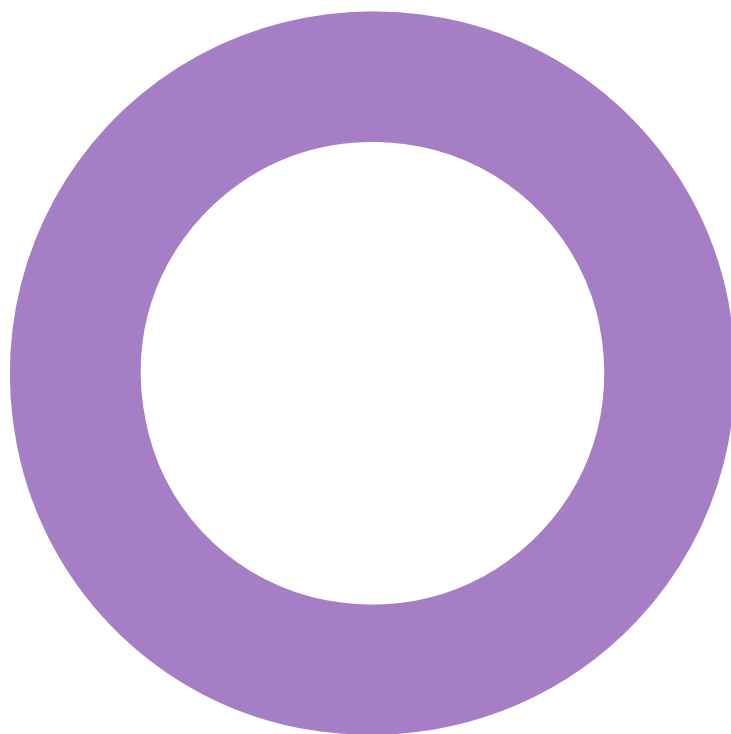


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SUSTAINABILITY

S96A ENERGY STRATEGY ADDENDUM: ENERGY STRATEGY REPORT.

REVISION 01 – 20 FEBRUARY 2024



Audit sheet.

Rev.	Date	Description	Prepared	Checked	Authorised
01	20/02/2024	Final Issue	J. Macklin	A. Lane	R. Evans
02	17/03/2025	Update to executive summary in red text.	J. Macklin	R. Evans	R. Evans

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Document reference: REP-10584-5A-JM-20240220-S96A Energy Strategy Addendum-Rev02.docx

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Executive summary.

This report describes the revised energy strategy for the Section 96A application for non-material amendments to the planning application at SGN Reading. This report is intended to update and supplement the approved Energy and Sustainability Strategy (produced by Briary Energy Consultants April 2019).

The consented Energy and Sustainability Strategy achieves a CO₂ emissions reduction of **20%** beyond the Part L 2013 Building Regulations baseline, using SAP 10 Carbon emission factors in line with the local authorities planning policy requirements in place at the time of the application. This was achieved through a combination of passive design measures, combi boilers to serve the dwellings, and zero carbon technologies (LZCs) namely Photovoltaics (PV).

As part of the Section 96A Application, the energy strategy has been amended, with decentralised Exhaust Air Heat Pumps (EAHP) for hot water generation and electric panel heaters for heating. **Both centralised Ground Source Heat Pump (GSHP) and Air Source Heat Pump (ASHP) strategies were considered; however, the analysis revealed that the necessary electrical infrastructure for both options was unavailable on site. As a result, an EAHP strategy was adopted, which allows for greater diversity to be applied. An EAHP strategy also only requires domestic-level maintenance, as opposed to commercial-level maintenance, and provides a more simplified metering solution. Both factors will be beneficial for the occupant.**

This proposed change in strategy from combi boilers to EAHP will avoid the use of fossil fuels and maintain alignment with Net Zero trajectories benefiting from the continuing decarbonisation of the electricity grid. This report outlines the carbon reductions associated with the proposed changes to the strategy.

Updated Part L1 (SAP) modelling has been undertaken for a representative sample of dwellings to demonstrate carbon reductions from the amended strategy and how the strategy meets / exceeds the carbon reductions from the consented strategy.

This report uses latest Part L 2021 carbon factors in line with latest GLA guidance, recognising the grid decarbonisation trajectory.

Drivers

The Previous Energy Strategy for the Proposed Development has been informed and driven by national, regional and local policies –at the time of submission namely, Building Regulations Part L 2013.

Energy strategy summary

The Energy Strategy has been developed using a ‘fabric first’ approach through the ‘Be Lean’, ‘Be Clean’, ‘Be Green’ energy hierarchy.

The energy strategy for the proposed development will minimise energy use and CO₂ emissions through the incorporation of a highly efficient building fabric, efficient lighting and ventilation, as well as EAHPs and PV.

The approach utilising EAHPs is assessed using the latest version of Part L (2021), making the development inherently more sustainable and efficient. The EAHP approach is estimated to generate carbon savings of **70%** when assessed against Part L 2021 Baseline. This far exceeds the 20% reduction achieved in the previous submission.

As can be seen from these assessments they both demonstrate an overall improvement in carbon emissions for the development.

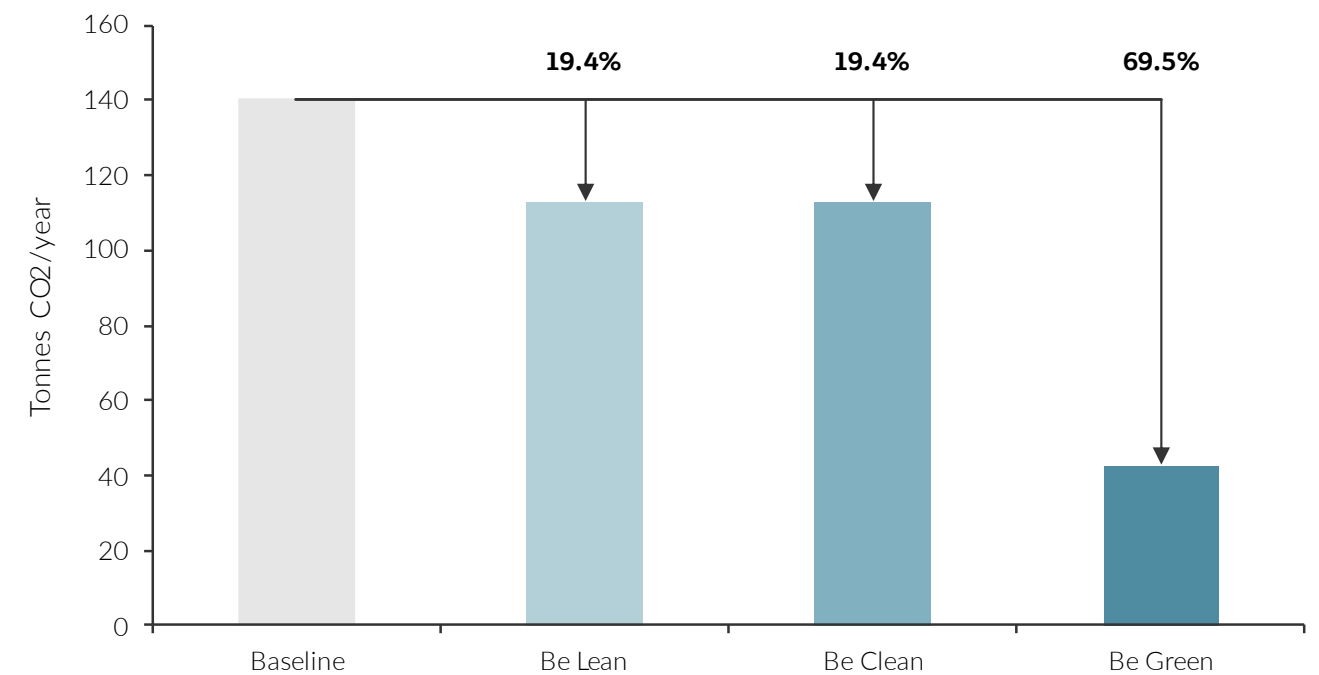


Figure 1: Carbon Reduction against ADL1A 2021

Introduction.

This Energy Strategy has been prepared in support of the S96 amendments to the planning application for SGN Reading, hereafter referred to as the 'Proposed Development'.

1.1 The proposed development

Planning permission has been granted for the creation of a new residential development, SGN Reading.

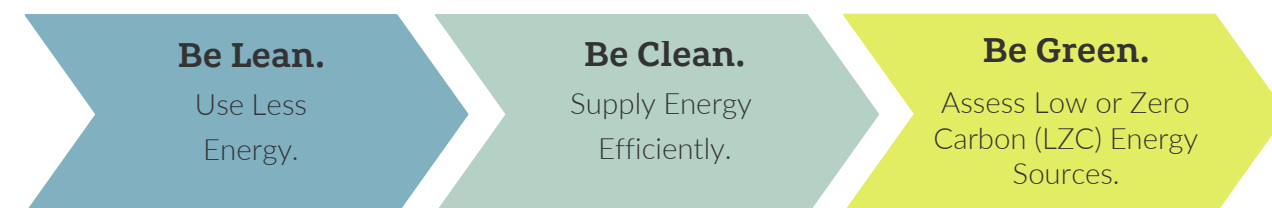
This report has been prepared to outline the Energy strategy for SGN Reading, Block A, B & C apartments. Heating only has been proposed for this project, there will be no provision for any comfort cooling within the apartments. SGN Reading comprises of 130 apartments within the A, B & C blocks with a total residential GIA of 11,287m².

1.2 Approach to the strategy

This Energy Statement proposes recommendations regarding the approach to the reducing carbon dioxide (CO₂) emissions and optimising energy efficiency within the development.

A representative sample of dwellings have been used in the assessment which represents circa 35% of the proposed development. Detailed inputs and results can be found in appendix A & B respectively.

This strategy summarises the pertinent regulatory and planning policies applicable to the Proposed Development, and sets targets commensurate with these policies, which the Proposed Development will seek to achieve. The Energy Strategy has been developed using a 'fabric first' approach through the 'Be Lean', 'Be Clean', 'Be Green' energy hierarchy.



After 'Be Green' an additional stage of the energy hierarchy has been introduced: Be seen - monitor, verify and report on energy performance in-use.

This approach will demonstrate how developments are performing in-use and will underpin progress in reducing carbon emissions, operational running costs and will encourage the industry's route to achieving zero carbon buildings.

1.3 Definitions and limitations

Definitions:

The following definitions should be understood throughout this statement:

- **Energy demand:** the 'room-side' amount of energy which must be input to a space to achieve comfortable conditions. In the context of space heating, this is the amount of heat which is emitted by a radiator, or other heat delivery mechanism.
- **Energy requirement:** the 'system-side' requirement for energy (fuel). In the context of a space heating system using a gas boiler, this is the amount of energy combusted (e.g. gas) to generate useful heat (i.e. the energy demand).
- **Regulated CO₂ emissions:** the CO₂ emissions emitted as a result of the combustion of fuel, or 'consumption' of electricity from the grid, associated with regulated sources (those controlled by Part L of the Building Regulations).

Limitations:

The appraisals within this statement are based on Part L calculation methodology and should not be understood as a predictive assessment of likely future energy requirements or otherwise. Occupants may operate their systems differently, and / or the weather may be different from the assumptions made by Part L approved calculation methods, leading to differing energy requirements.

2. Drivers.

The Previous Energy Strategy for the Proposed Development has been informed and driven by national, regional and local policies –at the time of submission namely, Building Regulations Part L 2013.

3. Be Lean.

Passive design and energy efficiency measures form the basis for the reduction in overall energy demand and carbon emissions for the proposed development. This Energy Strategy aims to reduce the energy demand initially by optimising the envelope and building services within the Proposed Development.



3.1 Passive design and energy efficiency features

Passive Design measures are those which reduce the demand for energy within buildings, without consuming energy in the process.

These are the most robust and effective measures for reducing CO₂ emissions as the performance of the solutions, such as wall insulation, is unlikely to deteriorate significantly with time, or be subject to change by future property owners. In this sense, it is possible to have confidence that the benefits these measures will continue at a similar level for the duration of their installation.

	Fabric performance A 'fabric first' approach has been taken in order to reduce the energy demand and CO₂ emissions from the Proposed Development. The Proposed Development will benefit from an efficient thermal envelope, where heat losses and gains will be controlled by the optimisation of the fabric of the building. Reducing the thermal transmittance of the building envelope where appropriate will help to reduce both heating and cooling requirement and result in lower energy requirements. Glazing Energy & Light Transmittance The design team has focused on ensuring a balance between the benefits of ample daylight and passive solar heating in winter months whilst limiting the amount of solar gain and the likelihood of high internal temperatures in summer.
	Space heating Heating to all dwellings will be provided by direct electric panel heaters.
	Space cooling Comfort cooling is not proposed to the residential homes.
	Mechanical ventilation The residential areas will be provided with high efficiency localised mechanical ventilation units with heat recovery. Mechanical ventilation is an important addition to the building services to maintain good indoor air quality by providing fresh air to all spaces and extracting stale air. Coupled

	to a heat exchanger, the warmth in extracted air can be recovered and delivered to the supply air. In this mode, the ventilation system reduces space heating and cooling demand. To reduce the electrical energy associated with fans; for areas in the Proposed Development with supply and extract ventilation, low specific fan powers will be targeted. Boosted ventilation and summer bypass will also be incorporated.
	Domestic hot water (DHW) system To limit the demand for hot water, all spaces will include the use of water-efficient fixtures and fittings including flow reducers in the taps of wash hand basins and aerated shower heads, to limit overall water consumption. The exhaust air heat pump system will efficiently provide 100% of the domestic hot water requirement to the dwellings.
	Natural daylight and lighting strategy The façades have been optimised to balance good levels of daylight with over-shading, through the use of balconies and façade treatments, to limit the risk of overheating. - LED lighting will be installed in all dwellings. Daylight and occupancy-linked lighting will be incorporated in all communal and commercial spaces, where appropriate to minimise the use of artificial lighting.

3.2 Fabric Parameters

Specific passive design and the energy efficiency features proposed are detailed below. The parameters below outline the inputs into the calculations at this stage in the design process.

Table 1: Target building fabric performance parameters.

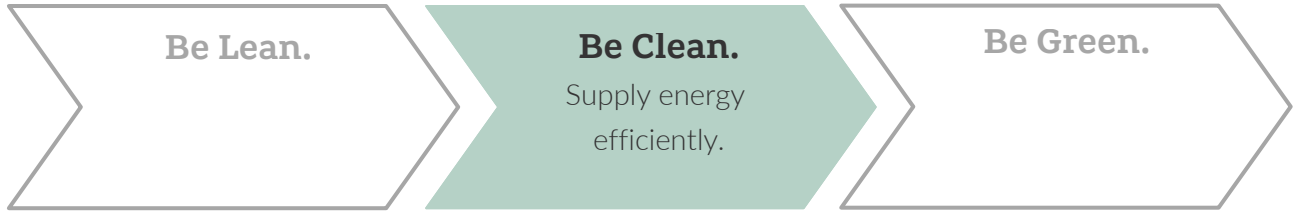
	Proposed in Previous Energy Strategy	Part L1 2021 - Notional	Modelled Approach
Floor U-value (W/m2K)	0.15	0.13	0.11
External wall U-value (W/m2K)	0.26	0.18	0.15
Sheltered Wall U-value (W/m2K)	Not specified.	0.18	0.18
Roof U-value (W/m2K)	0.18	0.11	0.11
Window U-value (W/m2K)	1.40	1.20	1.10
Window g-value	Not specified.	0.63	0.40
Door U-value (W/m2K)	1.09	1.00	1.00
Air permeability at 50 Pa	5.01 m3/(h.m2)	5 m3/(h.m2)	2.5 m3/(h.m2)
Thermal Bridging	0.08 Y-Value	0.05 W/m2K	0.08 Y-Value

Table 2 Be Lean domestic fabric energy efficiency results.

	Dwelling fabric energy efficiency (DFEE) kwh/m ² /year	Target fabric energy efficiency (TFEE) kwh/m ² /year	Reduction %
Area-weighted average:	25.83	26.92	4.0%

4. Be Clean.

This stage of the energy hierarchy includes consideration of connection to available district heat networks, or the use of on-site heat networks and decentralised energy production in order to provide energy and reducing consumption from the national grid and gas networks, through the generation of electricity, heating and cooling on-site.



4.1.1 Be Clean: network and technologies.

The following sections detail considerations of the infrastructure and low-carbon energy supply measures that have been considered.

	Decentralised heat and energy networks Offsite heating network As per the previous energy strategy, a connection to a district heating system is not considered viable. Due to the proposed servicing strategy, there is no location proposed for an energy centre plant room and as such, no connection to a future offsite heating network is proposed.
	Combined heat and power (CHP) CHP is not considered to be a viable option as per the previous energy strategy.
	Decentralised Energy Networks (DEN) The Proposed Development will be serviced on an individual dwelling basis. No energy network is proposed as per the previous energy strategy.

4.1.2 Be Clean summary.

There are no existing district heating networks near to the site or proposed to be extended to the site, therefore a connection to an existing offsite heat network is not proposed.

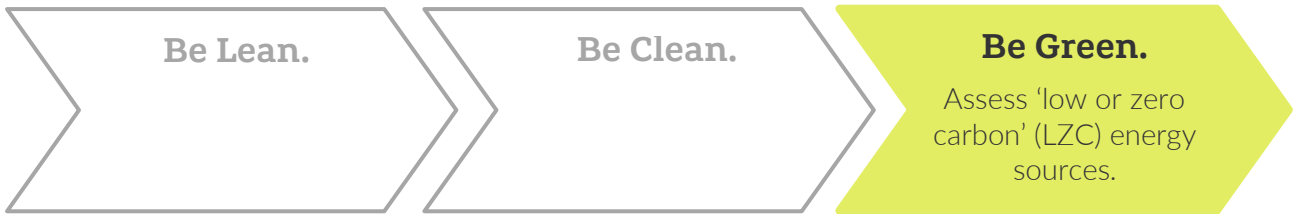
Opportunities for future connection to a low carbon district heating network (subject to detailed technical, practical, and economic feasibility evaluation) have been considered, and future-proofing measures proposed.

CHP is not proposed due to poor carbon reduction and adverse air quality impacts.

Therefore, no further carbon reductions are envisaged for the Be Clean stage of the energy hierarchy.

5. Be Green.

The final step of the energy hierarchy explores the feasibility of Low and Zero Carbon (LZC) technologies to allow for the production of renewable energy onsite in order to deliver further reduction in carbon emissions.



5.1 Low and zero carbon (LZC) technology assessment.

Renewable or zero carbon technologies harness energy from the environment and convert this to a useful form. Many renewable technologies are available, however, not all of these are commercially viable or suitable for all locations.

	Photovoltaics Photovoltaic panels harness energy from sunlight and convert this into useful energy in the form of electricity. A PV system requires viable roof space for the system array to be installed and function effectively. Suitability to proposed development: Photovoltaics are a feasible technology for consideration. Currently 0.48kWp of PV was applied per dwelling which totals 63kWp across the scheme. This is the same provision as the previous submission. This overall yield calculation allows for plant space, façade access and areas of shading on the overall roof space. (See Appendix C).
	Solar thermal Solar Thermal Panels are similar to PV Panels in that they harness energy from solar. This technology however converts solar into thermal energy that can offset the demand on hot water generation systems. Suitability to proposed development: Not proposed as per previous energy strategy.
	Heat Pumps Air source heat pumps (ASHP) use thermodynamic principles to convert heat from the air into useable heat within the building. ASHP need to be located externally with access to the ambient air, typically at roof level. Water source heat pumps (WSHP) use thermodynamic principles to convert heat from the water into useable heat within the building. WSHP need to be located with access to water with a near-constant temperature. Unlike some other sources of renewable energy, heat pumps do require energy (typically electricity or gas) to pump and compress refrigerant through the system. However, under the Renewable Energy Directive 2009/28/EC they are classified as renewable technologies provided that the final energy output significantly exceeds the primary energy input required to drive the heat pump.

	Suitability to Proposed Development: An exhaust air heat pump solution is proposed per dwelling to provide efficient domestic hot water generation. A centralised ASHP solution is not considered due to the lack of available electrical infrastructure, restrictions on available roof space and limited availability for internal plant rooms.
	Wind turbine Wind turbines with horizontal or vertical axis are renewable sources of energy which do not produce CO2 or other waste products. Most small locally installed wind turbines generate direct current (DC) and are not connected to the national grid. If the turbine is to be connected to the grid, an inverter and controller is required to produce AC electricity that the grid can accept. Suitability to proposed development: Not proposed as per previous energy strategy.
	Ground source heat pumps Ground Source systems work to extract heat or cooling energy from the ground. They are generally slightly more efficient than air source systems, as the ground temperature is more stable over the course of the year relative to air temperature. There are four common varieties of ground source systems: – Vertical, open loop, direct cooling (i.e., without heat pump) – Vertical, open loop, with heat pump – Horizontal, closed loop, with heat pump – Vertical, closed loop, with heat pump Suitability to proposed development: A centralised ASHP solution is not considered due to the lack of available electrical infrastructure and limited availability for internal plant rooms.

5.2 Proposed heating infrastructure.

The study has concluded that electric panel heaters are the most feasible technology for the Proposed Development, and with the recognition that the generation of electricity has a much lower carbon factor now than it used to be due to the decarbonisation of the grid, this approach is considered the most appropriate strategy for the provision of heat for this development.

5.2.1 Photovoltaic Panel Incorporation.

This assessment has been undertaken with the benefit of any photovoltaic panel contribution. Currently 0.48kWp of PV was applied per dwelling which totals the same 63kWp across the scheme as the previously consented energy strategy. This overall yield calculation allows for plant space, façade access and areas of shading on the overall roof space. (See Appendix C).

5.3 Be Green Domestic carbon performance.

The table and figure below outline the anticipated domestic CO₂ emissions for the Proposed Development at the Be Green stage.

Table 3 Be Green domestic carbon performance results.

	Dwelling emission rate (DER) kg.CO ₂ /year	Target emission rate 2021 (TER) kg.CO ₂ /year	Carbon Reduction %
Area-weighted average:	3.79	12.44	69.5%

5.3.1 Assessment Summary.

The feasibility of on-site renewable energy technologies has been assessed, and air source heat-pumps have been found most suitable. It is proposed that a heat pump arrangement with the remainder topped up using direct electricity to be most space and cost efficient.

The proposed heat-pump Energy Strategy is anticipated to result in carbon emission reductions of approximately 70% for the domestic elements compared to a Part L 2021 baseline.

Inputs Summary.

Table 4: Modelled building fabric and system performance parameters.

Floor U-value (W/m2.K)	0.11
External wall U-value (W/m2.K)	0.15
Sheltered wall U-value (W/m2.K)	0.18
Roof U-value (W/m2.K)	0.11
Window U-value (W/m2.K)	1.10
Window g-Value	0.40
Door U-value (W/m2.K)	1.00
Air permeability at 50 Pa	2.50 m3/(h.m2)
Thermal Bridging	Y-Value 0.08
Space Heating	Electric panel heater
Water Heating	Exhaust air heat pump
Ventilation system type	MVHR
PV	0.48kWp

6. Conclusion.

The energy strategy has been revised for the Section 96A application for non-material amendments to the planning application at SGN Reading. This proposed heat pump energy strategy has shown that the Proposed Development will result in a highly efficient, low-carbon scheme.

New, high efficiency servicing equipment and efficient façades will minimise the energy usage of the buildings. The strategy has been developed to ensure that the Proposed Development is efficient and economical.

This strategy has been prepared to demonstrate that at the planning stage, the Applicant and design team have given due consideration to the principles of energy and sustainability, and how these could be implemented for the Proposed Development.

6.1 Outcomes

It is anticipated that the amended strategy will result in a 69.5% reduction in CO₂ emissions which will be achieved beyond the Building Regulations Part L 2021 through the provision of energy efficiency measures as well as on-site renewables. This correlates to an 80.6% reduction against the 2013 baseline and is therefore a significant improvement over the consented energy strategy which achieved 20% carbon reduction.

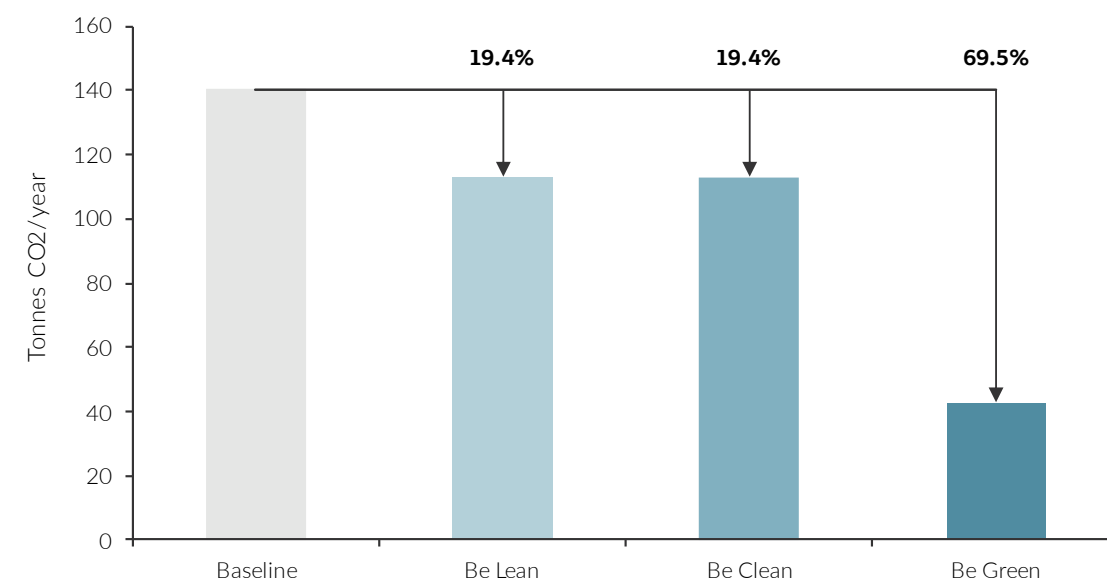
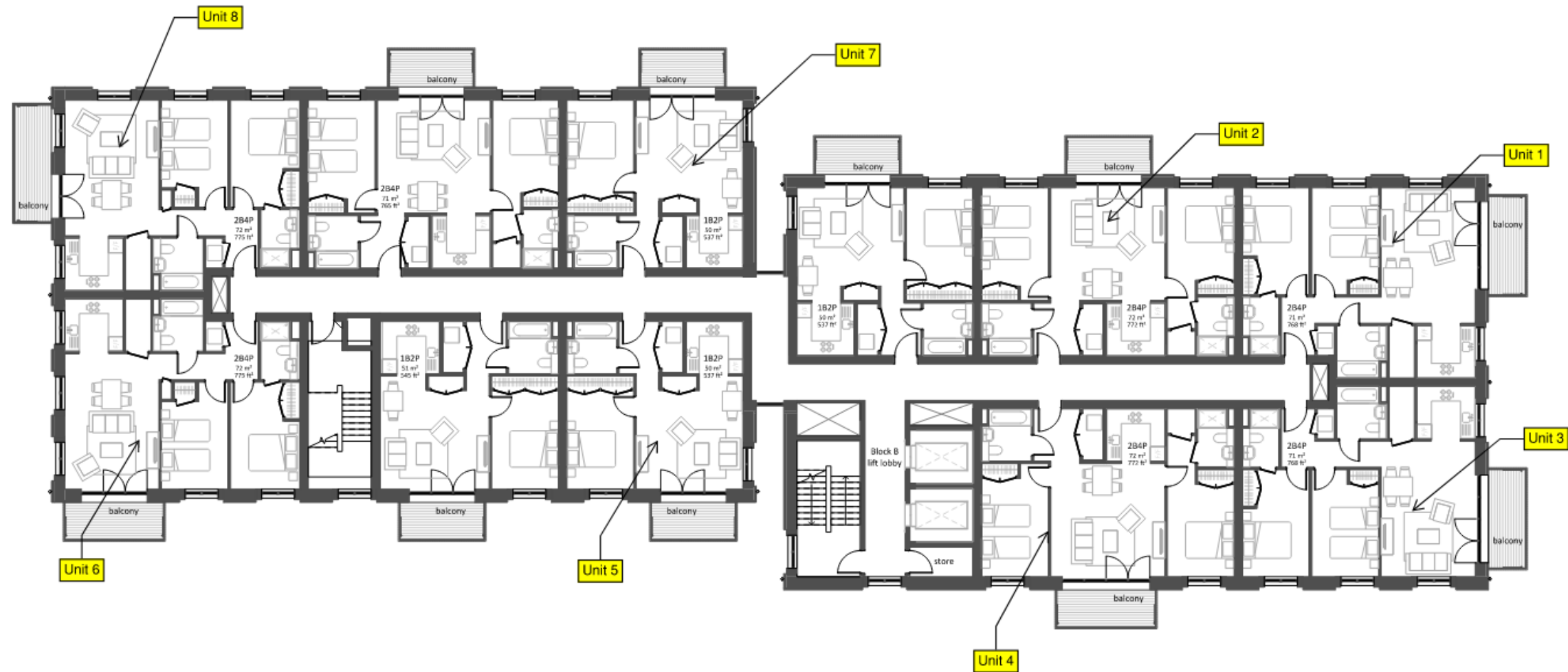


Figure 2: Proposed Carbon Reduction Results against 2021 Baseline.

Appendix A: SAP Sample & Results.



Block	Dwelling reference	GIA	Multiplier	Total area	CO2 emissions			Primary Energy			Fabric energy efficiency			Overall compliance
					Target Emissions Rate (TER)	Dwelling Emission Rate (DER)	Variance	Target Primary Energy Rate (TPER)	Dwelling Primary Energy Rate (DPER)	Variance	Target Fabric Energy Efficiency (TFEE)	Dwelling Fabric Energy Efficiency (DFEE)	Variance	
-	-	m²	-	m²	kgCO₂/m²/yr.	kgCO₂/m²/yr.	%	kWh/m²/yr	kWh/m²/yr	%	kWh/m²/yr	kWh/m²/yr	%	-
Block B	Unit 1	71.5	5	355	12.9	4.24	67.13%	69.57	45.62	34.43%	30.69	29.01	5.47%	YES
Block B	Unit 2	72.10	10	720	11.6	3.36	71.03%	62.64	36.84	41.19%	24.25	22.55	7.01%	YES
Block B	Unit 3	71.5	5	355	12.05	3.92	67.47%	64.99	42.42	34.73%	26.78	26.02	2.84%	YES
Block B	Unit 4	72.5	5	360	10.92	3.27	70.05%	59	35.93	39.10%	20.62	20.42	0.97%	YES
Block B	Unit 5	50.5	5	250	14.01	3.57	74.52%	75.97	39.58	47.90%	26.62	26.21	1.54%	YES
Block B	Unit 6	72.5	5	360	11.78	3.87	67.15%	63.55	41.87	34.11%	25.63	25.48	0.59%	YES
Block B	Unit 7	50.5	5	250	15.71	4.29	72.69%	85.09	46.84	44.95%	34.77	32.79	5.69%	YES
Block B	Unit 8	72.5	5	360	12.91	4.32	66.54%	69.62	46.39	33.37%	31.01	29.76	4.03%	YES
Block compliance			45	3010	12.44	3.79	69.55%	67.21	41.23	38.66%	26.92	25.83	4.03%	YES

Appendix B: SAP Input Sheet.

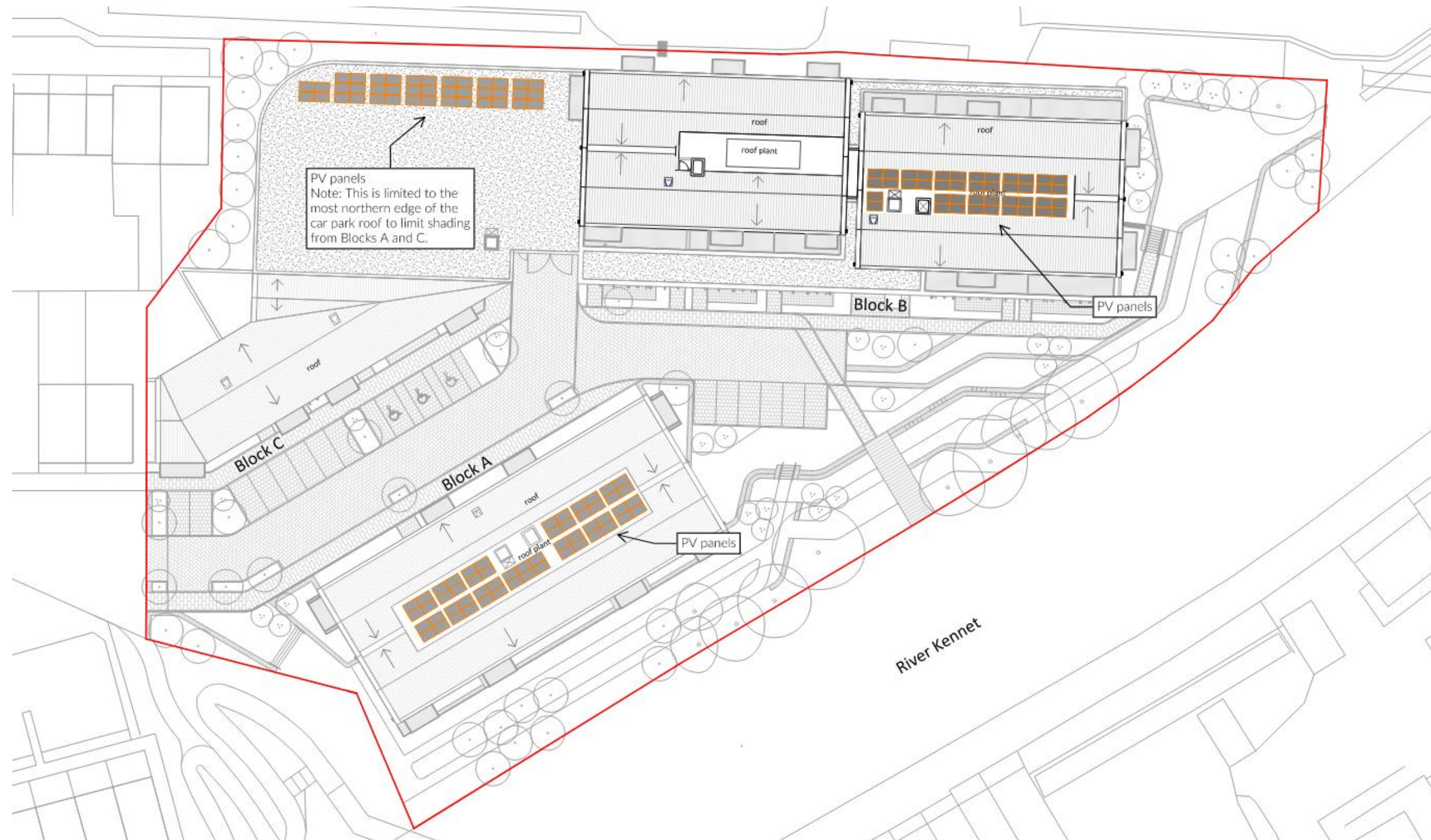
Parameter	Value
Thermal Mass Parameter (kJ/m².K)	175
External Wall U-value (W/m².K)	0.15
Exposed Basement / ground floor U-value (W/m².K)	0.11
Sheltered Wall U-value (W/m².K)	0.18
Party Wall U-value (W/m².K)	No heat loss – fully filled cavity with effective edge sealing
Roof U-value (W/m².K)	0.11
Windows U-value (W/m².K)	1.10
Window G-value	0.40
Doors – Opaque (W/m².K)	1.00
Air Permeability (m³/m².h at 50Pa)	2.50
Thermal Bridging Performance	Refer to psi values in Table 3

Thermal bridging junction	Psi value
y-Value Specified as per original Energy Strategy	0.08

Parameter	Value		
Ventilation	Mechanical Ventilation with Heat Recovery (MVHR). Typical Product: Decentralised Nuaire MRXBOXAB-ECO3-AE MVHR units (SFP and HR efficiency variable dependant on no. wet rooms).		
	Number of wet rooms (additional to kitchen)	MVHR specific fan power (W/l/s)	Heat recovery efficiency (%)
	1	0.50	90
	2	0.53	90
	3	0.60	89
	4	0.75	88
	Ductwork: Rigid.		
Lighting	100% energy efficient lamps – 90 lm/W LED		

Parameter	Value
Space heating and hot water – systems	Heating system – electric panel heaters Hot water – Dimplex EDL200UK-630 or equivalent Insulation type: Measured Loss Cylinder volume (L): 201 Loss (kWh/day): 1.61
Cooling	No
Photovoltaic	0.48kWp per dwelling.

Appendix C: Photovoltaics (PV) Roof Layout.





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