelling input values: New foundations - 70% recycled content & foamglass caps Brick and block structure, minimal steel, timber wherever possible U-values: Walls – 0.15 / Roof 0.10 / Floor 0.12 / Windows 1.0 average Air permeability to 3 m²/m³/hr @ 50pa Full MVHR ventilation throughout Highly efficient Air Source Heat Pump w/underfloor heating 4 kWp Solar Photovoltaics (PV) panels Overall floor area: 220m²

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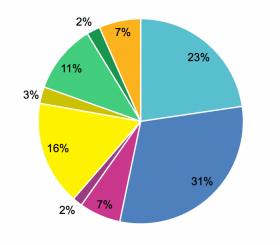
1. Existing Embodied Carbon 134 Greencroft Gardens Lifecycle CO₂ Analysis

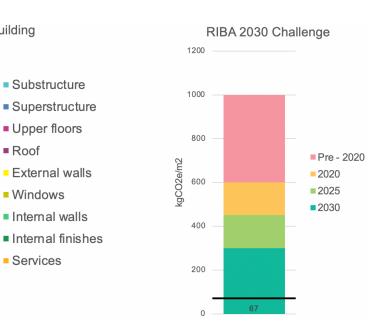
Embodied energy breakdown

Below are the key build features of the existing building and distribution of embodied carbon in the materials in the existing at 134 Greencroft Gardens.

Substructure	Piles	RC 32/40 (50kg/m3 reinforcement)	Existing
Substructure	Pile caps	RC 32/40 (200kg/m3 reinforcement)	Existing
Substructure	Basement walls	RC 32/40 (125kg/m3 reinforcement)	Existing
Substructure	Lowest floor slab	RC 32/40 (150kg/m3 reinforcement)	Existing
Superstructure	Core structure	RC 32/40 (100kg/m3 reinforcement)	Existing
Superstructure	Columns	Steel	Existing
Upper floors	Floor slab	Steel Concrete Composite	Existing
Upper floors	Joisted floors	Timber Joists + OSB topper (Domestic)	Existing
Roof	Roof	Timber Pitch Roof	Existing
Roof	Roof finishes	Bitumous Sheet	Existing
External walls	Facade	Blockwork with Brick	Existing
Windows	Glazing	Single Glazing	Existing
Windows	Window frames	Solid softwood timber frame	Existing
Internal walls	Partitions	Plasterboard + Steel Studs	Existing
Internal finishes	Ceilings	Plasterboard	Existing
Internal finishes	Floors	Carpet	Existing
Services	Services	Low	Existing

Distribution of Embodied Carbon of New Building by Building Aspect







1. Existing Lifecycle Carbon 134 Greencroft Gardens Lifecycle CO₂ Analysis

The following section looks at the carbon emissions throughout the life cycle of the existing building. This is broken into:

Embodied carbon in the physical structure, carbon associated with

- construction works, maintenance over time and end of life.
- **In-use carbon** from occupation and operation of the building. The operational carbon has been calculated using SAP to determine the yearly Dwelling Emission Rate if the building remains as existing.

Summary Table		$kgCO_2/m^2$	Total kgCO ₂
	Embodied (RIBA stage A1-D, excluding B6)	67	8,266
	In-use (RIBA stage B6)	3,297	407,121
	TOTAL	3,364	415,387

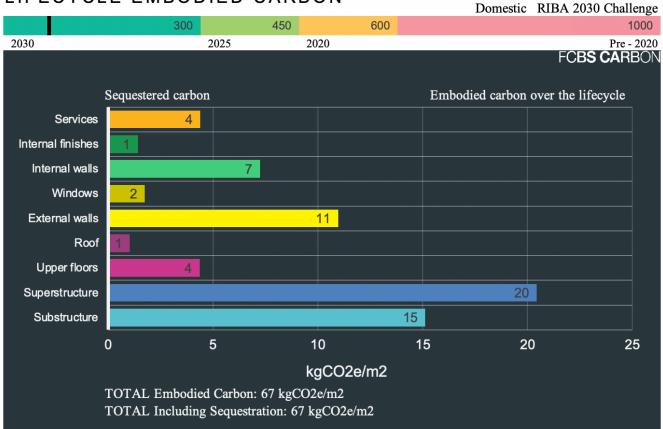
Observations

Introduction

The embodied carbon is a fraction of the overall lifecycle emissions - over a 60year life-cycle. Operational emissions are very high due to the poor energy efficiency of the existing.

Summary Graph

LIFECYCLE EMBODIED CARBON

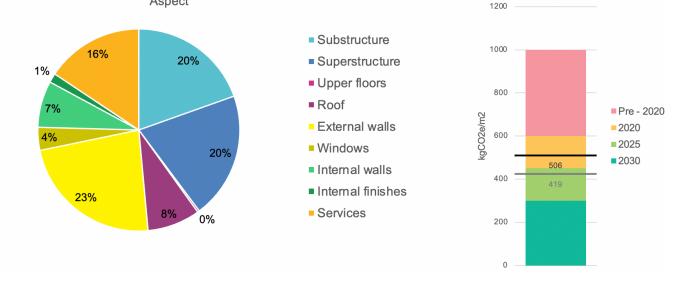


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2. Refurb & Extension Embodied Carbon 134 Greencroft Gardens Lifecycle CO₂ Analysis

Embodied energy breakdown		Below are the key build features of the refurbishment and extension scenario and distribution of embodied carbon in the materials.					
Substructure	Lowest floor slab	RC 32/40 (150kg/m3 reinforcement)	New	50%			
Substructure	Ground insulation	EPS	New				
Superstructure	Core structure	RC 32/40 (100kg/m3 reinforcement)	Existing				
Superstructure	Columns	Steel	Existing				
Superstructure	Beams	Steel	New	50%			
Upper floors	Joisted floors	JJI Engineered Joists + OSB topper	Existing	50%			
Roof	Roof	Timber Pitch Roof	New	90%			
Roof	Roof insulation	EPS	New				
Roof	Roof finishes	Ceramic tile	Existing				
External walls	Facade	Blockwork with Brick	Existing	40%			
External walls	Wall insulation	PIR	Existing				
Internal walls	Partitions	Plasterboard + Steel Studs	Existing	50%			
Internal finishes	Ceilings	Plasterboard	Existing	50%			
Internal finishes	Floors	Carpet	Existing	50%			
Services	Services	Medium	New				
Windows	Glazing	Double Glazing	New				
Windows	Window frames	Solid softwood timber frame	New				
External walls	Facade	Blockwork with Brick	New	60%			
External walls	Wall insulation	PIR	New	60%			
Upper floors	Joisted floors	Timber Joists + OSB topper (Domestic)	New	50%			
Internal finishes	Floors	Solid timber floorboards	New	50%			
Internal walls	Partitions	Plasterboard + Timber Studs	New	50%			
Internal finishes	Ceilings	Plasterboard	New	50%			
Roof	Roof	Timber Pitch Roof	Existing	10%			

Distribution of Embodied Carbon of New Building by Building Aspect



RIBA 2030 Challenge

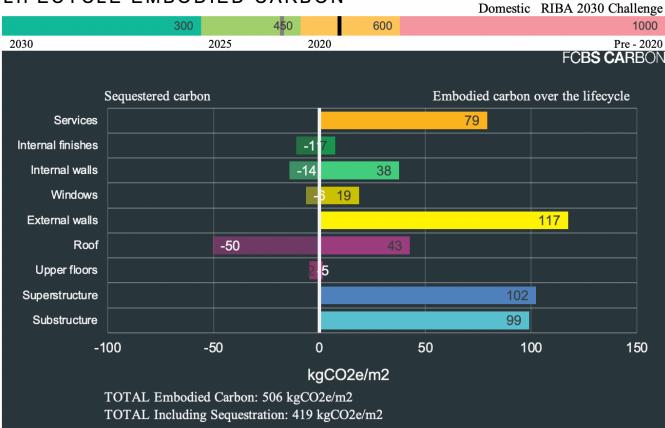


2. Refurb & Extension Lifecycle Carbon 134 Greencroft Gardens

Introduction	The following section looks at the carbon emissions throughout the life cycle of the existing building. This is broken into:						
	 Embodied carbon in the physical structure, carbon associated with construction works, maintenance over time and end of life. 						
	 In-use carbon from occupation and operational carbon has been calc yearly Dwelling Emission Rate if t 	ulated using S	AP to determi				
Summary Table		$kgCO_2/m^2$	Total kgCO ₂				
	Embodied (RIBA stage A1-D, excluding B6)	506	117,898				
	In-use (RIBA stage B6)	1,235	287,988				
	TOTAL	1,741	405,886				
Observations	The embodied carbon and construction we additional floorspace and steel work. Over due to increased floorspace, but per m ² is	rall in-use emis					

Summary Graph

LIFECYCLE EMBODIED CARBON



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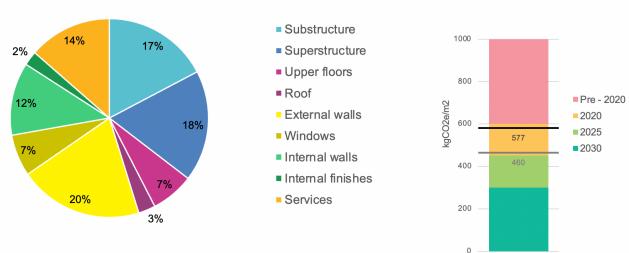
3. New Build Embodied Carbon 134 Greencroft Gardens Lifecycle CO₂ Analysis

Embodied energy breakdown

Below are the key build features of the proposed new building and distribution of embodied carbon in the materials.

Substructure	Piles	RC 32/40 70% GGBS (50kg/m3 reinforcement)	New
Substructure	Pile caps	RC 32/40 70% GGBS (200kg/m3 reinforcement)	New
Substructure	Capping beams	Foamglass (domestic only)	New
Substructure	Lowest floor slab	RC 32/40 70% GGBS (150kg/m3 reinforcement)	New
Substructure	Ground insulation	EPS	New
Superstructure	Beams	Steel	New
Upper floors	Floor slab	RC 32/40 50% GGBS (100kg/m3 reinforcement)	New
Upper floors	Joisted floors	Timber Joists + OSB topper (Domestic)	New
Roof	Roof	Timber Pitch Roof	New
Roof	Roof insulation	Cellulose, loose fill	New
Roof	Roof finishes	Ceramic tile	New
External walls	Facade	Party Wall Brick	New
External walls	Wall insulation	Rockwool	New
Windows	Glazing	Triple Glazing	New
Windows	Window frames	Solid softwood timber frame	New
Internal walls	Partitions	Plasterboard + Timber Studs	New
Internal finishes	Ceilings	Plasterboard	New
Internal finishes	Floors	Solid timber floorboards	New
Services	Services	Medium	New
External walls	Facade	Blockwork with Brick	New

Distribution of Embodied Carbon of New Building by Building Aspect



RIBA 2030 Challenge

1200

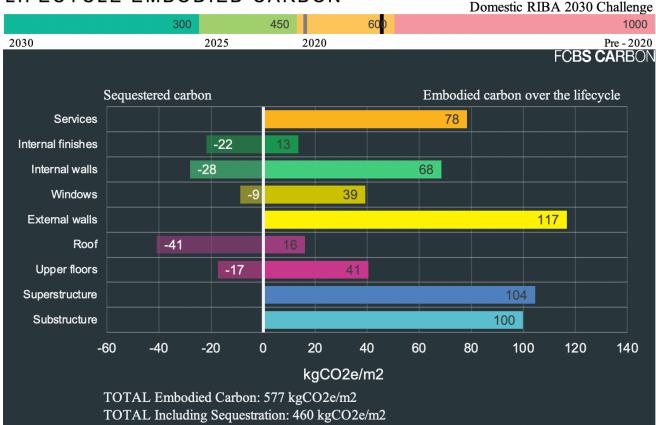


3. New BuildLifecycle Carbon134 GreencroftGardens

Introduction	The following section looks at the carbon emissions throughout the life cycle of the existing building. This is broken into:						
	- Embodied carbon in the physical st construction works, maintenance			with			
	 In-use carbon from occupation and operation of the building. The operational carbon has been calculated using SAP to determine the yearly Dwelling Emission Rate if the building remains as existing. 						
Observations	The new build is fairly carbon efficient in e internal timber use as possible, stud walls particularly impressive as an ultra-low car only 182,861 KgCO ² overall, over 60 years	etc. The in-us bon build. The	e emission are	!			
Summary Table		kgCO ₂ / m ²	Total kgCO ₂				
	Embodied (RIBA stage A1-D, excluding B6)	577	126,940				
	In-use (RIBA stage B6)	254	55,921				
	TOTAL	831	182,861				

Summary Graph

LIFECYCLE EMBODIED CARBON



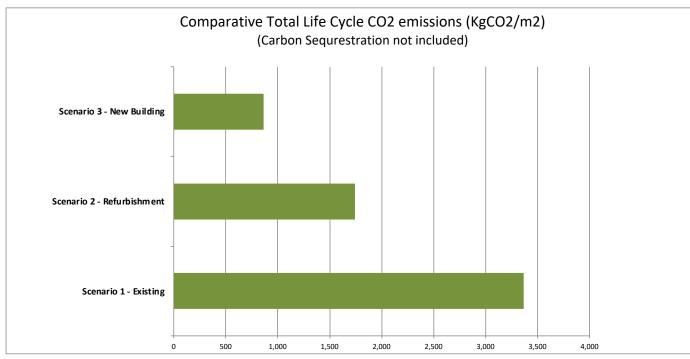


Lifecycle Analysis Comparison 134 Greencroft Gardens

Introduction	The following section analyses the results of the three case studies in order directly compare the scenarios.						
Comparative Analysis	emission refurbi - The flo similar KgCO ₂ design - The ex but ver proper - If carbo using r - When	ry high in-use en ty. on sequestration naterials such as analysed on a K g and the new b	ss than half of the o CO ₂ emissions proposed new be new elements, abodied emission d. aal embodied emission missions, particu n is considered (s timber), the ne g CO ₂ per m ² bas	ne existing or the , over a 60-year puild and refurbi- there is a saving ns due to the ul- nissions due to the ularly for the siz i.e. carbon 'lock ew build favours sis, the refurb is	e ilifecycle. ishment are g of 216,607 tra-low carbon no initial works, e if the existing ked in' through s further still.		
Summary Table		CO ₂ embodied	CO ₂ In-Use	CO ² per m2	CO ₂ Overall		

	CO₂ embodied	CO₂ In-Use	CO ² per m2	CO₂ Overall
1. Existing	8,266	407,121	3,364	415,387
2. Refurb	117,898	287,988	1,741	405,886
3. New	126,940	55,921	831	182,861







Conclusion 134 Greencroft Gardens Lifecycle CO₂ Analysis

Key findings

- The new build scenario 3 can be considered a much more carbon efficient and sustainable proposal from a long-term point of view.
- In addition to the low-carbon design of the proposed new build dwelling, the exemplary property will also:
 - Save approx. 876,000 litres of water over 60 years.
 - Create a more efficient and useable space
 - Be healthier and lighter space for people to live.
 - Have better accessibility, and:
 - A net-greening effect on the site.
- The existing building has some age-related structural and damp issues
- The proposed new build will last much longer than a refurbishment in the future and will also be designed to withstand any further subsidence issues, which will increase as a result of climate change.
- The new build scenario 3 will use 20% materials from the demolition of the existing building, as recommended by Camden Council. This will include some brick façades and crushed aggregate in the substructure (which is composed of 70% overall recycled materials)
- New build scenario 3 surpasses the Camden targets, but also London plan targets on carbon emissions, notably 35% beyond Part L building regulations CO_2 levels, with the property meeting an **82.33%** reduction in CO2 over Part L. This is met through forward-thinking low carbon design and technologies.
- If looked at further in the future the carbon saving of Scenario 3 would continue to increase dramatically, due to the low carbon in-use emissions of the proposed dwelling.

Appendix

Full SAP calculations of the three scenarios can be found on the following pages.



		Greencroft Gardens Issue						ed on D	ate	04/05	/2023			
Assessment Reference	е	Existing Prop Type Ref												
Property		Greencro	oft Gardens											
SAP Rating				48 E	DER		64.0	03		TER		12	.24	
Environmental				41 E	% DER	< TER						-4:	23.12	
CO₂ Emissions (t/year)				7.09	DFEE		235	.84		TFEE		47	.75	
Compliance Check	See BREL	% DFEE	< TFE	E						93.88				
% DPER < TPER				-438.92	DPER		346	.52		TPER			.30	
Assessor Details	Mr. N	licholas I	Powon							Asses	sor ID		/19-000	1
Client			Ross Standald	<i>f</i> +						A3363	301 10	וט	19-000	1
SUMMARY FOR INP														
SUMMART FOR INP	UIDAI	A FUR.	New Dullu	(As Designed)										
Orientation				West										
Property Tenture				1										
Transaction Type				6										
Terrain Type				Suburban										
1.0 Property Type				House, Detached										
2.0 Number of Storeys				2										
3.0 Date Built				2023										
4.0 Sheltered Sides				2										
5.0 Sunlight/Shade				Average or unknow	vn									
6.0 Thermal Mass Param	neter			Precise calculation	Precise calculation									
7.0 Electricity Tariff				Standard										
Smart electricity meter	r fitted			No										
Smart gas meter fitted				No										
7 0 Measurements														
7.0 Measurements				Ground flo			erimete	er Int		loor Are	a A			/ Height
7.0 Measurements				Ground flo 1st Stor	or:	-oss P 43.70 38.30	m	er Int	58.7		a A		Store 2.61 m 3.30 m	/ Height
7.0 Measurements 8.0 Living Area					or:	43.70	m	er Int	58.7	0 m²	a A		2.61 m	/ Height
8.0 Living Area 9.0 External Walls				1st Stor	oor: ey:	43.70 38.30	m m		58.7 64.6	0 m ² 7 m ² m ²			2.61 m 3.30 m	/ Height
8.0 Living Area 9.0 External Walls Description	Туре		construction	1st Stor	oor: ey: U-Value (W/m²K) (43.70 38.30 Kappa kJ/m ² K)	m m Gross Area(m ²)	Nett) Area (m²)	58.7 64.6 Shelter Res	0 m² 7 m² m² Shel	ter	Opening	2.61 m 3.30 m s Area C	alculation
8.0 Living Area 9.0 External Walls	Type Solid Wall	S		1st Stor	oor: ey: U-Value (W/m²K) (43.70 38.30 Kappa	m m Gross	Nett	58.7 64.6	0 m ² 7 m ² m ²	ter		2.61 m 3.30 m s Area C	alculation
8.0 Living Area 9.0 External Walls Description		S	olid wall : plastert	1st Stor	oor: ey: U-Value (W/m²K) (43.70 38.30 Kappa kJ/m ² K)	m m Gross Area(m ²)	Nett) Area (m²)	58.7 64.6 Shelter Res	0 m² 7 m² m² Shel	ter	Opening	2.61 m 3.30 m s Area C	alculatior
8.0 Living Area 9.0 External Walls Description External Wall 1		S	olid wall : plastert	1st Stor 34.70	oor: ey: U-Value (W/m²K) (43.70 38.30 Kappa kJ/m ² K)	m m Gross Area(m ²)	Nett) Area (m²)	58.7 64.6 Shelter Res	0 m² 7 m² m² Shel	ter	Opening 19.68 Kap	2.61 m 3.30 m s Area C Enter (alculatior
8.0 Living Area 9.0 External Walls Description External Wall 1 9.2 Internal Walls Description GF		S	iolid wall : plastert utside structure Construc Dense blo	34.70 34.70	U-Value (W/m²K) (ny 1.70	43.70 38.30 Kappa kJ/m ² K)	m m Gross Area(m ²)	Nett) Area (m²)	58.7 64.6 Shelter Res	0 m² 7 m² m² Shel	ter	Opening 19.68 Kap (kJ/n 75.	2.61 m 3.30 m s Area C Enter (ppa A n ² K) 00	alculatior Type Bross Area Area (m ²) 49.50
8.0 Living Area 9.0 External Walls Description External Wall 1 9.2 Internal Walls Description GF FF		S	iolid wall : plastert utside structure Construc Dense blo	1st Stor 34.70 woard on dabs, insulation, a	U-Value (W/m²K) (ny 1.70	43.70 38.30 Kappa kJ/m ² K)	m m Gross Area(m ²)	Nett) Area (m²)	58.7 64.6 Shelter Res	0 m² 7 m² m² Shel	ter	Opening 19.68 Kap (kJ/n	2.61 m 3.30 m s Area C Enter (ppa A n ² K) 00	alculatior Type Gross Area
8.0 Living Area 9.0 External Walls Description External Wall 1 9.2 Internal Walls Description GF FF		S	iolid wall : plastert utside structure Construc Dense blo	1st Stor 34.70 board on dabs, insulation, a ction bock, plasterboard on c ard on timber frame	or: ey: U-Value (Wim²K) (ny 1.70	43.70 38.30 Kappa kJ/m²K) 9.00	m m Gross Area(m² 205.00	Nett)Area (m²) 185.32 Gross	58.7 64.6 Shelter Res 0.00	0 m ² 7 m ² Shel Nor	ter i	Opening 19.68 Kap (kJ/n 75. 9.0	2.61 m 3.30 m s Area C Enter (ppa A n ² K) 00 00 lation(alculation Type Gross Area rea (m ² 49.50 78.24
8.0 Living Area 9.0 External Walls Description External Walls Description GF FF 10.0 External Roofs	Solid Wall	S o	iolid wall : plastert utside structure Construct Dense blo Plasterbo Constructio	1st Stor 34.70 board on dabs, insulation, a ction bock, plasterboard on c ard on timber frame	U-Value (W/m²K) (Iabs	43.70 38.30 Kappa kJ/m²K) 9.00	m m Gross Area(m² 205.00	Nett) Area (m²) 185.32	58.7 64.6 Shelter Res 0.00	0 m ² 7 m ² Shet Nor	ter i	Opening 19.68 (kJ/n 75. 9.0 r Calcu r Ty	2.61 m 3.30 m s Area C Enter (ppa A n ² K) 00 00 lationC pe	alculation Type Gross Area rea (m ² 49.50 78.24
8.0 Living Area 9.0 External Walls Description External Wall 1 9.2 Internal Walls Description GF FF 10.0 External Roofs Description External Roof flat	Solid Wall Type Extern: Roof	s o	Construction Construct Dense ble Plasterbo Plasterboard	1st Stor 34.70 board on dabs, insulation, a ction bock, plasterboard on c ard on timber frame n , insulated flat roof	ey: U-Value (W/m²K) (my 1.70 labs U-V (W/i 2.	43.70 38.30 Kappa kJ/m²K) 9.00	m m Gross Area(m² 205.00	Nett)Area (m ²) 185.32 Gross Area(m ²) 13.20	58.7 64.6 Shelter Res 0.00 Nett Area (m ²) 0.00	0 m ² 7 m ² Shet Nor Shelter Code None	ter e Shelte Facto 0.00	Opening 19.68 Kap (kJ/m 75. 9.0 er Calcu r Ty Enter Ar	2.61 m 3.30 m s Area C Enter C ppa A n ² K) 00 00 lationC pe Gross ea	alculation Type Bross Area 49.50 78.24 Dpening 0.00
8.0 Living Area 9.0 External Walls Description External Wall 1 9.2 Internal Walls Description GF FF 10.0 External Roofs Description	Solid Wall Type Externa Roof Externa Roof Externa	s o al Flat al Slope	iolid wall : plastert utside structure Construct Dense ble Plasterbo Constructio Plasterboard Plasterboard	1st Stor 34.70 board on dabs, insulation, a ction bock, plasterboard on c ard on timber frame	u-Value (W/m²K) (1.70) labs U-V (W/i 2. 2.	43.70 38.30 Kappa kJ/m²K) 9.00 alue h m²K)(k	m Gross Area(m²) 205.00	Nett)Area (m²) 185.32 Gross Area(m²)	58.7 64.6 Shelter Res 0.00 Nett Area (m ²)	0 m ² 7 m ² Shel Nor	ter e Shelte Facto	Opening 19.68 (kJrn 75. 9.0 r Calcu r Ty Enter Ar Enter Ar Enter Ar Enter	2.61 m 3.30 m s Area C Enter C ppa A ppa A pra K) 00 00 lationC pe Gross ea Gross ea Gross	alculation Type Gross Area .rea (m² 49.50 78.24 Dpening
8.0 Living Area 9.0 External Walls Description External Wall 1 9.2 Internal Walls Description GF FF 10.0 External Roofs Description External Roof flat External Roof pitch	Solid Wall Type Extern: Roof Extern: Roof	s o al Flat al Slope	iolid wall : plastert utside structure Construct Dense ble Plasterbo Constructio Plasterboard Plasterboard	1st Stor 34.70 board on dabs, insulation, a ction bock, plasterboard on c ard on timber frame n , insulated flat roof , insulated slope	u-Value (W/m²K) (1.70) labs U-V (W/i 2. 2.	43.70 38.30 Kappa kJ/m ² K) 9.00 alue <i>h</i> n ² K)(k 30 30	m m Gross) Area(m²) 205.00 (appa J/m²K)) 9.00 9.00	Nett)Area (m*) 185.32 Gross Area(m²) 13.20 50.40	58.7 64.6 Shelter Res 0.00 Nett Area (m ²) 0.00 1.16	0 m ² 7 m ² Shel Nor Shelter Code None None	Shelte Factor	Opening 19.68 (kJrn 75. 9.0 r Calcu r Ty Enter Ar Enter Ar Enter Ar Enter	2.61 m 3.30 m s Area C Enter C pa A n ² K) 00 00 lationC pe Gross ea Gross ea	alculation Type Bross Area 49.50 78.24 Dpening 0.00 1.16
8.0 Living Area 9.0 External Walls Description External Wall 1 9.2 Internal Walls Description GF FF 10.0 External Roofs Description External Roof flat External Roof pitch Dormer 10.2 Internal Ceilings	Solid Wall Type Externa Roof Externa Roof Externa	al Flat al Slope al Flat	Construction Construct Dense bla Plasterboard Plasterboard Plasterboard Plasterboard	1st Stor 34.70 Decision Deck, plasterboard on c ard on timber frame n , insulated flat roof , insulated slope , insulated flat roof	u-Value (W/m²K) (1.70) labs U-V (W/i 2. 2.	43.70 38.30 Kappa kJ/m ² K) 9.00 alue <i>h</i> n ² K)(k 30 30	m m Gross) Area(m²) 205.00 (appa J/m²K)) 9.00 9.00	Nett)Area (m*) 185.32 Gross Area(m²) 13.20 50.40	58.7 64.6 Shelter Res 0.00 Nett Area (m ²) 0.00 1.16	0 m ² 7 m ² Shel Nor Shelter Code None None	Shelte Factor	Opening 19.68 (kJrn 75. 9.0 r Calcu r Ty Enter Ar Enter Ar Enter Ar Enter	2.61 m 3.30 m S Area C Enter C Ppa A n ² K) 00 00 lationC pe Gross ea Gross ea Gross ea Gross ea	alculation ype Bross Area 49.50 78.24 Opening 0.00 1.16 0.00
8.0 Living Area 9.0 External Walls Description External Wall 1 9.2 Internal Walls Description GF FF 10.0 External Roofs Description External Roof flat External Roof pitch Dormer	Solid Wall Type Externa Roof Externa Roof Externa	al Flat al Slope al Flat	iolid wall : plastert utside structure Construct Dense ble Plasterbo Constructio Plasterboard Plasterboard	1st Stor 34.70 board on dabs, insulation, a stion ock, plasterboard on c ard on timber frame n , insulated flat roof , insulated slope , insulated flat roof Construction	u-Value (W/m²K) (1.70) labs U-V (W/r 2. 2. 2.	43.70 38.30 Kappa kJ/m ² K) 9.00 alue <i>h</i> n ² K)(k 30 30 30	m m Gross) Area(m²) 205.00 (appa J/m²K)/ 9.00 9.00 9.00	Nett)Area (m*) 185.32 Gross Area(m²) 13.20 50.40 4.30	58.7 64.6 Shelter Res 0.00 Nett Area (m ²) 0.00 1.16	0 m ² 7 m ² Shel Nor Shelter Code None None	Shelte Factor	Opening 19.68 (kJrn 75. 9.0 r Calcu r Ty Enter Ar Enter Ar Enter Ar Enter	2.61 m 3.30 m s Area C Enter C ppa A ppa A pra K) 00 00 lationC pe Gross ea Gross ea Gross	alculation Type Bross Area 49.50 78.24 Dpening 0.00 1.16 0.00 (m ²)
8.0 Living Area 9.0 External Walls Description External Wall 1 9.2 Internal Walls Description GF FF 10.0 External Roofs Description External Roof flat External Roof pitch Dormer 10.2 Internal Ceilings Description	Solid Wall Type Externa Roof Externa Roof Externa	al Flat al Slope al Flat	iolid wall : plastert utside structure Construct Dense ble Plasterbo Constructio Plasterboard Plasterboard Plasterboard Storey	1st Stor 34.70 board on dabs, insulation, a stion ock, plasterboard on c ard on timber frame n , insulated flat roof , insulated slope , insulated flat roof Construction	u-Value (W/m²K) (1.70) labs U-V (W/r 2. 2. 2.	43.70 38.30 Kappa kJ/m ² K) 9.00 alue <i>h</i> n ² K)(k 30 30 30	m m Gross Area(m ² , 205.00 205.00 205.00 9.00 9.00 9.00 9.00	Nett)Area (m²) 185.32 Gross Area(m²) 13.20 50.40 4.30	58.7 64.6 Shelter Res 0.00 Nett Area (m ²) 0.00 1.16 0.00	0 m ² 7 m ² Shelter Nor None None None	Shelte Factor	Opening 19.68 (kJrn 75. 9.0 r Calcu r Ty Enter Ar Enter Ar Enter Ar Enter	2.61 m 3.30 m s Area C Enter C pa A n ² K) 00 00 lationC pe Gross ea Gross ea Gross ea Area	alculation Type Bross Area 49.50 78.24 Dpening 0.00 1.16 0.00 (m ²)
8.0 Living Area 9.0 External Walls Description External Wall 1 9.2 Internal Walls Description GF FF 10.0 External Roofs Description External Roof flat External Roof pitch Dormer 10.2 Internal Ceilings Description Internal Ceiling 1	Solid Wall Type Externa Roof Externa Roof Externa	al Flat al Slope al Flat	iolid wall : plastert utside structure Construct Dense ble Plasterbo Constructio Plasterboard Plasterboard Plasterboard Storey	1st Stor 34.70 board on dabs, insulation, a stion ock, plasterboard on c ard on timber frame n , insulated flat roof , insulated slope , insulated flat roof Construction	u-Value (W/m²K) (1.70) labs U-V (W/r 2. 2. 2.	43.70 38.30 Kappa kJ/m ² K) 9.00 alue <i>h</i> n ² K)(k 30 30 30	m m Gross) Area(m ²) 205.00 (205.00 (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (205.00) (Nett Area (m*) 185.32 Gross Area(m²) 13.20 50.40 4.30	58.7 64.6 Shelter Res 0.00 Nett Area (m ²) 0.00 1.16 0.00	0 m ² 7 m ² Shel Nor Shelter Code None None	ter Shelte Facto 0.00 0.00	Opening 19.68 (kJrn 75. 9.0 r Calcu r Ty Enter Ar Enter Ar Enter Ar Enter	2.61 m 3.30 m S Area C Enter C Ppa A n ² K) 00 1ationC pe Gross ea Gross ea Gross ea Sasa Area 58.	alculation ype Gross Area 49.50 78.24 0.00 1.16 0.00 (m ²) 70 Area (m



11.2 Internal Floors

Description		Storey Index	Construction Plasterboard ceiling, carpeted chipboard f	loor				Kappa (kJ/m²K) 9.00	Area (m 58.70
12.0 Opening Types Description Windows Doors Roof lights	Data Source Manufacturer Manufacturer Manufacturer	Type Window Solid Doo Roof Light		Glazing Gap	Filling Type	G-value 0.63 0.63	Frame Type	Frame Factor 0.70 0.70	U Value (W/m²K 4.20 3.00 4.20
13.0 Openings Name Front door Front elevation Side elevation Side door RL RL	Opening Ty Doors Windows Windows Doors Roof lights Roof lights	vpe	Location External Wall 1 External Wall 1 External Wall 1 External Wall 1 External Roof pitch External Roof pitch	Orienta Wes Sout Sout Wes Eas	st st :h :h st	Area 2.7 9.3 5.8 1.7 0.5 0.5	3 3 7 5 8	3	tch 30
14.0 Conservatory			None						
15.0 Draught Proofing			100			%			
16.0 Draught Lobby			No						
17.0 Thermal Bridging			Default						
Y-value			0.20			W/m²K			
18.0 Pressure Testing			No						
Test Method			Blower Door			7			
Mechanical Ventilation Mechanical Ventila 20.0 Fans, Open Fireplace	tion System Pres	sent	No						
21.0 Fixed Cooling System	ı		No						
22.0 Lighting									
No Fixed Lighting			No Name Efficacy Lighting 1 81.00	Po v 1		Capa 8 ⁷	acity 10		ount 14
24.0 Main Heating 1			SAP table						
Percentage of Heat			100.00			%			
Fuel Type			Mains gas						
SAP Code			104						
In Winter			84.00						
In Summer			75.00						
Controls SAP Code			2104						
Delayed Start Stat			No						
Flue Type			Balanced						
Fan Assisted Flue			No						
Is MHS Pumped			Pump in heated space						
Heating Pump Age			2013 or later						
Heat Emitter			Radiators						
Flow Temperature			Unknown						
			Yes			_			
Boiler Interlock									
Boiler Interlock Combi boiler type			Standard Combi						
			Standard Combi						



26.0 Heat Netwo	rks			None							
28.0 Water Heati	ng										
Water Heating	g			Main Heat	ing 1						
SAP Code	SAP Code										
Flue Gas Hea	Flue Gas Heat Recovery System										
Waste Water	Waste Water Heat Recovery Instantaneous System 1										
Waste Water	Heat Recove	ery Instantane	ous System	2 No							
Waste Water	Heat Recove	ery Storage S	ystem	No							
Solar Panel	Solar Panel										
Water use <=	Yes										
Cold Water Source				From head	From header tank						
Bath Count				1							
28.3 Waste Wate	r Heat Reco	overy System									
29.0 Hot Water C	ylinder			None	None						
In Airing Cupt	ooard			No							
34.0 Small-scale	Hydro			None							
Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Recommendatio Lower cost n None Further meas	neasures	nieve even hi	gher standa	rds							
				Typical Cost	: Ту	pical saving	s per year	SAP ra	ting	improvement Environmer	ntal Impact
				£3,500 - £5,50	0	£155		E 48 E 53 0		E 4 E 4 0	2



Property Reference	Green	croft Gardens						Issi	ued on Da	ate	04/05/2	023
Assessment Reference	e Hypot	hetical ASHP			Pro	р Туре	Ref					
Property	Green	croft Gardens										
				DED					TED			
SAP Rating			75 C	DER		4.87			TER		9.68	
Environmental			95 A	% DER	< IER						49.6	
CO ₂ Emissions (t/year))		0.96	DFEE		77.9)1		TFEE		44.7	
Compliance Check			See BREL	% DFEE	< TFE	_					-74.0	
% DPER < TPER			2.27	DPER		49.8	85		TPER		51.0	1
Assessor Details	Mr. Nichola	as Bowen							Assess	sor ID	D71	9-0001
Client	Green Tige	er, Ross Standaloft										
SUMMARY FOR INP	UT DATA FO	R: New Build (As Designed)									
Orientation			West									
Property Tenture			1									
Transaction Type			6									
Terrain Type			Suburban									
1.0 Property Type			House, Detached									
			Bouse, Detached									
2.0 Number of Storeys												
3.0 Date Built			2023									
4.0 Sheltered Sides			2									
5.0 Sunlight/Shade			Average or unknowr	1								
6.0 Thermal Mass Param	leter		Precise calculation									
7.0 Electricity Tariff			Standard									
Smart electricity meter	⁻ fitted		No									
Smart gas meter fitted			No									
7.0 Measurements												
no modela emerica			Ground floo		.oss P 40.70	erimete	r In		Floor Area 97 m²	a A		torey Heig 30 m
					39.70				4 m²			50 m 54 m
			1st Store					40.0	10 2			~ 4
			2nd Store		28.20	m		49.6	68 m²			64 m
8.0 Living Area						m		49.6	8 m² m²			64 m
9.0 External Walls			2nd Store	ý:	28.20				m²		2.	
9.0 External Walls Description	Туре	Construction	2nd Store	y: U-Value (W/m²K) (28.20 Kappa kJ/m²K)	Gross Area(m²)		Shelter Res	m² Shelte		2. Openings /	Area Calculat Type
9.0 External Walls Description External Wall 1	Solid Wall	Solid wall : plasterbo outside structure	2nd Store 34.70 ard on dabs, insulation, an	U-Value (W/m²K) (v 0.30	28.20 Kappa kJ/m ² K) 9.00	Gross Area(m²) 123.63	Area (m²) 91.36	Shelter Res 0.00	m² Shelte	е	2. Dpenings / 32.27	Area Calculat Type Enter Gross A
9.0 External Walls Description		Solid wall : plasterbo outside structure	34.70 ard on dabs, insulation, any oard on dabs, AAC block,	y: U-Value (W/m²K) (28.20 Kappa kJ/m²K)	Gross Area(m²)	Area (m ²)	Shelter Res	m² Shelte	е	2. Dpenings / 32.27	Area Calculat Type
9.0 External Walls Description External Wall 1 New walls	Solid Wall	Solid wall : plasterbo outside structure Cavity wall : plasterb	34.70 ard on dabs, insulation, any oard on dabs, AAC block,	U-Value (W/m²K) (v 0.30	28.20 Kappa kJ/m ² K) 9.00	Gross Area(m²) 123.63	Area (m²) 91.36	Shelter Res 0.00	m² Shelte	е	2. Dpenings / 32.27	Area Calculat Type Enter Gross A
9.0 External Walls Description External Wall 1	Solid Wall	Solid wall : plasterbo outside structure Cavity wall : plasterb	2nd Store 34.70 ard on dabs, insulation, any oard on dabs, AAC block, ide structure	U-Value (W/m²K) (v 0.30	28.20 Kappa kJ/m ² K) 9.00	Gross Area(m²) 123.63	Area (m²) 91.36	Shelter Res 0.00	m² Shelte	е	2. Dpenings / 32.27 0.00 Kapp	Area Calculat Type Enter Gross A Enter Gross A A Area (1
9.0 External Walls Description External Wall 1 New walls 9.2 Internal Walls Description GF	Solid Wall	Solid wall : plasterbo outside structure Cavity wall : plasterb filled cavity, any outs Construct Dense bloc	2nd Store 34.70 ard on dabs, insulation, and oard on dabs, AAC block, ide structure	U-Value (W/m ² K) (y 0.30 0.18	28.20 Kappa kJ/m ² K) 9.00	Gross Area(m²) 123.63	Area (m²) 91.36	Shelter Res 0.00	m² Shelte	е	2. Dpenings / 32.27 0.00 Kapp (kJ/m ² 75.00	Area Calculat Type Enter Gross A Enter Gross A A Area (I K) 85.01
9.0 External Walls Description External Wall 1 New walls 9.2 Internal Walls Description	Solid Wall	Solid wall : plasterbo outside structure Cavity wall : plasterb filled cavity, any outs Constructi Dense bloo Plasterboa	2nd Store 34.70 ard on dabs, insulation, any oard on dabs, AAC block, ide structure	U-Value (W/m ² K) (y 0.30 0.18	28.20 Kappa kJ/m ² K) 9.00	Gross Area(m²) 123.63	Area (m²) 91.36	Shelter Res 0.00	m² Shelte	е	2. Dpenings / 32.27 0.00 Kapp. (kJ/m ²¹	Area Calculat Type Enter Gross A Enter Gross A Enter Gross A (1) A Area (1) K) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1
9.0 External Walls Description External Wall 1 New walls 9.2 Internal Walls Description GF FF SF	Solid Wall	Solid wall : plasterbo outside structure Cavity wall : plasterb filled cavity, any outs Constructi Dense bloo Plasterboa	2nd Store 34.70 ard on dabs, insulation, and oard on dabs, AAC block, ide structure ion ck, plasterboard on da rd on timber frame	U-Value (W/m ² K) (y 0.30 0.18	28.20 Kappa kJ/m ² K) 9.00	Gross Area(m²) 123.63	Area (m²) 91.36	Shelter Res 0.00	m² Shelte	е	2. Dpenings / 32.27 0.00 Kapp (kJ/m ²) 75.00 9.00	Area Calculat Type Enter Gross A Enter Gross A Enter Gross A (1) A Area (1) K) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1
9.0 External Walls Description External Wall 1 New walls 9.2 Internal Walls Description GF FF SF	Solid Wall	Solid wall : plasterbo outside structure Cavity wall : plasterb filled cavity, any outs Constructi Dense bloo Plasterboa	2nd Store 34.70 ard on dabs, insulation, and oard on dabs, AAC block, ide structure ion ck, plasterboard on da rd on timber frame	y: U-Value (W/m²K) (0.30 0.18 bs	28.20 Kappa kJ/m²K) 9.00 60.00	Gross Area(m²) 123.63 184.61	Area (m²) 91.36 184.61	Shelter Res 0.00 0.00	M ² Shelte None	e e Shelte	2. Dpenings J 32.27 0.00 Kapp. (kJ/m ² 75.00 9.00 9.00 r Calcula	Area Calculat Type Enter Gross A Enter Gross A Enter Gross A A Area (1 K) 85.00 110.0 45.00 tionOpeni
9.0 External Walls Description External Wall 1 New walls 9.2 Internal Walls Description GF FF SF 10.0 External Roofs	Solid Wall Cavity Wall	Solid wall : plasterbo outside structure Cavity wall : plasterb filled cavity, any outs Constructi Dense bloc Plasterboa Plasterboa	2nd Store 34.70 ard on dabs, insulation, and oard on dabs, AAC block, ide structure ion ck, plasterboard on da rd on timber frame	U-Value (W/m²K) (0.30 0.18 bs	28.20 Kappa kJ/m²K) 9.00 60.00 60.00	Gross Area(m²) 123.63 184.61	Area (m²) 91.36 184.61 Gross	Shelter Res 0.00 0.00	m ² Shelter	e e Shelte	2. Dpenings J 32.27 0.00 Kapp (kJ/m ² 75.00 9.00 9.00 9.00	Area Calculat Type Enter Gross A Enter Gross A A Area (I K) 0 85.00 110.0 45.00 tionOpenie coss 0.00
9.0 External Walls Description External Wall 1 New walls 9.2 Internal Walls Description GF FF SF 10.0 External Roofs Description Roof	Solid Wall Cavity Wall Type External Flat	Solid wall : plasterbo outside structure Cavity wall : plasterb filled cavity, any outs Constructi Dense bloc Plasterboa Plasterboa	2nd Store 34.70 ard on dabs, insulation, any oard on dabs, AAC block, ide structure ion ck, plasterboard on da rd on timber frame rd on timber frame	U-Value (W/m²K) (0.30 0.18 bs	28.20 Kappa kJ/m²K) 9.00 60.00 60.00	Gross Area(m²) 123.63 184.61 (appa J/m²K)/	Area (m²) 91.36 184.61 Gross srea(m²)	Shelter Res 0.00 0.00	m ² Shelter None Shelter	e e Shelte Factor	2. Dpenings / 32.27 0.00 Kapp (kJ/m ² 75.00 9.00 9.00 9.00 r Calcula r Type Enter G	Area Calculat Type Enter Gross A Enter Gross A A Area (I K) 0 85.00 110.0 45.00 tionOpenie coss 0.00
9.0 External Walls Description External Wall 1 New walls 9.2 Internal Walls Description GF FF SF 10.0 External Roofs Description Roof	Solid Wall Cavity Wall Type External Flat	Solid wall : plasterbo outside structure Cavity wall : plasterb filled cavity, any outs Constructi Dense bloc Plasterboa Plasterboa	2nd Store 34.70 ard on dabs, insulation, any oard on dabs, AAC block, ide structure ion kk, plasterboard on da rd on timber frame rd on timber frame insulated flat roof Construction	y: U-Value (W/m²K) 0.30 0.18 bs U-V (W/n 0.	28.20 Kappa kJ/m²K) 9.00 60.00 60.00 alue k n²K)(k 15 d chipk	Gross Area(m²) 123.63 184.61 (appa J/m²K)A 9.00	Area (m ²) 91.36 184.61 Gross Area(m ²) 92.97 or	Shelter Res 0.00 0.00	m ² Shelter None Shelter	e e Shelte Factor	2. Dpenings / 32.27 0.00 Kapp. (kJ/m ²) 75.00 9.00 9.00 9.00 9.00 r Calcula r Type Enter G Area	Area Calculat Type Enter Gross A Enter Gross A A Area (I K) 0 85.00 110.0 45.00 tionOpenie coss 0.00
9.0 External Walls Description External Wall 1 New walls 9.2 Internal Walls Description GF FF SF 10.0 External Roofs Description Roof 10.2 Internal Ceilings Description Internal Ceiling 1	Solid Wall Cavity Wall Type External Flat	Solid wall : plasterbo outside structure Cavity wall : plasterb filled cavity, any outs Construction Plasterboa Plasterboa Plasterboard, i Plasterboard, i	2nd Store 34.70 ard on dabs, insulation, any oard on dabs, AAC block, ide structure ion k, plasterboard on da rd on timber frame rd on timber frame insulated flat roof Construction Plasterboard ceilir	y: U-Value (W/m²K) 0.30 0.18 bs U-V (W/n 0.	28.20 Kappa kJ/m²K) 9.00 60.00 60.00 alue k n²K)(k 15 d chipk	Gross Area(m²) 123.63 184.61 (appa J/m²K)A 9.00 poard flo poard flo	Area (m*) 91.36 184.61 Gross Area(m²) 92.97 or or	Shelter Res 0.00 0.00 Nett Area (m ²) 0.00	m ² Shelter None Shelter	shelter Factor	2. Dpenings / 32.27 0.00 Kapp (kJ/m ² 75.00 9.00 9.00 r Calcula r Calcula r Type Enter G Area Shelter	Area Calculat Type Enter Gross A Enter Gross A a Area (r K) 110.0 45.00 tionOpenic ross 0.00 a Area (m ²) 90.44 49.68
9.0 External Walls Description External Wall 1 New walls 9.2 Internal Walls Description GF FF SF 10.0 External Roofs Description Roof 10.2 Internal Ceilings Description Internal Ceiling 1 FF 11.0 Heat Loss Floors	Solid Wall Cavity Wall Type External Flat Roof Type Ground Floor - S	Solid wall : plasterbo outside structure Cavity wall : plasterb filled cavity, any outs Construction Plasterboa Plasterboard, f Plasterboard, f Storey Lowest occupied +1	34.70 ard on dabs, insulation, any oard on dabs, AAC block, ide structure ion sk, plasterboard on dab rd on timber frame insulated flat roof Construction Plasterboard ceilir Plasterboard ceilir	y: U-Value (W/m²K) (0.30 0.18 bs U-V (W/n 0. (W/n 0.	28.20 Kappa kJ/m²K) 9.00 60.00 60.00 alue M n²K)(k 15 d chipt d chipt	Gross Area(m²) 123.63 184.61 (appa J/m²K)A 9.00 00ard flc 00ard flc 00ard flc	Area (m ²) 91.36 184.61 Gross vrea(m ²) 92.97 or or	Shelter Res 0.00 0.00 Nett Area (m ²) 0.00	m² Shelter None	shelter Factor	2. Dpenings / 32.27 0.00 Kapp (kJ/m ² 75.00 9.00 9.00 r Calcula r Type Enter G Area Shelter K Factor (k	Area Calculat Type Enter Gross A Enter Gross A Enter Gross A (10.0 45.00 tionOpenie ross 0.00 A Area (m ²) 90.44 49.68



11.2 Internal Floors

Description Storey Construction Kappa Area (m²) Index (kJ/m²K) Plasterboard ceiling, carpeted chipboard floor Plasterboard ceiling, carpeted chipboard floor Internal Floor 1 90.44 9.00 9.00 49.68 SF 12.0 Opening Types Glazing Filling Description Data Source Type Glazing G-value Frame Frame U Value (W/m²K) Туре Factor Gap Type Windows Manufacturer Double Low-E Soft 0.05 0.63 Window 0.70 1.60 1.60 Doors Manufacturer Solid Door Roof lights Manufacturer Roof Light Double Low-E Soft 0.05 0.63 0.70 1.60 13.0 Openings Opening Type Orientation Pitch Name Location Area (m²) Front door Doors External Wall 1 West 2.18 Front elevation Windows External Wall 1 West 23.83 Side elevation Windows External Wall 1 South 1.04 External Wall 1 Rear elevation Windows East 5.21 14.0 Conservatory None 15.0 Draught Proofing 100 % No 16.0 Draught Lobby 17.0 Thermal Bridging Default 0.20 W/m²K Y-value **18.0 Pressure Testing** No Blower Door Test Method **19.0 Mechanical Ventilation Mechanical Ventilation** Mechanical Ventilation System Present No 20.0 Fans, Open Fireplaces, Flues 21.0 Fixed Cooling System No 22.0 Lighting No Fixed Lighting No Capacity 810 Name Efficacy Power Count 81.00 Lighting 1 10 20 24.0 Main Heating 1 Database Percentage of Heat 100.00 % Database Ref. No. 100063 Fuel Type Electricity 0.00 In Winter In Summer 0.00 Model Name ECODAN 8.5kW Manufacturer Mitsubishi Electric Europe B.V. Heat Pump System Type 2207 Controls SAP Code Is MHS Pumped Pump in heated space Heating Pump Age 2013 or later Heat Emitter Radiators Enter value Flow Temperature Flow Temperature Value 35.00 None 25.0 Main Heating 2 26.0 Heat Networks None Heat Source Fuel Type Heating Use Efficiency Percentage Of Heat Heat Electrical **Fuel Factor** Efficiency type Heat Power Ratio



Heat source 1
Heat source 2
Heat source 3
Heat source 4
Heat source 5

28.0 Water Heating

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

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder			Hot Water	Cylinder						
Cylinder Stat			Yes							
Cylinder In Heated Sp	ace		Yes							
Independent Time Co	trol		Yes							
Insulation Type			Measured	Loss						
Cylinder Volume			150.00					L		
Loss			1.90					kWh/da	y	
Pipes insulation			Fully insul	ated primar	y pipework					
In Airing Cupboard			No							
31.0 Thermal Store			None							
32.0 Photovoltaic Unit			One Dwel	ling						
Export Capable Meter	?		No							
Connected To Dwelling	1		Yes							
Diverter			No							
Battery Capacity [kWh	l		0.00							
PV Cells kWp	Orientatior	Elevation	Overs	shading F	GHRS	MCS Certificate	Over: Facto	or	MCS Certificate Reference	Panel Manufacturer
3.00	Horizontal	Horizontal				Yes	1.00		Reference	
34.0 Small-scale Hydro			None							
Jan Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Recommendations Lower cost measure None Further measures to		r standards								

luarus			
Typical Cost	Typical savings per year	Ratings af	ter improvement
Typical Cost	Typical savings per year	SAP rating	Environmental Impact
£4,000 - £6,000	£82	C 76	A 95
		0	0
		0	0



	Gre	encr	oft Gardens						Issu	ied on D	ate	04/05/2	023	
Assessment Reference	Lea	an				Pro	ор Туре	Ref						
Property	Gre	encr	oft Gardens											
SAP Rating				87 B	DER		9.0	6		TER		9.66		
Environmental				90 B	% DEF	< TER						6.21		
CO ₂ Emissions (t/year)				1.71	DFEE		39.	88		TFEE		44.4	0	
Compliance Check				See BREL	% DFE	E < TFI	EE					10.1	8	
% DPER < TPER				-4.58	DPER		53.	15		TPER		50.8		
Assessor Details	Mr. Nich	nolas	Bowen							Asses	sor ID	D71	9-000	1
Client			Ross Standalo	ft										
SUMMARY FOR INPL														
Drientation				West										
Property Tenture				1										
Fransaction Type				6										
				Suburban										
errain Type .0 Property Type				House, Detached										
				3										
2.0 Number of Storeys 3.0 Date Built				3										
I.0 Sheltered Sides				3										
5.0 Sunlight/Shade	- 4			Average or unknown Precise calculation										
5.0 Thermal Mass Paramo	eter			Precise calculation										
.0 Electricity Tariff				Standard										
Smart electricity meter	fitted			No										
Smart gas meter fitted				No										
7.0 Measurements					11 4			I4			_			
					Heat		Perimeto	er int		loor Are	a A	Average S		Heigh
				Ground flo		40.40			91.9				90 m	
				Ground flo 1st Store 2nd Store	ey:	40.40 36.40 28.19	m		78.0	0 m² 8 m²		2.	90 m 80 m 46 m	
3.0 Living Area				1st Store	ey:	36.40	m		78.0	0 m²		2.	80 m	
3.0 Living Area 9.0 External Walls				1st Store 2nd Store	ey:	36.40	m		78.0	0 m² 8 m²		2.	80 m	
-	Туре		Construction	1st Store 2nd Store	ey: ey: U-Value	36.40 28.19 Карра	m m Gross		78.0 49.3	0 m² 8 m²	ter	2.	80 m 46 m Area C	
9.0 External Walls Description Walls	Type Cavity Wall	(1st Stor 2nd Store 82.50 board on dabs, AAC block,	ey: ey: U-Value (W/m²K)	36.40 28.19 Карра	m m Gross	²) Area (m ²)	78.0	0 m ² 8 m ² m ²		2. 2. Openings	80 m 46 m	ype
3.0 External Walls Description Walls Dormer		(f	Cavity wall : plaster filled cavity, any out	1st Stor 2nd Store 82.50 board on dabs, AAC block,	ey: ey: U-Value (W/m²K) 0.15	36.40 28.19 Kappa (kJ/m²K	m m Gross) Area(m ²	²) Area (m ²)	78.0 49.3 Shelter Res	0 m² 8 m² m² Shel	ie	2 2. Openings <i>J</i> 24.87	80 m 46 m Area Q Enter ('ype Gross Area
Description Walls Dormer Dormer	Cavity Wall	(f	Cavity wall : plaster filled cavity, any out Timber framed wall	1st Stor 2nd Store 82.50 board on dabs, AAC block, side structure (one layer of plasterboard)	ey: ey: U-Value (W/m²K) 0.15	36.40 28.19 Kappa (kJ/m²K 60.00	m m Gross) Area(m ² 267.13	242.26 Area (m²)	78.0 49.3 Shelter Res 0.00	0 m² 8 m² m² Shel	ie	2. 2. Openings / 24.87 9.20	80 m 46 m Area C Enter (Enter ('ype Gross Area Gross Area
Description Walls Dormer Description	Cavity Wall	(f	Cavity wall : plaster filled cavity, any out Timber framed wall Construc	1st Stor 2nd Stor 82.50 board on dabs, AAC block, side structure (one layer of plasterboard) tion	ey: ey: U-Value (W/m²K) 0.15	36.40 28.19 Kappa (kJ/m²K 60.00	m m Gross) Area(m ² 267.13	242.26 Area (m²)	78.0 49.3 Shelter Res 0.00	0 m² 8 m² m² Shel	ie	2. 2. 0penings / 24.87 9.20 Kapp (kJ/m ²	Area C Enter (Enter (Area C Enter (K)	Type Gross Area Gross Area Gross Area Gross Area
Description Walls Dormer Dormer Description GF FF	Cavity Wall	(f	Cavity wall : plaster filed cavity, any out Timber framed wall Construc Plasterbo Plasterbo	1st Stor 2nd Stor 82.50 board on dabs, AAC block, side structure (one layer of plasterboard) tion ard on timber frame ard on timber frame	ey: ey: U-Value (W/m²K) 0.15	36.40 28.19 Kappa (kJ/m²K 60.00	m m Gross) Area(m ² 267.13	242.26 Area (m²)	78.0 49.3 Shelter Res 0.00	0 m² 8 m² m² Shel	ie	2. 2. 0penings / 24.87 9.20 (kJ/m ² 9.00 9.00	Area C Enter (Enter (Area C Enter (K)	ype Gross Area Gross Area rea (m ² 57.42 149.00
Description Walls Dormer Description Conternal Walls Description GF FF SF	Cavity Wall	(f	Cavity wall : plaster filed cavity, any out Timber framed wall Construc Plasterbo Plasterbo	1st Stor 2nd Stor 82.50 board on dabs, AAC block, side structure (one layer of plasterboard) tion ard on timber frame	ey: ey: U-Value (W/m²K) 0.15	36.40 28.19 Kappa (kJ/m²K 60.00	m m Gross) Area(m ² 267.13	242.26 Area (m²)	78.0 49.3 Shelter Res 0.00	0 m² 8 m² m² Shel	ie	2. 2. 0penings / 24.87 9.20 (kJ/m ² 9.00	Area C Enter (Enter (Area C Enter (K)	Type Gross Area Gross Area Gross Area Gross Area Gross Area Gross Area Gross Area Gross Area
3.0 External Walls Description Walls Dormer 3.2 Internal Walls Description GF FF SF	Cavity Wall Timber Frame	(f	Cavity wall : plaster filled cavity, any out Timber framed wall Construc Plasterbo Plasterbo Plasterbo Plasterbo	1st Stor 2nd Stor 82.50 board on dabs, AAC block, side structure (one layer of plasterboard) tion ard on timber frame ard on timber frame ard on timber frame	ey: ey: U-Value (W/m²K) 0.15 0.15	36.40 28.19 Kappa (kJ/m ² K 60.00 9.00	m m Gross) Area(mi 267.13 15.07	*) Area (m²) 242.26 5.87	78.0 49.3 Shelter Res 0.00 0.00	0 m ² 8 m ² m ² Shel Nor	ie	2. 2. 2. 24.87 9.20 Kapp (kJ/m ²¹ 9.00 9.00 9.00	Area C Enter (Enter (Area C Enter (K)	ype Gross Area Gross Area rea (m² 57.42 149.00 28.26
Description Walls Dormer Description Conternal Walls Description GF FF SF	Cavity Wall	(f	Cavity wall : plaster filed cavity, any out Timber framed wall Construc Plasterbo Plasterbo	1st Stor 2nd Stor 82.50 board on dabs, AAC block, side structure (one layer of plasterboard) tion ard on timber frame ard on timber frame ard on timber frame	ey: ey: U-Value (W/m²K) 0.15 0.15	36.40 28.19 Kappa (kJ/m ² K 60.00 9.00	m Gross) Area(m ² 267.13 15.07	242.26 Area (m²)	78.0 49.3 Shelter Res 0.00 0.00 0.00	0 m ² 8 m ² m ² Shel Nor	ne ne Shelte	2 2. 0penings / 24.87 9.20 (kJ/m ² 9.00 9.00 9.00 9.00	Area C Area C Enter (Enter (K)	ype Gross Area Gross Area rea (m² 57.42 149.00 28.26
3.0 External Walls Description Walls Dormer 3.2 Internal Walls Description GF FF SF	Cavity Wall Timber Frame Type External F	(f 	Cavity wall : plaster filed cavity, any out Timber framed wall Construct Plasterbo Plasterbo Plasterbo Construction	1st Stor 2nd Stor 82.50 board on dabs, AAC block, side structure (one layer of plasterboard) tion ard on timber frame ard on timber frame ard on timber frame	ey: ey: U-Value (W/m²K) 0.15 0.15 0.15	36.40 28.19 Kappa (kJ/m ² K 60.00 9.00	m Gross) Area(m ² 267.13 15.07	*) Area (m²) 242.26 5.87 Gross	78.0 49.3 Shelter Res 0.00 0.00	0 m ² 8 m ² m ² Shel Nor Nor	ne ne Shelte	2 2. 24.87 9.20 Kapp . (kJ/m ² 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.0	Area C Area C Enter (Enter (Enter (K) tionC	ype Gross Area Gross Area .rea (m ² 57.42 149.00 28.26
0.0 External Walls Description Walls Dormer 0.2 Internal Walls Description GF FF SF	Cavity Wall Timber Frame Type External F Roof External F	Flat	Cavity wall : plaster filled cavity, any out Timber framed wall Construct Plasterbo Plasterbo Plasterbo Plasterbo	1st Stor 2nd Stor 82.50 board on dabs, AAC block, side structure (one layer of plasterboard) tion ard on timber frame ard on timber frame ard on timber frame	ey: ey: U-Value (W/m²K) 0.15 0.15 0.15	36.40 28.19 (kJ/m²K 60.00 9.00 Value / /m²K)(ł	m Gross) Area(m 267.13 15.07 Kappa Kappa	^(*) Area (m ²) 242.26 5.87 5.87 Gross Area(m ²)	78.0 49.3 Shelter Res 0.00 0.00 0.00	0 m ² 8 m ² Shel Nor Nor	Shelte Facto	2 2. 2. 24.87 9.20 (kJ/m ² 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.0	Area C Enter (Enter (Area C Enter (Area C)	ype Bross Area Bross Area Gross Area rea (m ² 57.42 149.00 28.26 Dpening
0.0 External Walls Description Walls Dormer 0.2 Internal Walls Description GF FF SF 00.0 External Roofs Description GF Flat	Cavity Wall Timber Frame Type External F Roof	- Flat	Cavity wall : plaster filed cavity, any out Timber framed wall Construct Plasterbo Plasterbo Plasterbo Plasterboard Plasterboard	1st Stor 2nd Stor 82.50 board on dabs, AAC block, side structure (one layer of plasterboard) tion ard on timber frame ard on timber frame ard on timber frame ard on timber frame	ey: ey: U-Value (W/m²K) 0.15 0.15 0.15	36.40 28.19 (kJ/m²K 60.00 9.00 Value /m²K)(l	m m Gross) Area(m ² 267.13 15.07 (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5.07) (5	^(*) Area (m ²) 242.26 5.87 5.87 Gross Area(m ²) 9.00	78.0 49.3 Shelter Res 0.00 0.00 0.00 Nett Area (m ²) 7.76	0 m ² 8 m ² m ² Nor Nor Shelter Code None	Shelte Facto 0.00	2 2. 2. 24.87 9.20 (kJ/m ² 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.0	80 m 46 m Area C Enter (Enter (Enter (K) tion(S ross	ype Bross Area Bross Area Frea (m ⁴ 57.42 149.00 28.26 Dpening 7.76
0.0 External Walls Description Walls Dormer 0.2 Internal Walls Description GF FF SF 0.0 External Roofs Description GF Flat FF Flat SF Flat	Cavity Wall Timber Frame Type External F Roof External F Roof External F Roof	-Tat Flat Flat	Cavity wall : plaster filled cavity, any out Timber framed wall Construct Plasterbo Plasterbo Plasterboard Plasterboard Plasterboard Plasterboard	1st Stor 2nd Stor 82.50 board on dabs, AAC block, side structure (one layer of plasterboard) tion ard on timber frame ard on timber frame ard on timber frame ard on timber frame ard on timber frame insulated flat roof insulated flat roof	ey: ey: U-Value (W/m²K) 0.15 0.15 0.15	36.40 28.19 Kappa (kJ/m²K 60.00 9.00 9.00 Value 1 /m²K)(k).10).10	m m Gross) Area(m 267.13 15.07 (Kappa (J/m ² K) 9.00 9.00 9.00	Gross Area(m²) 242.26 5.87 9.87 9.00 26.50 25.50	78.0 49.3 Shelter Res 0.00 0.00 0.00 Nett Area (m ²) 7.76 0.00 0.00	0 m ² 8 m ² m ² Shel Nor Nor None None None	Shelte Facto 0.00 0.00 0.00	2 2. 2. 24.87 9.20 Kapp (kJ/m ²¹ 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.0	Area C Enter (Enter (Area C Enter (Area C) Enter (Area (ype pross Area Gross Area 57.42 149.00 28.26 Opening 7.76 0.00 0.00
3.0 External Walls Description Walls Dormer 3.2 Internal Walls Description GF FF SF 10.0 External Roofs Description GF Flat FF Flat	Cavity Wall Timber Frame Type External F Roof External F Roof External S Roof External S Roof External S	Flat Flat Flat Flat Slope	Cavity wall : plaster filled cavity, any out Timber framed wall Construct Plasterbo Plasterbo Plasterbo Plasterboard Plasterboard Plasterboard Plasterboard	1st Stor 2nd Stor 82.50 board on dabs, AAC block, side structure (one layer of plasterboard) tion ard on timber frame ard on timber frame	ey: ey: U-Value (W/m²K) 0.15 0.15 0.15 (W (W () () () () () () () () () () () () ()	36.40 28.19 (kJ/m²K 60.00 9.00 Value 1 /m²K)(k)).10	m m Gross) Area(m ² 267.13 15.07 Kappa (J/m ² K) 9.00 9.00	Gross Area(m²) 242.26 5.87 Gross Area(m²) 9.00 26.50	78.0 49.3 Shelter Res 0.00 0.00 0.00 Nett Area (m²) 7.76 0.00	0 m ² 8 m ² m ² Shel Nor Nor Nor None None	Shelta Facto 0.00 0.00	2 2. 2. 24.87 9.20 Kapp; (kJ/m ² 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.0	Area C Enter (Enter (Enter (Enter (Area C Enter (Area C Enter (Area C Enter (Area C Enter (Enter (C Enter (Enter	ype pross Area Gross Area Frea (m ² 57.42 149.00 28.26 Opening 7.76 0.00
Description Walls Dormer Description Calinternal Walls Description GF FF SF 0.0 External Roofs Description GF Flat FF Flat SF Flat Pitch	Cavity Wall Timber Frame Type External F Roof External F Roof External F Roof External S Roof	Flat Flat Flat Flat Slope	Cavity wall : plaster filled cavity, any out Timber framed wall Construct Plasterbo Plasterbo Plasterbo Plasterboard Plasterboard Plasterboard Plasterboard	1st Stor 2nd Stor 82.50 board on dabs, AAC block, side structure (one layer of plasterboard) tion ard on timber frame ard on timber frame ard on timber frame and on t	ey: ey: U-Value (W/m²K) 0.15 0.15 0.15 (W (W () () () () () () () () () () () () ()	36.40 28.19 (kJ/m²K 60.00 9.00 9.00 Value 1 /m²K)(H).10).10).10).10	m m Gross) Area(m ² 267.13 15.07 (J/m ² K) 9.00 9.00 9.00 9.00 9.00	Gross Area(m²) 242.26 5.87 9.00 26.50 25.50 39.00	78.0 49.3 Shelter Res 0.00 0.00 0.00 7.76 0.00 0.00 1.00	0 m ² 8 m ² m ² Shelter Nor Nore None None None None	Shelto Facto 0.00 0.00 0.00 0.00	2 2. 2. 24.87 9.20 (kJ/m ² 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.0	Area C Enter (Enter (Enter (Enter (Area C Enter (Area C Enter (Area C Enter (Area C Enter (Enter (Enter (C Enter (C Enter (Enter (Enter (Enter (Enter (Enter (Enter (Enter (C Enter (C Enter (Enter (En)	ype pross Area gross Area Gross Area Gross Area 57.42 149.00 28.26 Deening 7.76 0.00 0.00 1.00



Internal Ceiling 2	+	1		Plasterboard ceiling, ca	rpeted chip	board floor					49.38
	Туре	Storey Index		Construction		U-Va (W/m	² Κ)	Shelter Code		ctor (kJ/i	
Heatloss Floor 1	Ground Floor - Solic	d Lowest occup	bied	Slab on ground, screed over ir	sulation	0.1	2	None	0	.00 110	.00 91.96
11.2 Internal Floors Description		Storey Index	Cor	struction						Kappa (kJ/m²k	Area (m ²
Internal Floor 1 Internal Floor 2		macx		terboard ceiling, carpeted terboard ceiling, carpeted						9.00 9.00	49.38 78.00
2.0 Opening Types Description	Data Source	Туре		Glazing		Glazing	Filling	G-value	Frame	Frame	
Windows Door	Manufacturer Manufacturer	Window Solid Doo	r	Triple Low-E Soft 0	.05	Gap	Туре	0.57	Туре	Factor 0.70	(W/m²K 1.00 1.00
Roof light Roof window	Manufacturer Manufacturer	Roof Light Roof Wind		Triple Low-E Soft 0 Triple Low-E Soft 0				0.57 0.57		0.70 0.70	1.00 1.00
13.0 Openings											
Name Front door	Opening Ty Door	pe		Location Walls		Orient We		Area 2.1		F	litch
Front elevation	Windows			Walls		We		16.2	24		
Front dormer	Windows			Dormer		We		9.2			
Rear elevation Side elevation	Windows Windows			Walls Walls		Ea Sou		4.0 1.1			
Side elevation	Windows			Walls		No	rth	1.1	8		
RL Rear RL	Roof light Roof windov	v		Pitch GF Flat		Ea Horiz		1.0 7.7			30 0
14.0 Conservatory				None							
15.0 Draught Proofing				100				%			
16.0 Draught Lobby				No							
17.0 Thermal Bridging				Calculate Bridges							
7.1 List of Bridges			~	-		. .					
Bridge Type E2 Other lintels (including	n other steel linte	ale)		rce Type Approved Scheme	Length 17.59	Psi 0.04	Adjuste 0.04	d Reference	:		Importe Yes
E3 Sill		510)		Approved Scheme	16.68	0.03	0.03				Yes
E4 Jamb E5 Ground floor (normal)				Approved Scheme Approved Scheme	54.47 40.40	0.04 0.10	0.04 0.10				Yes Yes
E6 Intermediate floor with				Approved Scheme	64.00	0.00	0.00				No
E16 Corner (normal)	0		Gov	Approved Scheme	26.00	0.05	0.05				No
R1 Head of roof window R2 Sill of roof window				e K1 - Default e K1 - Default	1.22 1.22	0.24 0.24	0.24 0.24				Yes Yes
R3 Jamb of roof window				e K1 - Default	12.77	0.24	0.24				Yes
R11 Upstands or kerbs of	f rooflights			e K1 - Default	4.00	0.24	0.24				Yes
E14 Flat roof E13 Gable (insulation at r	rafter level)			e K1 - Default Approved Scheme	33.00 10.40	0.16 0.05	0.16 0.05				No No
E12 Gable (insulation at a				Approved Scheme	6.80	0.05	0.05				No
R9 Roof to wall (flat ceilin	ig)			e K1 - Default	4.70	0.32	0.32				No
R7 Flat ceiling (inverted) R6 Flat ceiling				e K1 - Default e K1 - Default	4.70 15.00	0.12 0.12	0.12 0.12				No No
Y-value				0.05				W/m²K			
8.0 Pressure Testing				Yes							
Designed AP ₅₀				3.00					n²) @ 50 F	a	
Test Method				Blower Door					, e	-	
19.0 Mechanical Ventilation	1										
Mechanical Ventilation	ion Quatara D	aant		Vac							
Mechanical Ventilat		sent		Yes				_			
Approved Installatio				Yes				_			
Mechanical Ventilat	ion data Type			Database		heat react	(on)				
Type MV Reference Num	ber			Balanced mechanical ver 500167	iulauOH WI[]	neat ieco\	ery	=			
								=			
Configuration				5							
Configuration Manufacturer SFP				5 0.86				=			
U U											



			_	
Wet Rooms	5			
SFP from Installer Commissioning Certificate	No			
MVHR System Location	Inside heated envelope (installed exe	clusively)		
Duct Installation Specification	Level 1			
20.0 Fans, Open Fireplaces, Flues				
21.0 Fixed Cooling System	No]	
22.0 Lighting				
No Fixed Lighting	No			
	NameEfficacyLighting 181.00	Power 10	Capacity 810	Count 22
4.0 Main Heating 1	Database]	
Description	boiler]	
Percentage of Heat	100.00		%	
Database Ref. No.	17919]	
Fuel Type	Mains gas]	
In Winter	88.50		Ī	
In Summer	86.60		Ī	
Model Name	NCB-28LDWE		Ę	
Manufacturer	KD Navien		Ę	
System Type	Combi boiler		Ξ́	
Controls SAP Code	2110		Ξ́	
Delayed Start Stat	Yes		Ξ́	
Flue Type	Balanced		Ę	
Fan Assisted Flue	Yes		Ę	
Is MHS Pumped	Pump in heated space		Ξ́	
Heating Pump Age	2013 or later		Ξ́	
Heat Emitter	Radiators		Ξ́	
Flow Temperature	Enter value		ī	
Flow Temperature Value	35.00		Ξ́	
Boiler Interlock	No		ī	
Combi boiler type	Standard Combi		i i i i i i i i i i i i i i i i i i i	
Combi keep hot type	None		Ę	
25.0 Main Heating 2	None		<u>-</u>	
26.0 Heat Networks	None			
28.0 Water Heating			-	
Water Heating	Main Heating 1			
SAP Code	901			
Flue Gas Heat Recovery System	No			
Waste Water Heat Recovery Instantaneous System 1	No			
Waste Water Heat Recovery Instantaneous System 2	No			
Waste Water Heat Recovery Storage System	No			
Solar Panel	No		_	
Water use <= 125 litres/person/day	Yes			
Cold Water Source	From header tank			
Bath Count	1			
28.3 Waste Water Heat Recovery System				
29.0 Hot Water Cylinder	None]	



In Airing Cup	board			No							
34.0 Small-scale	e Hydro			None							
Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Recommendation Lower cost in None Further mea	measures	lieve even hi	gher standa	ards							
				Typical Cost	т	ypical savings	s per year	R SAP ra		improvement Environme	
				£3,500 - £5,500)	£180		B 8 B 90 0	, •	B S B S C	91 91



Property Reference	Green	ncroft Gardens						lssı	ied on D	ate	04/05/20	23
Assessment Reference	Propo	sed			Pro	ор Туре	Ref					
Property	Greer	ncroft Gardens										
SAP Rating			92 A	DER		1.6	3		TER		9.51	
Environmental			98 A	% DER	< TER						82.33	
CO ₂ Emissions (t/year)			0.31	DFEE		39.	38		TFEE		44.40	
Compliance Check			See BREL	% DFEI	E < TFB	E					10.18	
% DPER < TPER			66.77	DPER		16.	61		TPER		49.99	
Assessor Details	Mr. Nichola	as Bowen							Asses	sor ID	D719-	0001
Client	Green Tige	er, Ross Standalof	t									
SUMMARY FOR INPL												
Orientation			West									_
Property Tenture			1									
Transaction Type			6									
Terrain Type			Suburban									
1.0 Property Type			House, Detached									
2.0 Number of Storeys			3									
3.0 Date Built			2023									
4.0 Sheltered Sides												
5.0 Sunlight/Shade			Average or unknow	3								
5.0 Thermal Mass Parame	otor		Precise calculation									
7.0 Electricity Tariff			Standard									
Smart electricity meter	fitted		No									
Smart gas meter fitted			No									
7.0 Measurements				Host		Perimete	r In	ornal	loor Are	- A	verage St	orov Hoir
			Ground floo 1st Store	or:	40.40 36.40	m	, 110	91.9	96 m² 90 m²	a r	2.90 2.80) m Š
			2nd Store	ey:	28.19	m		49.3	88 m²		2.4	3 m
8.0 Living Area			82.50						m²			
9.0 External Walls												
Description	Type						Nett	Shelter	Shel	ter	Openings Ar	ea Calcula
Walls	Туре	Construction			(kJ/m ² K)) Area(m ²) Area (m²)	Res				Туре
Demo	Cavity Wall	Cavity wall : plastert filled cavity, any outs		(W/m²K) 0.15	(kJ/m²K) 60.00) Area(m ² 267.13) Area (m²) 242.26	Res 0.00	Nor			nter Gross A
Dormer		Cavity wall : plastert filled cavity, any outs		(W/m²K)	(kJ/m ² K)) Area(m ²) Area (m²)	Res	Nor			
Dormer 9.2 Internal Walls Description	Cavity Wall	Cavity wall : plastert filled cavity, any outs	side structure (one layer of plasterboard)	(W/m²K) 0.15	(kJ/m²K) 60.00) Area(m ² 267.13) Area (m²) 242.26	Res 0.00				nter Gross A
9.2 Internal Walls Description	Cavity Wall	Cavity wall : plasterf filled cavity, any outs Timber framed wall Construct	side structure (one layer of plasterboard) tion	(W/m²K) 0.15	(kJ/m²K) 60.00) Area(m ² 267.13) Area (m²) 242.26	Res 0.00			9.20 Er Kappa (kJ/m²K	nter Gross A nter Gross A Area (1
9.2 Internal Walls Description GF FF	Cavity Wall	Cavity wall : plastert filled cavity, any out Timber framed wall Construct Plasterboa Plasterboa	side structure (one layer of plasterboard) tion ard on timber frame ard on timber frame	(W/m²K) 0.15	(kJ/m²K) 60.00) Area(m ² 267.13) Area (m²) 242.26	Res 0.00			9.20 Er Kappa (kJ/m²K 9.00 9.00	nter Gross A nter Gross A Area (1) 57.4 149.0
9.2 Internal Walls Description GF FF SF	Cavity Wall	Cavity wall : plastert filled cavity, any out Timber framed wall Construct Plasterboa Plasterboa	side structure (one layer of plasterboard) tion ard on timber frame	(W/m²K) 0.15	(kJ/m²K) 60.00) Area(m ² 267.13) Area (m²) 242.26	Res 0.00			9.20 Er Kappa (kJ/m²K 9.00	Area (n 57.4
9.2 Internal Walls Description GF FF SF 10.0 External Roofs	Cavity Wall Timber Frame	Cavity wall : plastert filled cavity, any out Timber framed wall Construct Plasterboa Plasterboa Plasterboa	ide structure (one layer of plasterboard) tion ard on timber frame ard on timber frame ard on timber frame	(W/m²K) 0.15 0.15	(kJ/m²K) 60.00 9.00) Area(m ² 267.13 15.07) Area (m²) 242.26 5.87	Res 0.00 0.00	Nor	ie	9.20 Er Kappa (kJ/m²K 9.00 9.00 9.00	Area (n 57.4: 149.0 28.2
9.2 Internal Walls Description GF FF SF	Cavity Wall	Cavity wall : plastert filled cavity, any out Timber framed wall Construct Plasterboa Plasterboa	ide structure (one layer of plasterboard) tion ard on timber frame ard on timber frame ard on timber frame	(W/m²K) 0.15 0.15	(kJ/m²K) 60.00 9.00 /alue ł) Area(m ² 267.13 15.07) Area (m²) 242.26 5.87	Res 0.00 0.00 Nett Area	Nor	Shelte	9.20 Er Kappa (kJ/m²K 9.00 9.00 9.00	Area (n 57.4: 149.0 28.2
9.2 Internal Walls Description GF FF SF 10.0 External Roofs	Cavity Wall Timber Frame Type External Flat	Cavity wall : plastert filled cavity, any out Timber framed wall Construct Plasterboa Plasterboa Plasterboa	ide structure (one layer of plasterboard) tion ard on timber frame ard on timber frame ard on timber frame	(W/m²K) 0.15 0.15 U-V (W/	(kJ/m²K) 60.00 9.00 /alue ł) Area(m ² 267.13 15.07) Area (m²) 242.26 5.87 Gross	Res 0.00 0.00	Nor	e Shelte Facto	9.20 Er Kappa (kJ/m ² K 9.00 9.00 9.00 9.00 9.00 er Calculati r Type Enter Gro	Arter Gross A hter Gross A Area (1) 57.4. 149.0 28.2 onOpeni
9.2 Internal Walls Description GF FF SF 10.0 External Roofs Description	Cavity Wall Timber Frame Type External Flat Roof External Flat	Cavity wall : plasterf filled cavity, any out Timber framed wall Construct Plasterboa Plasterboa Construction t Plasterboard,	ide structure (one layer of plasterboard) tion ard on timber frame ard on timber frame ard on timber frame	(W/m²K) 0.15 0.15 U-\ (W/ 0	(kJ/m²K) 60.00 9.00 /alue ł /m²K)(k) Area(m² 267.13 15.07 Kappa kJ/m²K)/	Area (m²) 242.26 5.87 Gross Area(m²)	Res 0.00 0.00 Nett Area (m²)	Nor Shelter Code	e Shelte Facto	9.20 Er Kappa (kJ/m²K 9.00 9.00 9.00 Pr Calculati r Type Enter Gro Area Enter Gro	Area (II) 57.4: 149.0 28.2: 0000peni
9.2 Internal Walls Description GF FF SF 10.0 External Roofs Description GF Flat	Cavity Wall Timber Frame Type External Flat Roof	Cavity wall : plastert filled cavity, any out Timber framed wall Construct Plasterboa Plasterboa Construction t Plasterboard, t Plasterboard,	tion ard on timber frame ard on timber frame ard on timber frame ard on timber frame	(W/m²K) 0.15 0.15 U-V (W/ 0 0	(kJ/m²K) 60.00 9.00 ✓alue ł /m²K)(k 0.10) Area(m² 267.13 15.07 Kappa (J/m²K) <i>J</i> 9.00	Area (m²) 242.26 5.87 Gross Area(m²) 9.00	Res 0.00 0.00 Nett Area (m²) 7.76	Nor Shelter Code None	Shelte Facto 0.00	9.20 En Kappa (kJ/m²K 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.0	Area (II) 57.4. 57.4. 149.0 28.21 onOpeni onSs 7.7(oss 0.00
9.2 Internal Walls Description GF FF SF 10.0 External Roofs Description GF Flat FF Flat SF Flat	Cavity Wall Timber Frame Type External Flat Roof External Flat Roof External Flat Roof	Cavity wall : plastert filled cavity, any out Timber framed wall Construct Plasterboa Plasterboa Construction t Plasterboard, t Plasterboard, t Plasterboard,	tion ard on timber frame ard on timber frame ard on timber frame ard on timber frame insulated flat roof insulated flat roof	(W/m²K) 0.15 0.15 U-\ (W/ 0 0 0	(k, //m²k) 60.00 9.00 //alue k /m²K)(k 0.10 0.10	 Area(m² 267.13 15.07 Kappa J/m²K), 9.00 9.00 9.00 	Area (m²) 242.26 5.87 Gross Area(m²) 9.00 26.50 25.50	Res 0.00 0.00 Nett Area (m²) 7.76 0.00 0.00	Shelter Code None None	Shelte Facto 0.00 0.00 0.00	9.20 Er Kappa (kJ/m²K 9.00 9.00 9.00 9.00 Pr Calculati r Type Enter Gro Area Enter Gro Area Enter Gro Area	Area (r) 57.4; 149.0 28.20 onOpeni oss 7.70 oss 7.00 oss 0.00
9.2 Internal Walls Description GF FF SF 10.0 External Roofs Description GF Flat FF Flat	Cavity Wall Timber Frame Type External Flat Roof External Flat Roof External Flat	Cavity wall : plastert filled cavity, any out Timber framed wall Plasterboa Plasterboa Plasterboard, t Plasterboard, t Plasterboard, pe Plasterboard,	ide structure (one layer of plasterboard) tion ard on timber frame ard on timber frame ard on timber frame insulated flat roof insulated flat roof	(W/m²K) 0.15 0.15 U-\ (W/ 0 0 0 0 0 0 0	(kJ/m²K) 60.00 9.00 ✓alue ł /m²K)(k 0.10) Area(m² 267.13 15.07 Kappa (J/m²K)/ 9.00 9.00	Area (m²) 242.26 5.87 Gross Area(m²) 9.00 26.50	Res 0.00 0.00 Nett Area (m ²) 7.76 0.00	Nor Shelter Code None None	Shelte Facto 0.00 0.00 0.00	9.20 Er Kappa (kJ/m²K 9.00 9.00 9.00 Pr Calculati r Type Enter Gro Area Enter Gro Area Enter Gro Area Enter Gro Area	Area (II) 57.4 149.0 28.2 onOpeni oss 7.7(oss 0.00 oss 0.00 oss 0.00
9.2 Internal Walls Description GF FF SF 10.0 External Roofs Description GF Flat FF Flat SF Flat Pitch	Cavity Wall Timber Frame Type External Flat Roof External Flat Roof External Flat Roof External Slo Roof External Slo Roof External Flat	Cavity wall : plastert filled cavity, any out Timber framed wall Plasterboa Plasterboa Plasterboard, t Plasterboard, t Plasterboard, pe Plasterboard,	tion ard on timber frame ard on timber frame ard on timber frame ard on timber frame insulated flat roof insulated flat roof insulated flat roof insulated flat roof insulated slope	(W/m²K) 0.15 0.15 U-\ (W/ 0 0 0 0 0 0 0	/alue / 9.00 /alue / /m²K)(k 0.10 0.10 0.10	(xappa (xJ/m ² K)/ 9.00 9.00 9.00 9.00	Area (m²) 242.26 5.87 Gross Area(m²) 9.00 26.50 25.50 39.00	Res 0.00 0.00 Nett Area (m²) 7.76 0.00 0.00 1.00	Nor Shelter Code None None None	Shelte Facto 0.00 0.00 0.00 0.00	9.20 Er Kappa (kJ/m²K 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00 9.00	Area (II) 57.4 149.0 28.2 onOpeni oss 7.7(oss 0.00 oss 0.00 oss 0.00



Internal Ceiling 2	+	1		Plasterboard ceiling, ca	rpeted chip	board floor					49.38
	Туре	Storey Index		Construction		U-Va (W/m	² Κ)	Shelter Code		ctor (kJ/i	
Heatloss Floor 1	Ground Floor - Solic	d Lowest occup	bied	Slab on ground, screed over ir	sulation	0.1	2	None	0	.00 110	.00 91.96
11.2 Internal Floors Description		Storey Index	Cor	struction						Kappa (kJ/m²k	Area (m ²
Internal Floor 1 Internal Floor 2		macx		terboard ceiling, carpeted terboard ceiling, carpeted						9.00 9.00	49.38 78.00
2.0 Opening Types Description	Data Source	Туре		Glazing		Glazing	Filling	G-value	Frame	Frame	
Windows Door	Manufacturer Manufacturer	Window Solid Doo	r	Triple Low-E Soft 0	.05	Gap	Туре	0.57	Туре	Factor 0.70	(W/m²K 1.00 1.00
Roof light Roof window	Manufacturer Manufacturer	Roof Light Roof Wind		Triple Low-E Soft 0 Triple Low-E Soft 0				0.57 0.57		0.70 0.70	1.00 1.00
13.0 Openings											
Name Front door	Opening Ty Door	pe		Location Walls		Orient We		Area 2.1		F	litch
Front elevation	Windows			Walls		We		16.2	24		
Front dormer	Windows			Dormer		We		9.2			
Rear elevation Side elevation	Windows Windows			Walls Walls		Ea Sou		4.0 1.1			
Side elevation	Windows			Walls		No	rth	1.1	8		
RL Rear RL	Roof light Roof windov	v		Pitch GF Flat		Ea Horiz		1.0 7.7			30 0
14.0 Conservatory				None							
15.0 Draught Proofing				100				%			
16.0 Draught Lobby				No							
17.0 Thermal Bridging				Calculate Bridges							
7.1 List of Bridges			~	-		. .					
Bridge Type E2 Other lintels (including	n other steel linte	ale)		rce Type Approved Scheme	Length 17.59	Psi 0.04	Adjuste 0.04	d Reference	:		Importe Yes
E3 Sill		510)		Approved Scheme	16.68	0.03	0.03				Yes
E4 Jamb E5 Ground floor (normal)				Approved Scheme Approved Scheme	54.47 40.40	0.04 0.10	0.04 0.10				Yes Yes
E6 Intermediate floor with				Approved Scheme	64.00	0.00	0.00				No
E16 Corner (normal)	0		Gov	Approved Scheme	26.00	0.05	0.05				No
R1 Head of roof window R2 Sill of roof window				e K1 - Default e K1 - Default	1.22 1.22	0.24 0.24	0.24 0.24				Yes Yes
R3 Jamb of roof window				e K1 - Default	12.77	0.24	0.24				Yes
R11 Upstands or kerbs of	f rooflights			e K1 - Default	4.00	0.24	0.24				Yes
E14 Flat roof E13 Gable (insulation at r	rafter level)			e K1 - Default Approved Scheme	33.00 10.40	0.16 0.05	0.16 0.05				No No
E12 Gable (insulation at a				Approved Scheme	6.80	0.05	0.05				No
R9 Roof to wall (flat ceilin	ig)			e K1 - Default	4.70	0.32	0.32				No
R7 Flat ceiling (inverted) R6 Flat ceiling				e K1 - Default e K1 - Default	4.70 15.00	0.12 0.12	0.12 0.12				No No
Y-value				0.05				W/m²K			
8.0 Pressure Testing				Yes							
Designed AP ₅₀				3.00					n²) @ 50 F	a	
Test Method				Blower Door					, e	-	
19.0 Mechanical Ventilation	1										
Mechanical Ventilation	ion Quatara D	aant		Vac							
Mechanical Ventilat		sent		Yes				_			
Approved Installatio				Yes				_			
Mechanical Ventilat	ion data Type			Database		heat react	(on)				
Type MV Reference Num	ber			Balanced mechanical ver 500167	iulauOH WI[]	neat ieco\	ery	=			
								=			
Configuration				5							
Configuration Manufacturer SFP				5 0.86				=			
U U											



Wet Rooms	5			1	
SFP from Installer Commissioning Certificate	No			j	
MVHR System Location	Inside heated en	velope (installed excl	usively)	j	
Duct Installation Specification	Level 1			j	
20.0 Fans, Open Fireplaces, Flues				-	
	Nia			1	
21.0 Fixed Cooling System	No				
22.0 Lighting	No			1	
No Fixed Lighting	Name Lighting 1	Efficacy 81.00	Power 10	Capacity 810	Count 22
4.0 Main Heating 1	Database]	
Description	boiler]	
Percentage of Heat	100.00			%	
Database Ref. No.	100063]	
Fuel Type	Electricity]	
In Winter	0.00]	
In Summer	0.00]	
Model Name	ECODAN 8.5kW	,]	
Manufacturer	Mitsubishi Electr	ic Europe B.V.]	
System Type	Heat Pump]	
Controls SAP Code	2207]	
Is MHS Pumped	Pump in heated	space]	
Heating Pump Age	2013 or later]	
Heat Emitter	Radiators]	
Flow Temperature	Enter value]	
Flow Temperature Value	35.00]	
25.0 Main Heating 2	None]	
26.0 Heat Networks	None]	
28.0 Water Heating					
Water Heating	Main Heating 1]	
SAP Code	901]	
Flue Gas Heat Recovery System	No]	
Waste Water Heat Recovery Instantaneous System 1	No]	
Waste Water Heat Recovery Instantaneous System 2	No]	
Waste Water Heat Recovery Storage System	No]	
Solar Panel	No]	
Water use <= 125 litres/person/day	Yes]	
Cold Water Source	From header tan	k]	
Bath Count	1]	
Immersion Only Heating Hot Water	No]	

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	Yes	
Cylinder In Heated Space	Yes	
Independent Time Control	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	



Lowe	er cost m None	neasures	eve even higher	standards							ftor improvom	
Recomm	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oc	t Nov	Dec
34.0 Sma		-			None							
	4.00		Horizontal	Horizonta	l Nor	e Or Little		No	1.00			
	PV Cell	s kWp	Orientation	Elevation	ove	ershading	FGHRS	MCS Certificat	e Overs Facto	shading r	MCS Certificate Reference	Panel Manufacturer
Batte	ry Capac	ty [kWh]			6.00							
Diver	ter				No							
Conn	ected To	Dwelling			Yes							
Expo	rt Capab	le Meter?			No							
32.0 Pho	otovoltaio	c Unit			One Dw	elling						
31.0 The	rmal Sto	ere			None							
In Air	ing Cupb	oard			No							
Pipes	s insulatio	on			Fully ins	ulated prin	nary pipewor	k				
Loss					1.90					kWh/da	ау	

Tuniaal Coot	Tuninal actions new year	Ratings after improvement				
Typical Cost	Typical savings per year	SAP rating	Environmental Impact			
£4,000 - £6,000	£79	A 93	A 98			
		0	0			
		0	0			