

**LOVE
DESIGN
STUDIO/O**



June 2023

**Land to the Rear of 51-53
Greenfield Avenue
Energy and Sustainability Statement**

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Section Zero

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**Executive
Summary**

Executive Summary

An assessment of the site’s sustainability and energy credentials has been carried out for the proposed development at the land to the rear of 51-53 Greenfield Avenue, Watford, WD19 5DJ. The proposed residential development involves the demolition of the existing garage on site to facilitate the erection of two semi-detached bungalows. The site is located within the jurisdiction of Three Rivers District Council.

The proposed scheme has incorporated energy efficiency measures through a well-insulated building fabric shell. Additionally, the energy strategy will make use of high efficiency air source heat pumps for space heating and domestic hot water.

The proposed scheme currently provides an on-site **regulated CO₂ reduction of 48%** against a notional dwelling compliant with Part L (2021).

The scheme will continue to integrate the core sustainability principles within its design, including sustainable construction, transport, waste, health, and wellbeing.

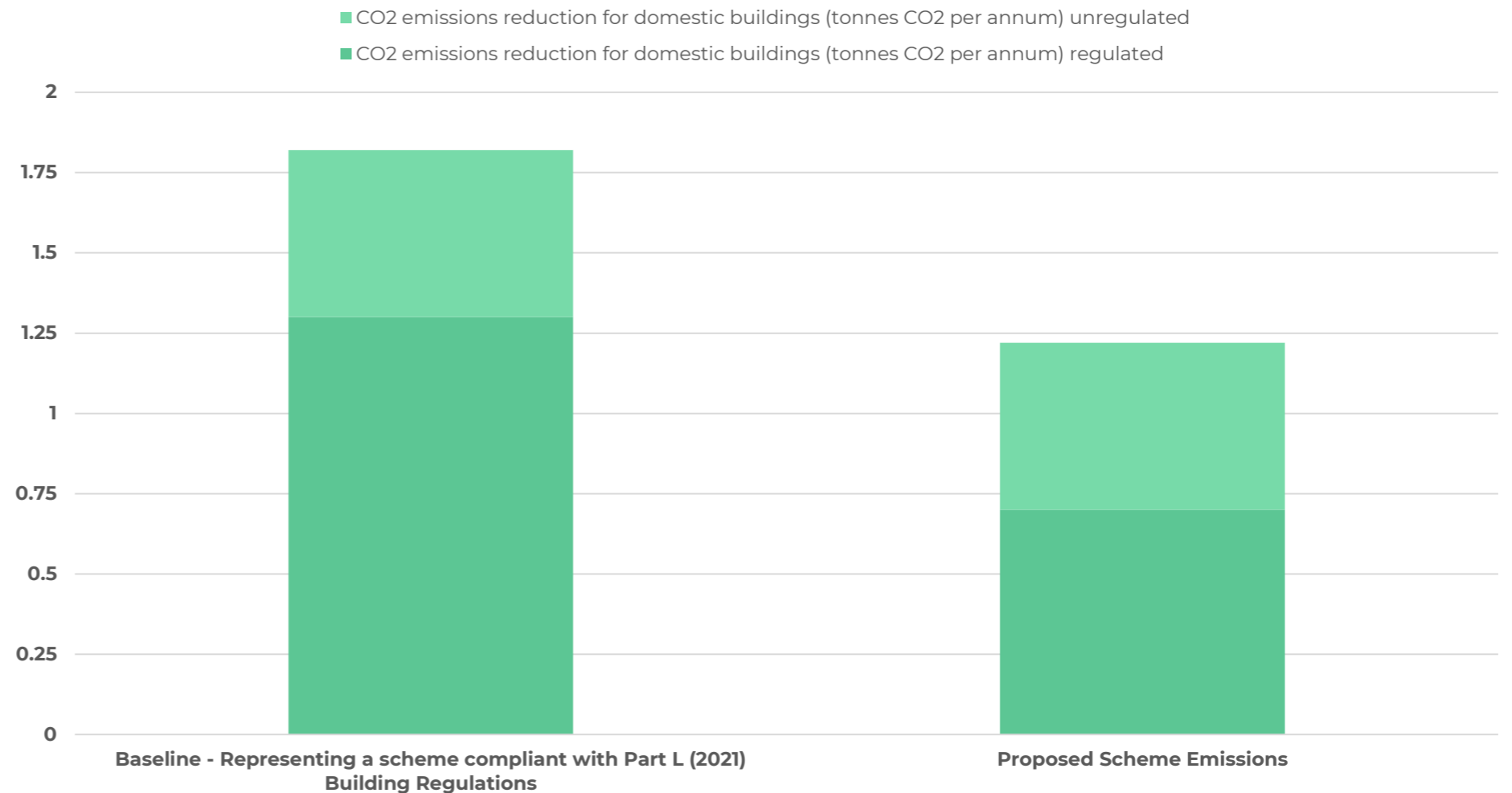


Figure 1: Total regulated carbon dioxide savings achieved through an energy efficient design and low carbon energy strategy.

Table 1: Total carbon dioxide site-wide savings

	Regulated residential carbon dioxide emissions	
	(Tonnes CO ₂ per annum)	(%) reduction from baseline
Baseline - Representing a scheme compliant with Part L (2021) Building Regulations	1.3	-
Proposed Scheme Emissions	0.7	48%

Section One

1

Introduction

Site Overview

An assessment of the site's energy and sustainability credentials has been carried out for the proposed development at the land to the rear of 51-53 Greenfield Avenue, Watford, WD19 5DJ. The proposed development involves the demolition of the existing garage on site to facilitate the erection of two semi-detached bungalows.

The site is located within the jurisdiction of Three Rivers District Council.

The purpose of this statement is to highlight the sustainability credentials of the scheme and demonstrate the energy strategy and carbon reductions that will be achieved through the proposed development.



Figure 2: Aerial view of the proposed site (red).

National Planning Policy

National Planning Policy Framework (2021)

The National Planning Policy Framework sets out the Government's planning policies for England and how these should be applied. It provides a framework within which locally prepared plans for housing and other development can be produced.

Planning law requires that applications for planning permission be determined in accordance with the development plan unless material considerations indicate otherwise. The National Planning Policy Framework must be considered in preparing the development plan and is a material consideration in planning decisions. Planning policies and decisions must also reflect relevant international obligations and statutory requirements.

The purpose of the planning system is to contribute to the achievement of sustainable development. In summary the framework advises:

“Plans should take a proactive approach to mitigating and adapting to climate change, considering the long-term implications for flood risk, coastal change, water supply, biodiversity and landscapes, and the risk of overheating from rising temperatures. Policies should support appropriate measures to ensure the future resilience of communities and infrastructure to climate change impacts, such as providing space for physical protection measures, or making provision for the possible future relocation of vulnerable development and infrastructure.

New development should be planned for in ways that:

- *Avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure; and*

Can help to reduce greenhouse gas emissions, such as through its location, orientation, and design. Any local requirements for the sustainability of buildings should reflect the government's policy for national technical standards.

To help increase the use and supply of renewable and low carbon energy and heat, plans should:

- *Provide a positive strategy for energy from these sources, that maximises the potential for suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts);*
- *Consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and*

Identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers.

Local Planning Policy

Core Strategy (2011)

The Three Rivers Core Strategy includes a variety of overarching spatial policies to guide development and land use in the area over a 15-year period.

Policy extracts that are deemed relevant to energy have been set out below for reference:

POLICY ENV13 'Achieving High Levels of Environmental Performance'

All developments must:

- *"Tackle climate change by reducing carbon emissions, increasing energy and water efficiency of buildings, promoting the use of renewable energy systems, and using other natural resources wisely, including through the use of sustainable building materials"*
- *"...submit a 'CPLAN Energy and Sustainability Statement' demonstrating the extent to which sustainability principles have been incorporated into the location, design, construction and future use of proposals, and the expected carbon emissions."*
- *"...demonstrate that their development will produce at least 25% less carbon dioxide emissions than Building Regulations Part L (2006) requirements with a minimum of 10% being provided by on-site renewable and/or low carbon (i.e., Combined Heat and Power) energy supply systems."*

"In line with Government policy, where it can be proven that on-site renewable technology is not feasible, the Council will consider connection to a local, decentralised, renewable or low carbon energy supply as a substitute for on-site renewable energy technology."

Policy extracts that are deemed relevant to sustainability have been set out below for reference:

- *POLICY CP9 'Green Infrastructure'*
- *POLICY CP12 'Design of Development'*

Development Management Policies (2013)

The Development Management Policies document sets out the policies against which planning applications will be assessed within the Three Rivers District.

Policy extracts that are deemed relevant to energy have been set out below for reference:

POLICY DM4 'Carbon Dioxide Emissions and Renewable Energy'

"From 2013, applicants will be required to demonstrate that development will produce 5% less carbon dioxide emissions than Building Regulations Part L requirements (2013) having regard to feasibility and viability. This may be achieved through a combination of energy efficiency measures, incorporation of on-site low carbon and renewable technologies, connection to a local, decentralized, renewable or low carbon energy supply."

Policy extracts that are deemed relevant to sustainability have been set out below for reference:

- *POLICY DM8 'Flood Risk and Water Resources'*
- *POLICY DM9 'Contamination and Pollution'*
- *POLICY DM10 'Waste Management'*

Section Two

2

Energy

Methodology and Assumptions

To demonstrate the carbon dioxide emissions associated with the proposed development, the following assumptions, definitions, and methodology have been applied:

- SAP software has been used to calculate the carbon dioxide emissions for the scheme using SAP 10.2 Carbon Factors
- The latest version of SAP 10 software version has been used following recent updates
- Building fabric will be selected based on the U-values provided by the manufacturer to achieve a high level of building efficiency.
- Renewable technology, for the purpose of the report, includes for the provision of low carbon technologies, including heat-pump technology and PV solar panels.
- Drawings used to model the scheme are based on the drawing set received 22nd June 2023 from Warner Planning.

Updates to SAP software

On the 15th June 2022, Part L (2013) Building Regulations were replaced by Part L (2021). The aim of this update is to improve the energy efficiency of new buildings. Some of the changes are listed below:

- 31% lower CO₂ emissions required under part L (2021) in comparison to its 2013 counterpart for new build developments
- Air tightness testing now mandatory
- Improvements to thermal bridging and building fabric targets

There are several other differences that are included in the update, which means that the software used to validate the scheme's emissions and energy performance also required updating. Under Part L 2013, SAP 2012 was the default software used; however, to accommodate changes this has now been updated to SAP 10.2.

Therefore, in line with industry progression, SAP 10.2 has been utilised throughout.

Energy Efficiency Measures

Passive Design Measures Summary

Table 2 sets out the inputs used for the SAP calculations to generate carbon emission reduction findings.

In summary, the scheme will benefit from:

- An orientation that suits daylight and sunlight access.
- Being airtight, reducing draughts and heat loss.
- A well-insulated building fabric shell.
- 100% efficient lighting.

The Dwelling Fabric Energy Efficiency (DFEE) provides an improvement upon building regulations Part L (2021) standards (see Table 3).

Overall, the scheme meets a combined on-site reduction of **4% against the TFEE** (Part L 2021 Baseline).

These improvements against Building Regulation targets demonstrate that the proposed scheme has utilised energy efficiency measures to reduce energy demand.

Table 2: SAP Model inputs

Proposed Technical Information			
Building Fabric	Input	Unit	Comment
External Wall U-value	0.14	W/m ² K	Include unheated areas
Roof U-value	0.11	W/m ² K	-
Ground Floor U-value	0.11	W/m ² K	-
Windows U-value	1.2	W/m ² K	-
Door U-value	1.0	W/m ² K	-
Other Technical Information	Input	Unit	Comment
Windows g-value	0.63	-	-
Frame-Factor	0.7	-	-
Thermal Mass Parameter	Medium (250 kJ/m ² K)		Default value
Thermal Bridge Y-value	0.05	-	Thermal Bridging calculations to be carried out Post-Planning.
Ventilation Method	Titon CME2 Q Plus		Mechanical Extract Ventilation
System Assumptions			All wet rooms and kitchens
Air permeability	3.0 @50Pa (m ³ /(h.m ²))		-

Table 3: Area-weighted Fabric Energy Efficiency ratings for the scheme

	TFEE (kWh/m ² /yr)	DFEE (kWh/m ² /yr)
Development total	40.72	38.97

Low Carbon Energy Strategy

Proposed Energy Strategy

Energy assessments should explain how the opportunities for producing, storing, and using low-carbon energy on-site will be maximised.

It was decided that for the purposes of this application, an individual Air Source Heat Pump to each unit was the most feasible and applicable low-carbon energy strategy for the scheme. This all-electric option also assists in maximising the scheme's CO₂ reduction.

The details of the ASHPs will be provided at the detailed design stage; therefore, conservative efficiencies have been used for the purpose of this report based on default SAP figures for residential uses.

It is currently proposed that each of the condenser units are to be discreetly located within 15 metres of the internal unit.

Table 4: Summary of Be Green measures included

Technical Information		
Low Carbon Energy Strategy		
Space Heating System	Individual ASHPs	175.1% default efficiency, MCS certified
Heating Emitter	Underfloor	-
Domestic Hot Water System	Same as space heating	-
Storage	Yes	~180 litres, 100mm foam insulation
Space Cooling System	No	-
Low/Zero Carbon Technologies used	ASHPs	175.1% default efficiency, MCS certified

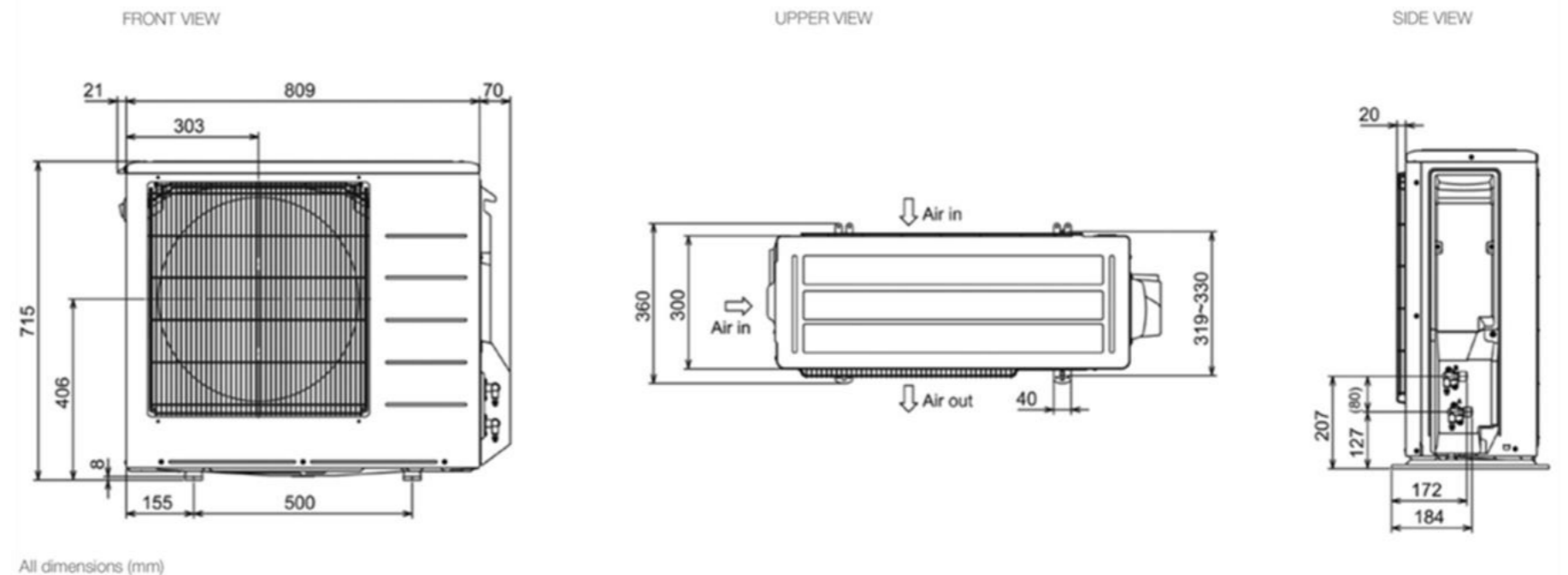


Figure 3: ©Mitsubishi QUHZ-W40VA example dimensions

Carbon Emission Results Summary

The proposed scheme has minimised regulated energy demand through an energy efficient fabric. A low carbon energy strategy has been opted for, with an efficient heat pump system to provide space heating and domestic hot water.

This combination of energy efficiency measures and a low carbon energy strategy provides an on-site **regulated CO2 reduction of 48%** against a notional dwelling compliant with Part L (2021).

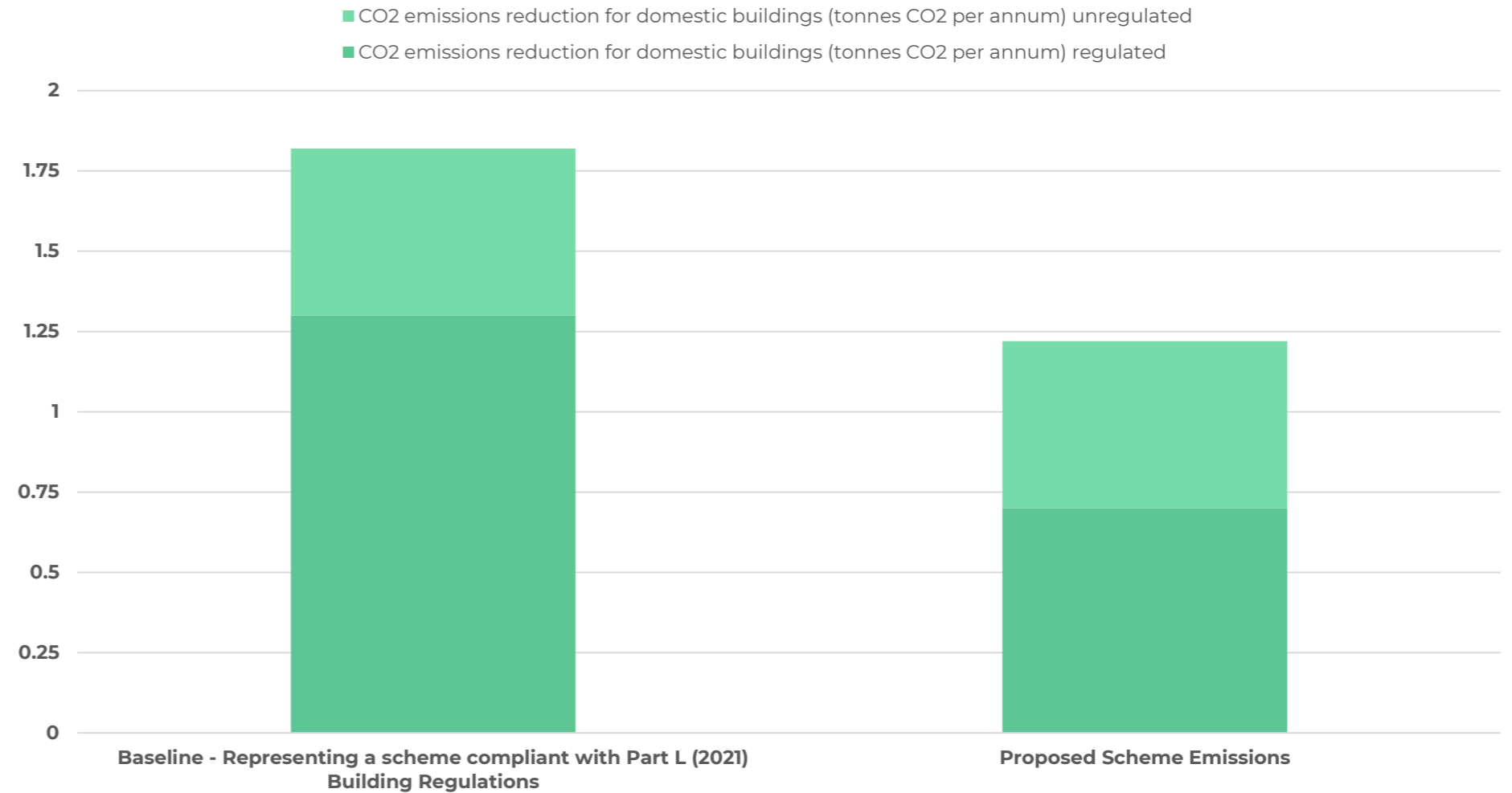


Figure 4: Total regulated carbon dioxide savings achieved through an energy efficient design and low carbon energy strategy.

Table 5: Total carbon dioxide site-wide savings.

	Regulated residential carbon dioxide emissions	
	(Tonnes CO ₂ per annum)	(%) reduction from baseline
Baseline - Representing a scheme compliant with Part L (2021) Building Regulations	1.3	-
Proposed Scheme Emissions	0.7	48%

Table 6: Area-weighted Fabric Energy Efficiency ratings for the scheme

	TFEE (kWh/m ² /yr)	DFEE (kWh/m ² /yr)
Development total	40.72	38.97

Section Three

3

Sustainability

Sustainability and Climate Change Appraisal

To meet the Local Authority's sustainability requirements, we have set out the sustainability credentials of the scheme in similar format to that of the, now defunct, Code for Sustainable Homes.

In a statement made on 25 March 2015, the Secretary of State for Communities and Local Government, Eric Pickles, confirmed that from 27 March 2015, changes to the 2008 Climate Change Act would mean local authorities in England could no longer require code level 3, 4, 5 or 6 as part of the conditions imposed on planning permissions. Applicants should work towards to the relevant Building Regulations standard; however, energy requirements for dwellings in the UK are now typically set by the Building Regulations equivalent to code level 4.

For the purpose of this assessment, we have used the categories from the Code as a method for assessing and demonstrating the scheme's sustainability credentials.



Energy Display Devices

The scheme will be provided with the ability to display energy consumption data and record energy use; this is to promote the specification of equipment to display energy consumption data, thus empowering dwelling occupants to reduce energy use.



Drying Space

To promote a reduced energy means of drying clothes. Space will look to be made available for the ability to dry clothes to avoid utilising heat energy.



Energy Labelled White Goods

Where white goods will be provided, the scheme will look to have them classified as energy efficient with at least an A-rating, where feasible. This is to promote the provision or purchase of energy efficient white goods, thus reducing the CO₂ emissions from appliance use in the dwelling.



External Lighting

All external space lighting, including lighting in common areas, will be provided by dedicated energy efficient fittings with appropriate control systems in-line with Building Regulations standards; this is to promote the provision of energy efficient external lighting, thus reducing CO₂ emissions associated with the dwelling.



Sustainable Transport

The site is accessible to various means of sustainable transport. Carpenders Park railway station is approximately a 10-minute walk away from the site. Additionally, the Upper Hitch bus stops are situated within an approximately 3-minute walk, serving the 346, R16, and R17 bus routes.



Home Office

The scheme should promote working from home by providing occupants with the necessary space and services, thus reducing the need to commute.

Sustainability and Climate Change Appraisal

Water and Surface Water Run-Off



Indoor Water Use

To reduce the consumption of potable water in the home, the scheme should consider water efficient fittings, appliances, and water recycling systems. Rainwater harvesting in the form of rainwater butts should be used for landscape maintenance. The scheme will aim to reduce water consumption to 110 litres/household/day, as per the Three Rivers District Council Action Plan.



External Water Use

Space should be made available for the provision of water butts on the roof area; this is to promote the recycling of rainwater and reduce the number of mains potable water used for external water uses.



Flood Risk

The site is situated within Flood zone 1 and therefore has a low probability of flooding.

Materials



Environmental Impact of Materials

To specify materials with lower environmental impacts over their life cycle; where feasible, key elements of the building Envelope should achieve an equivalent rating of A+ to D in the 2008 version of The Green Guide:

- Roof
- External walls
- Internal walls (including separating walls)
- Upper and ground floors (including separating floors)
- Windows.



Responsible Sourcing of Materials - Basic Building Elements

To promote the specification of responsibly sourced materials for the basic building elements; materials in the following Building Elements will look to be responsibly sourced:

- a) Frame
- b) Ground floor
- c) Upper floors (including separating floors)
- d) Roof
- e) External walls
- f) Internal walls (including separating walls)
- g) Foundation/substructure (excluding sub-base materials)
- h) Staircase

Additionally, timber in these elements will be legally sourced



Responsible Sourcing of Materials - Finishing Elements

To promote the specification of responsibly sourced materials for the finishing elements; materials in the following Finishing Elements will look to be responsibly sourced:

- a) Staircase
- b) Windows
- c) External & internal doors
- d) Skirting
- e) Panelling
- f) Furniture
- g) Fascias
- h) Any other significant use

Additionally, timber in these elements will be legally sourced

Sustainability and Climate Change Appraisal

Waste



Storage of Non-recyclable Waste and Recyclable Household Waste

Refuse space will be provided for each dwelling. Space for recycling containers will:

- Be located in an adequate external space
- Be sized according to the frequency of collection
- Store recyclable waste in identifiably different bins



Construction Site Waste Management

A compliant Site Waste Management Plan (SWMP) should be carried out setting out target benchmarks for waste, procedures for minimising hazardous waste and monitoring/measuring/reporting of hazardous and non-hazardous waste groups; this is to promote resource efficiency via the effective and appropriate management of construction site waste.

The SWMP should look to include procedures to sort and divert waste from landfill, through either:

- a. Re-use on site (in situ or for new applications)
- b. Re-use on other sites
- c. Salvage/reclaim for re-use
- d. Return to the supplier via a 'take-back' scheme
- e. Recovery and recycling using an approved waste management contractor
- f. Compost

according to the defined waste groups (in line with the waste streams generated by the scope of the works).

Composting

Space for individual home composting facilities will be provided to promote the provision of compost facilities to reduce the amount of household waste sent to landfill.

Pollution



Global Warming Potential (GWP) of Insulants

To promote the reduction of emissions of gases with high GWP associated with the manufacture, installation, use and disposal of foamed thermal and acoustic insulating materials; where feasible, insulating materials in the elements of the dwelling listed below will have a low GWP (in manufacture AND installation):

- Roofs: including loft access
- Walls: internal and external including lintels and all acoustic insulation
- Floors: including ground and upper floors
- Hot water cylinder: pipe insulation and other thermal stores
- Cold water storage tanks: where provided
- External doors



NOx Emissions

To promote the reduction of nitrogen oxide (NOX) emissions into the atmosphere; there will be no combustion boilers provided on-site within the dwellings.

Health and Wellbeing



Daylight

Spaces should be well lit to promote good daylighting and thereby improve quality of life and reduce the need for energy to light the home; in line with BRE guidelines.



Sound Insulation

The average noise level at the site is considered low regarding rail and traffic noise. Building materials should be chosen as such to improve the sound insulation between dwellings, the A408 to the east, and from the railway line to the west; in-line with BS8223. This is also to promote the provision of improved sound insulation to reduce the likelihood of noise complaints from neighbours.

Sustainability and Climate Change Appraisal

Management



Home User Guide

The scheme will look to provide a Home User Guide to the owner/tenants prior to handover to promote the provision of guidance enabling occupants to understand and operate their home efficiently and make the best use of local facilities.



Considerate Constructors Scheme

There is a commitment to meet best practice under a nationally or locally recognised certification scheme such as the Considerate Constructors Scheme; this is to promote the environmentally and socially considerate, and accountable management of construction sites.



Construction Site Impacts

To promote construction sites managed in a manner that mitigates environmental impacts; where feasible, there will be procedures that will typically cover one or more of the following items:

- Monitor, report and set targets for CO₂ production or energy use arising from site activities
- Monitor and report CO₂ or energy use arising from commercial transport to and from site
- Monitor, report and set targets for water consumption from site activities
- Adopt best practice policies in respect of air (dust) pollution arising from site activities
- Adopt best practice policies in respect of water (ground and surface) pollution occurring on the site

Where feasible, 80% of site timber should be reclaimed, re-used or responsibly sourced



Security

The principles of Secure by Design will be carried out for the scheme, to promote the design of developments where people feel safe and secure—where crime and disorder, or the fear of crime, does not undermine quality of life or community cohesion.



Ecology

To minimise reductions and promote an improvement in ecological value and enhance the ecological value of the site, the scheme will look to promote:

- development on land that already has a limited value to wildlife and discourage the development of ecologically valuable sites.
- the protection of existing ecological features from substantial damage during the clearing of the site and the completion of construction works.
- the most efficient use of a building's footprint by ensuring that land and material use is optimised across the development.

Section Four

4

Conclusion

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The proposed scheme has incorporated energy efficiency measures through a well-insulated building fabric shell. Additionally, the energy strategy will make use of high efficiency air source heat pumps for space heating and domestic hot water.

The proposed scheme currently provides an on-site **regulated CO₂ reduction of 48%** against a notional dwelling compliant with Part L (2021).

The scheme will continue to integrate the core sustainability principles within its design, including sustainable construction, transport, waste, health, and wellbeing.



Figure 5: Total regulated carbon dioxide savings achieved through an energy efficient design and low carbon energy strategy.

Table 7: Total carbon dioxide site-wide savings.

	Regulated residential carbon dioxide emissions	
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Proposed Scheme Emissions	0.7	48%

Section Five

5

Appendices

Appendix A: Summary of SAP inputs

Item	Comment		
General			
Description	Demolition of existing garage on site to facilitate the erection of two semi-detached bungalows.		
Calculation method	Elmhurst Design SAP 10 & Approved Document Part L 2021		
Technical Information			
Energy Efficient Building Fabric	Proposed Fabric Values	Unit	Comment
External Wall U-value	0.14	W/m ² K	
Roof U-value	0.11	W/m ² K	-
Ground Floor U-value	0.11	W/m ² K	-
Windows U-value	1.2	W/m ² K	Not including frame
Windows g-value	0.63	-	-
Window Frame-Factor	0.7	-	-
Thermal Mass Parameter	Medium	TMP	Default value
Thermal Bridging Y-value	0.05	-	Thermal Bridging calculations TBD
Ventilation Method	Titon CME2 Q		Mechanical Extract Ventilation (Kitchen and Wet rooms)
Air permeability	3.0	@50Pa (m ³ /(h.m ²))	-
Low Carbon Energy Strategy			
Space Heating System	Air Source Heat Pumps		175.1% default efficiency, MCS certified
Heating Emitter	Underfloor heating		-
Domestic Hot Water System	Same as space heating		-
Storage	Yes		~180 litres, 100mm foam insulation
Space Cooling System	No		-
Low/Zero Carbon Technologies used	ASHPs		175.1% default efficiency, MCS certified

Appendix B: DER/TER SAP Worksheets

LOVE DESIGN STUDIO/O

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We help design teams within the built environment create sustainable spaces and buildings.

Our work encompasses all stages of a building's lifetime; from advising developers on new development to landowners on improving their building stock. Our experience of each RIBA Stage enabling us to better advise on the other.

Environmental consultants, designers, engineers and technicians in the built environment.

Whether it be a single house extension, commercial property, school, or multi-residential masterplan; Love Design Studio will look to maximise the scheme's sustainability credentials where most value is obtained.