BPTW

Richmond College

Design & Access Statement

August 2021

BPTW brings together specialisms in Architecture and Planning to transform not just physical spaces, but people's lives. Our work tells our story. We are bold. We are innovative. We care.

For over 30 years we have worked with many of the UK's leading developers and housing providers to create desirable new homes and places. With over 100 staff, our teams are made up of individual experts who cultivate a friendly, creative and collaborative partnership with everyone we work with. From start to finish, we are committed to deliver success on every measure.

BPTW. Together we transform people's lives.

RIC3-BPTW-XX-XX-DO-A-0610-C03-A3

Report presented by: BPTW
In association with: Levitt Bernstein

For further information contact:
Richard Knight; Associate, Architecture
rknight@bptw.co.uk

Document Authors:

BPTW // Levitt Bernstein

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1.0 Introduction

1.1 Client & Design Team

Client

Clarion Housing Group comprises the country's largest housing association, Clarion Housing, with 125,000 homes nationwide. We are also a leading developer, with an aim to build 50,000 homes over ten years and a business for social purpose, with our charitable foundation Clarion Futures.

We use our strength and scale to create opportunities that change people's lives.

Architect

For over 30 years we have worked with many of the UK's leading developers and housing providers to create desirable new homes and places.

With over 100 staff, our teams are made up of individual experts who cultivate a friendly, creative and collaborative partnership with everyone we work with. From start to finish, we are committed to deliver success on every measure.

Planning Consultant

Barton Willmore is the UK's leading independent planning and design consultancy. From our 13 offices nationwide we combine national influence with local knowledge to offer the very best advice.

Landscape Architect

As architects, landscape architects and urban designers, we create award winning buildings, living landscapes and thriving urban spaces, using inventive design to solve real life challenges. Putting people at the heart of our work, each of our projects is different but the driving force behind every one is the desire to create an environment that is beautiful, sustainable and functional.

Sustainability

Etude are a team of sustainability engineers with experience in energy policy, low energy building design, environmental assessment, and construction inspection.

Fire Consultant & MEP

MLM Group, part of Sweco from April 2021. Shaping a better built and natural environment for people to live, work, learn and play.

1.2 Application Summary

Key moves from the Reserved Matters Application

Proposed temporary access for residential vehicles whilst the remaining development is built-out. Upon completion, this access point will be solely cyclists and pedestrians.

Previously 12no. market sale terraces houses, this new building is proposed as 28no. shared ownership apartments. The building height remains as per the RMA, with minor changes to the overall footprint

Buildings 1-4, whilst having a similar footprint and massing to the RMA will have internal alterations, including cycle storage allocated per core at ground floor, as well as a revised typical floor plan to better orientate apartments.

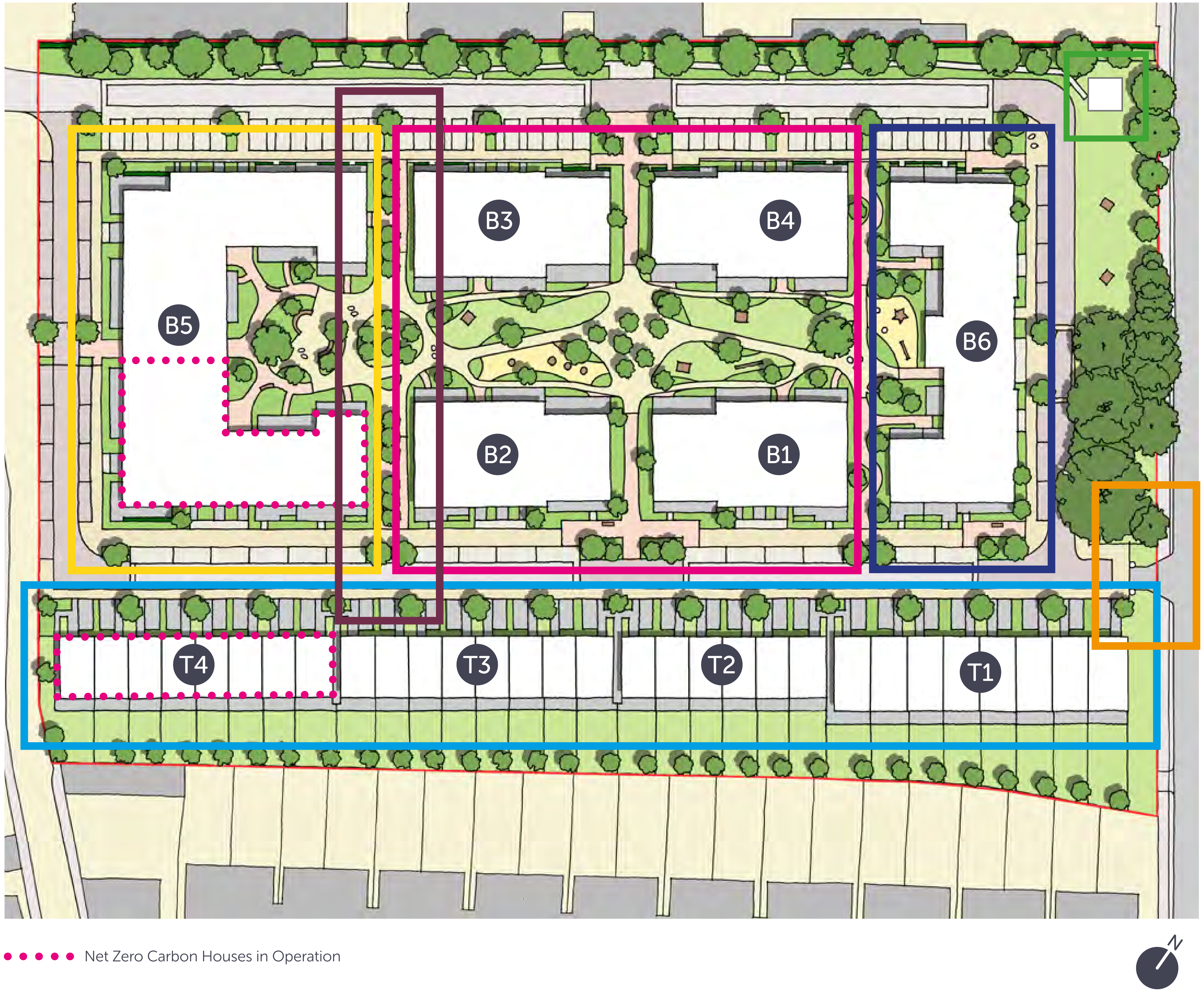
The apartments highlighted on plan will target NZC and as such some internal adjustments to Building 5, window proportions and envelope amendments have been implemented to achieve this target.

It is proposed that the houses reduce from 7 terrace rows to 4 to increase the building envelope efficiency. By also removing 2 houses, the remaining homes can be widened to allow for better living.

Following guidance from Etude, the NZC houses will also have a more efficient building envelope as well as allowance for ASHP within each property

Relocation of substation to North East corner of the site from existing location to the South of the brick entrance piers along Egerton Road.

Removal of the previously proposed through-road between buildings 5 and 2 & 3 to allow for a continuous, enlarged central amenity



2.0 Site History & Context

2.1 Site Location

Richmond College, TW2 7SJ

The site is located on the existing Richmond college site between Egerton Road and Marsh Farm Lane. It is bounded to the north by the new secondary school and future sports centre and to the south by existing residential building on Craneford Way. To the west is Marsh Farm Lane a pedestrian route that will see some regeneration as part of the wider outline scheme. To the east is Egerton Road.

The site currently is occupied by functioning and vacant college buildings which will be decanted into newly constructed buildings elsewhere within the masterplan area.

The site is a 10 min walk from Twickenham Station. A number of bus routes are within the same walking distance, and serve areas as far as Hammersmith, Hounslow, Hampton Wick and Tolworth. Bus routes consist of 110, 267, 281 and 681.

Location of LB Richmond within Greater London

Site location at macro scale

Location of St. Margaret's and North Twickenham Ward within LB Richmond

Site location at micro scale

2.2 Existing Context

The surrounding area is primarily residential ranging from Victorian terraces to 1950's styles with the majority falling within the early part of the 21st century.

The existing College building is a 1930's building and the largest building in the area with a tower that can be seen from several streets away.

Site aerial

1 Existing purpose built homes - Craneford Way

2 Surrounding vernacular - Egerton Road

3 Existing Richmond upon Thames College building

4 Existing Richmond upon Thames College building

05 Existing Marsh Farm Lane - to be upgraded

06 Existing amenity space - to be upgraded.

07 View north from the playing fields

2.3 Planning History

Outline Planning & Illustrative Masterplan

The wider master plan was granted outline planning permission in 2015 and principles were established for the residential element of the site. The maximum heights and mass locations for the blocks were set in accordance with the wider masterplan.

The outline planning permission allowed for up to 190 parking spaces located on street and within a podium. Offstreet parking was restricted to 10%.

KEY TO DRAWING

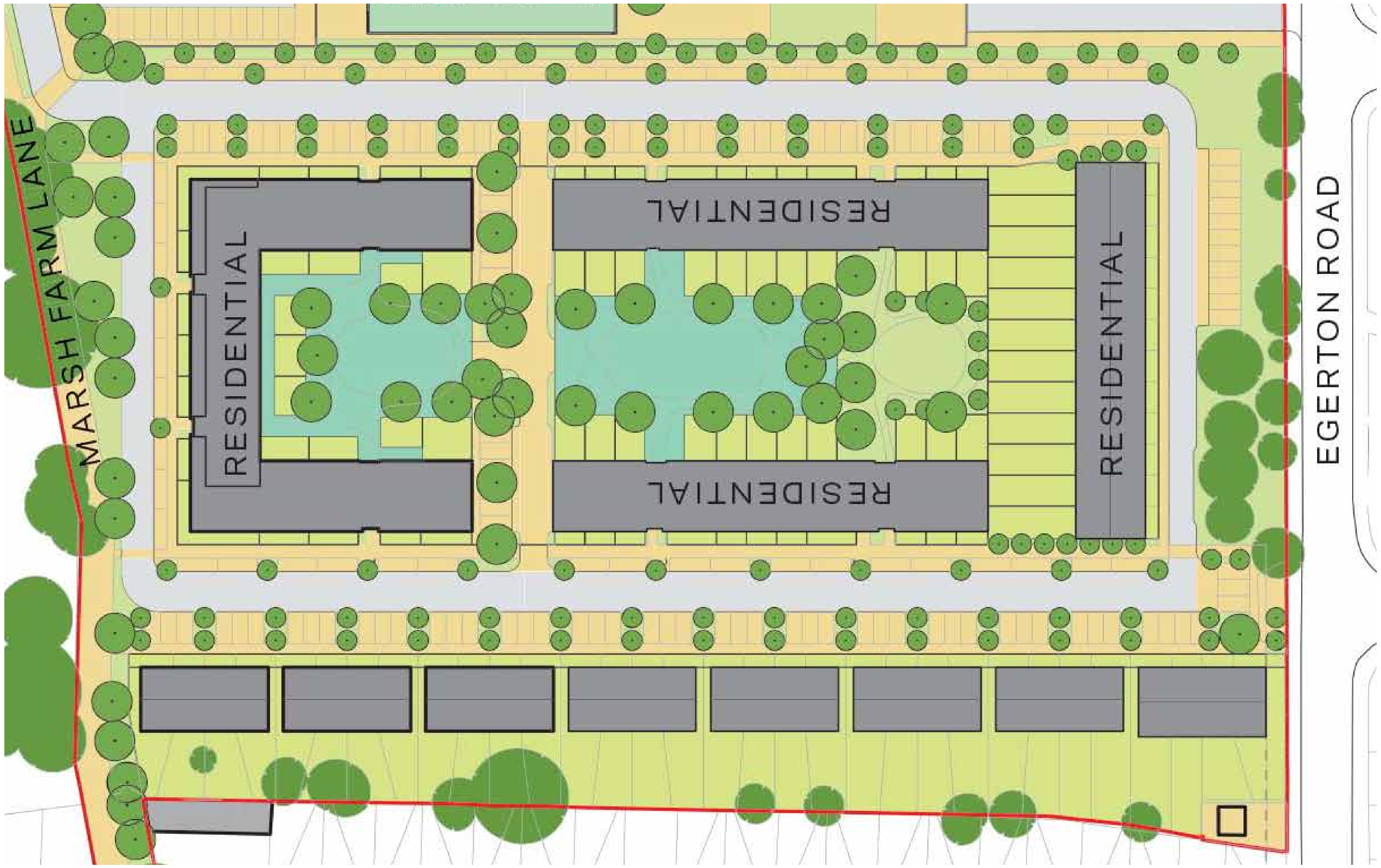
- APPLICATION SITE BOUNDARY
- EXISTING BUILDINGS
- BUILDING ZONES
- ROADWAYS
- PREDOMINANTLY HARD LANDSCAPE
- PREDOMINANTLY SOFT LANDSCAPE
- PREDOMINANTLY GRASS SPORTS
- PREDOMINANTLY ALL-WEATHER SPORTS
- PREDOMINANTLY PRIVATE GARDENS
- PREDOMINANTLY SOFT LANDSCAPE INCLUDING PLAY AREAS FOR CHILDREN & YOUNG PEOPLE; WITH PODIUM PARKING UNDERNEATH
- EXISTING TREES
- NEW TREES

2.3 Planning History

Outline Planning & Illustrative Masterplan

The site forms the residential zone of the wider development of the whole site. The wider development includes a new secondary school, new main college,STEM building and sports field.

The main college building and school are largely constructed and operational. The residential zone is at the south end of the site to the rear of the college campus



KEY TO DRAWING

- APPLICATION SITE BOUNDARY
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- EXISTING TREES
- NEW TREES

2.3 Planning History

Reserved Matters Application

The Reserved Matters Application 18/4157/RES was granted permission in September 2019 which allowed for 180 units, to include a mix of duplexes, terrace housing and flats across Private, Intermediate and Affordable Rent tenures.

The new application will look to maintain as much of the approved application as possible and build on the architectural character and principles, to enhance the scheme further.

3.0 Energy Strategy

Images and text from Etude's
Sustainability & Energy Strategy report

3.1 Energy Strategy Review

Net Zero Carbon

As of April 2020, the most recent and detailed definition of Net Zero Operational Carbon new buildings has been developed by LETI, the UKGBC and the Better Building Partnership (BBP). It is supported by the RIBA, CIBSE and the Good Homes Alliance.

It is not only about regulated energy & offsetting

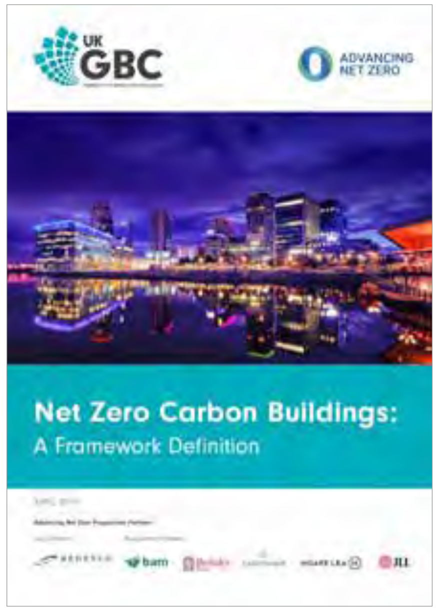
Contrary to previous definitions of Zero Carbon, this definition includes all energy uses and does not exclude unregulated energy (e.g. energy used by appliances and white goods). This is more comprehensive as other definitions (e.g. the GLA's requirement to achieve a minimum 35% improvement over Part L on site and to offset the residual regulated energy) are not accurate definitions of Net Zero Carbon.

A particularly important consideration is also that, contrary to the approach currently used in planning policy, the role for carbon offsetting is minimised. There is a growing consensus that carbon offsetting should not be part of the strategy for achieving Net Zero Carbon for new residential buildings as it simply moves the issue of reducing carbon elsewhere. Where carbon can be reduced on a scheme through better energy efficiency, lower carbon heat and PVs, it should be prioritised.

How to achieve it?

There is a growing body of guidance documents on how to achieve Net Zero Carbon. In particular LETI has developed a Climate Emergency Design Guide written by more than 100 industry experts from different organisations. The guide is available at www.leti.london and includes indicative design characteristics for various archetypes.

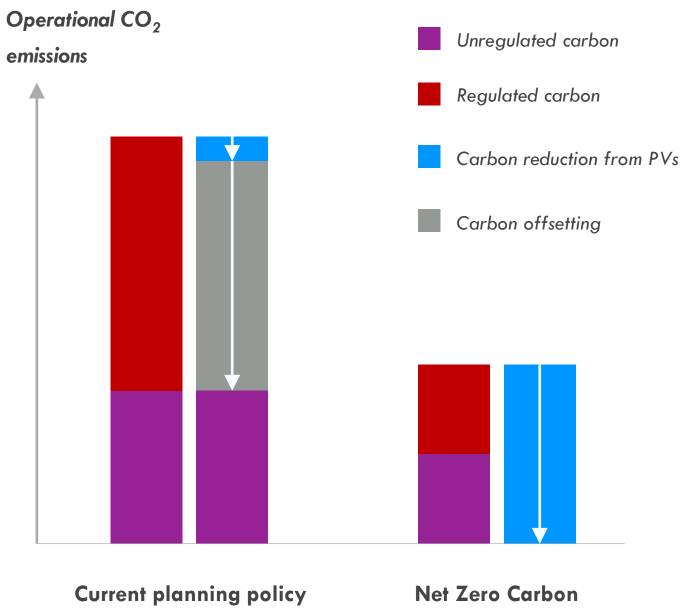
Although very few residential buildings in the UK have already delivered Net Zero Carbon there is a number of examples of schemes which have delivered exemplar levels of energy efficiency. A large number of these buildings have been Passivhaus certified.



*The **Net Zero Carbon Buildings Framework** developed by the UK Green Building Council (UKGBC)*

*The **2030 Climate Challenge** guidance developed by the RIBA*

Ten key requirements for a Net Zero Operation Carbon - A summary
Developed by LETI in collaboration with UKGBC and BBP, and supported by the Good Homes Alliance, RIBA and CIBSE



Net Zero Carbon requires efforts to reduce (significantly) both regulated and unregulated energy and generate a significant amount of energy from on site renewables. It does not rely on carbon offsetting.

Passivhaus, heat pumps and solar photovoltaics deliver net zero carbon buildings
Left: Goldsmith Street, Norwich; Norwich Council / Mikhail Riches Architects
Right: Roxbury E+ Townhouses, Boston; Boston City Council / Interface Studio Architects

Credit:
Text & images from Etude's Initial Design Review document

3.2 Energy Strategies & Implementation

Low Energy Design

In the first instance we wish to revisit some of the early design decisions and look to integrate the adjacent principles to reduce energy consumption.

These principles are usually put to best effect in the early design stages, as they look to address the massing, form and materiality. However there are a number of these which we believe can be implemented into the approved scheme with minor variation from the design, but greatly effect to the sustainability of the development.

With the intention of implementing the suggestions listed, we will explore:

> Simplifying terrace house forms to reduce heat loss and potential thermal bridges

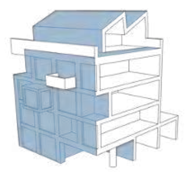
> Review window proportions

> Review and implementation of MVHR system into each property

> Increase the thickness of the building fabric

> Explore external enclosure

Building 5 and Terrace 4 will be designed as 'Net Zero Carbon in Operation'



Building form

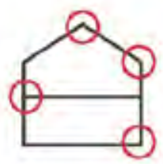
The building form has been optimized in order to reduce heat loss areas and the number of complex junctions. **The current form factor is 1.41 for the block and 2.40 for the Terrace.**

Elevation design

The proportions of windows range **between 23% and 35%** and seek to find the right balance between efficiency, overheating and daylight.

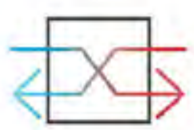
Insulation

A well insulated envelope is proposed with low U-values (e.g. **0.13 W/m².K for external walls in the NZC block and 0.1 W/m².K in the NZC terrace**). The insulation line has been clearly identified.



Detailing

A very airtight envelope is proposed (i.e. **0.6 m³/h/m² at 50Pa**) and key thermal bridges have been identified.



Mechanical ventilation

Mechanical Ventilation with Heat Recovery is provided in each unit. A **heat recovery efficiency of 90%** is targeted for each dwelling.

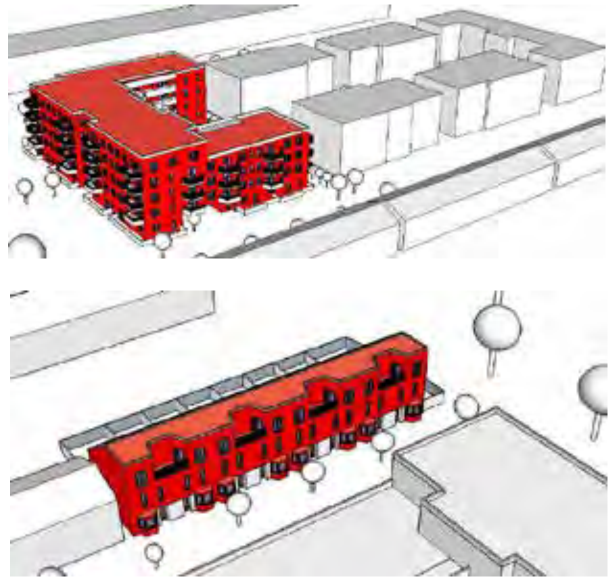
Credit:
Above images from Etude's Energy & Sistainabiliy Statement

Space heating demand

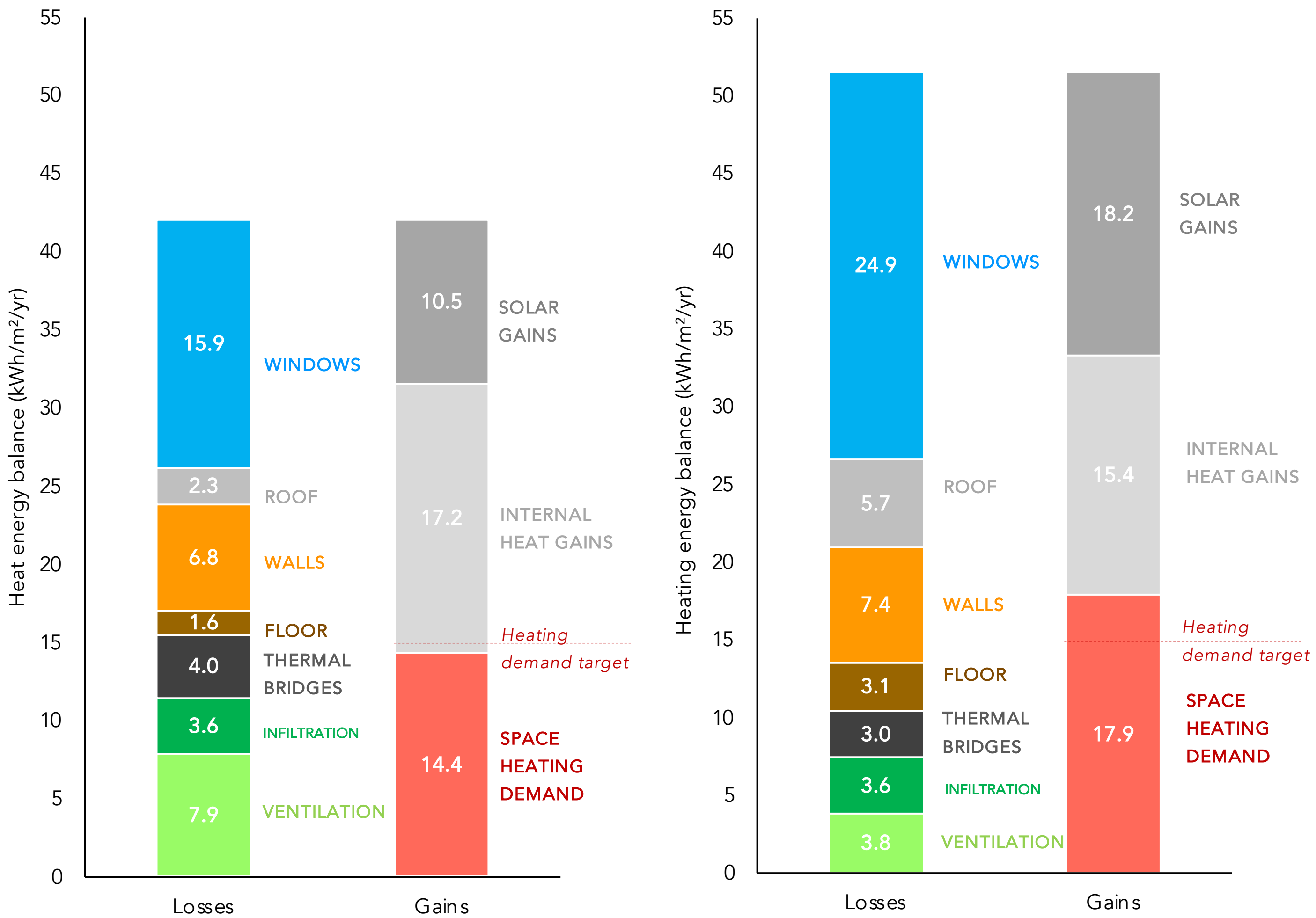
The figure below summarises the results of the Stage 3 PHPP analysis for Richmond College.

The bars on the left show heat energy lost from the building (e.g. through windows, thermal bridges, infiltration), and the bars on the right show heat gains into the building (e.g. solar gains, internal gains).

The difference is the space heating demand (shown in red), which will need to be provided by the heating system. Based on the Stage 3 PHPP analysis, this is less than the Passivhaus requirement of 15 kWh/m².yr for the block and slightly more for the terrace. The block should be able to comply with Passivhaus subject to further efforts during detailed design and construction.



3D images of Richmond College energy models for Block 5 (top) and Terrace 4 (bottom)



Bar charts showing estimated annual heating energy balance using PHPP for Richmond College Block 5 (left) and Terrace 4 (right).

3.3 Net Zero Carbon in Operation

The Net Zero Carbon block and terraces have been designed with Passivhaus levels of fabric and ventilation efficiency and the heat energy demand is based on the Passivhaus target in PHPP.

The primary energy has also been assessed in PHPP alongside the renewable energy generation from photovoltaic panels (PVs).

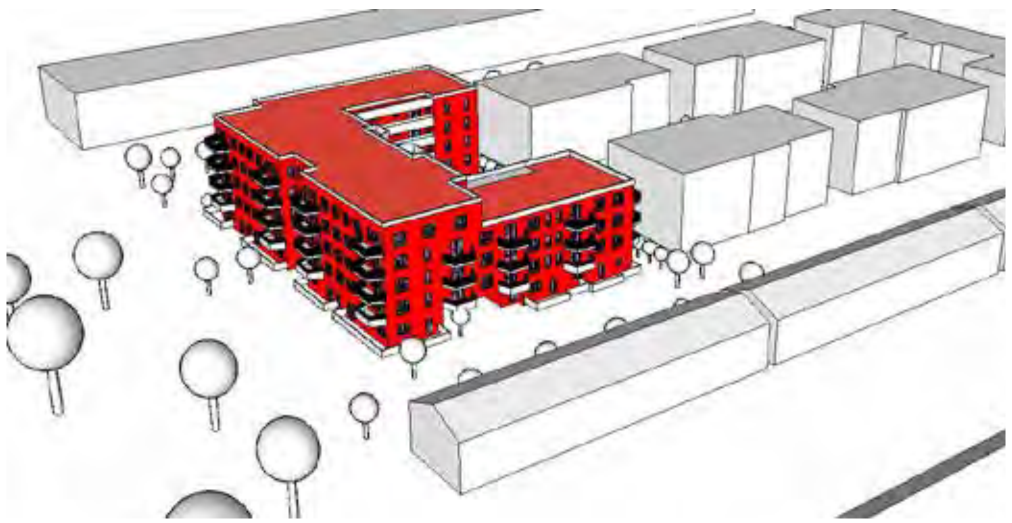
The adjacent extract summarises the PHPP calculations. Although the full Passivhaus standard is not a specific target, the criteria and methodology are used as a route to Net Zero Carbon.

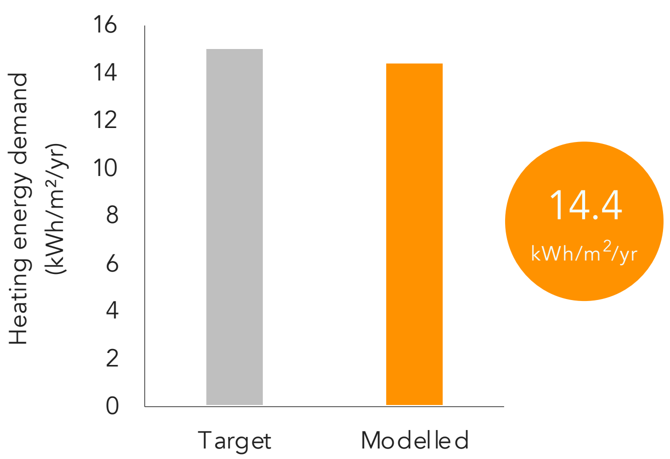
A detail summary of this strategy and further expansion on building fabric, low carbon services, renewable energies and sustainability can be found within Etudes accopanying Energy & Sustainability Statement and Circular Economy Statement.

Specific building characteristics with reference to the treated floor area

					Criteria	Alternative criteria	Fullfilled?[2]
	Treated floor area	m²	4643.0				
Space heating	Heating demand	kWh/(m²a)	14	≤	15	-	yes
	Heating load	W/m²	10	≤	-	10	
Space cooling	Cooling & dehum. demand	kWh/(m²a)	-	≤	-	-	-
	Cooling load	W/m²	-	≤	-	-	
	Frequency of overheating (> 25 °C)	%	5	≤	10		yes
	Frequency of excessively high humidity (> 12 g/kg)	%	0	≤	20		yes
Airtightness	Pressurization test result n_{50}	1/h	0.6	≤	0.6		yes
Non-renewable Primary Energy (PE)	PE demand	kWh/(m²a)	27	≤	-		-
Primary Energy Renewable (PER)	PER demand	kWh/(m²a)	34	≤	60	60	yes
	Generation of renewable energy (in relation to pro-jected building footprint area)	kWh/(m²a)	92	≥	-	-	

[2] Empty field: Data missing; '-': No requirement





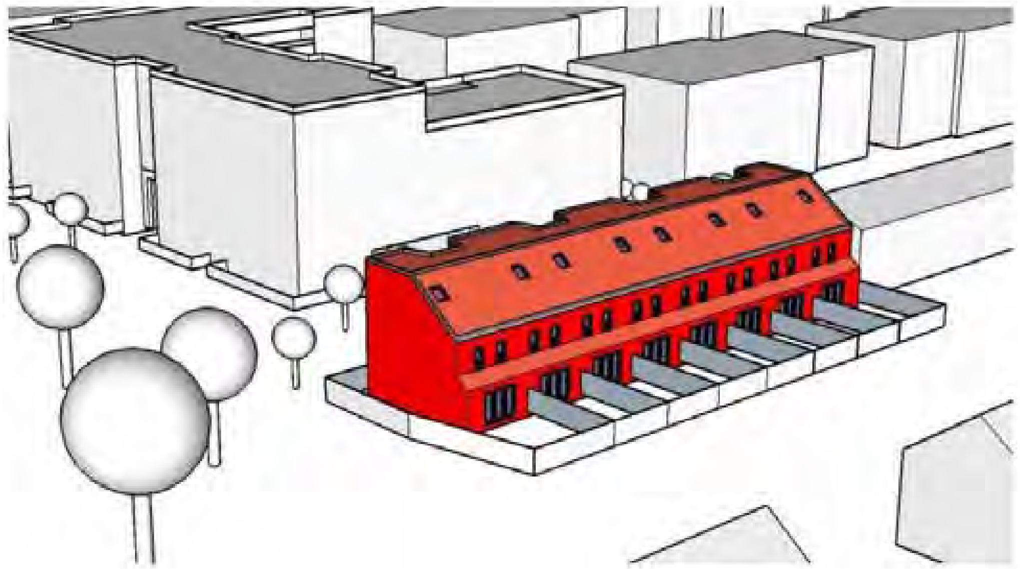
Total heating energy demand of building compared to the Passivhaus target of 15 kWh/m²/yr

Extract taken from Etudes Energy & Stainability Statement

Specific building characteristics with reference to the treated floor area

					Criteria	Alternative criteria	Fulfilled?[2]
	Treated floor area	m²	791.8				
Space heating	Heating demand	kWh/(m²a)	18	≤	15	-	no
	Heating load	W/m²	12	≤	-	10	
Space cooling	Cooling & dehum. demand	kWh/(m²a)	-	≤	-	-	-
	Cooling load	W/m²	-	≤	-	-	
	Frequency of overheating (> 25 °C)	%	10	≤	10		yes
	Frequency of excessively high humidity (> 12 g/kg)	%	0	≤	20		yes
Airtightness	Pressurization test result n_{50}	1/h	0.6	≤	0.6		yes
Non-renewable Primary Energy (PE)	PE demand	kWh/(m²a)	29	≤	-		-
Primary Energy Renewable (PER)	PER demand	kWh/(m²a)	36	≤	45	36	yes
	Generation of renewable energy (in relation to projected building footprint area)	kWh/(m²a)	48	≥	60	45	

[2] Empty field: Data missing; '-': No requirement



Total heating energy demand of building compared to the Passivhaus target of 15 kWh/m²/yr

3.4 Low Carbon Heat and On-Site Renewable Energy Generation

Heating and hot water

The heating systems for Richmond College will not use any fossil fuels on site.

Blocks of flats

Space heating and hot water will be provided in the apartments by rooftop air source heat pumps supplying heat energy via an ambient temperature (20-25°C) communal distribution system to individual heat pumps within each apartment.

Houses

Space heating and domestic hot water will be provided by individual air source heat pumps with a hot water storage tank in each house. Underfloor heating will be used.

Ventilation

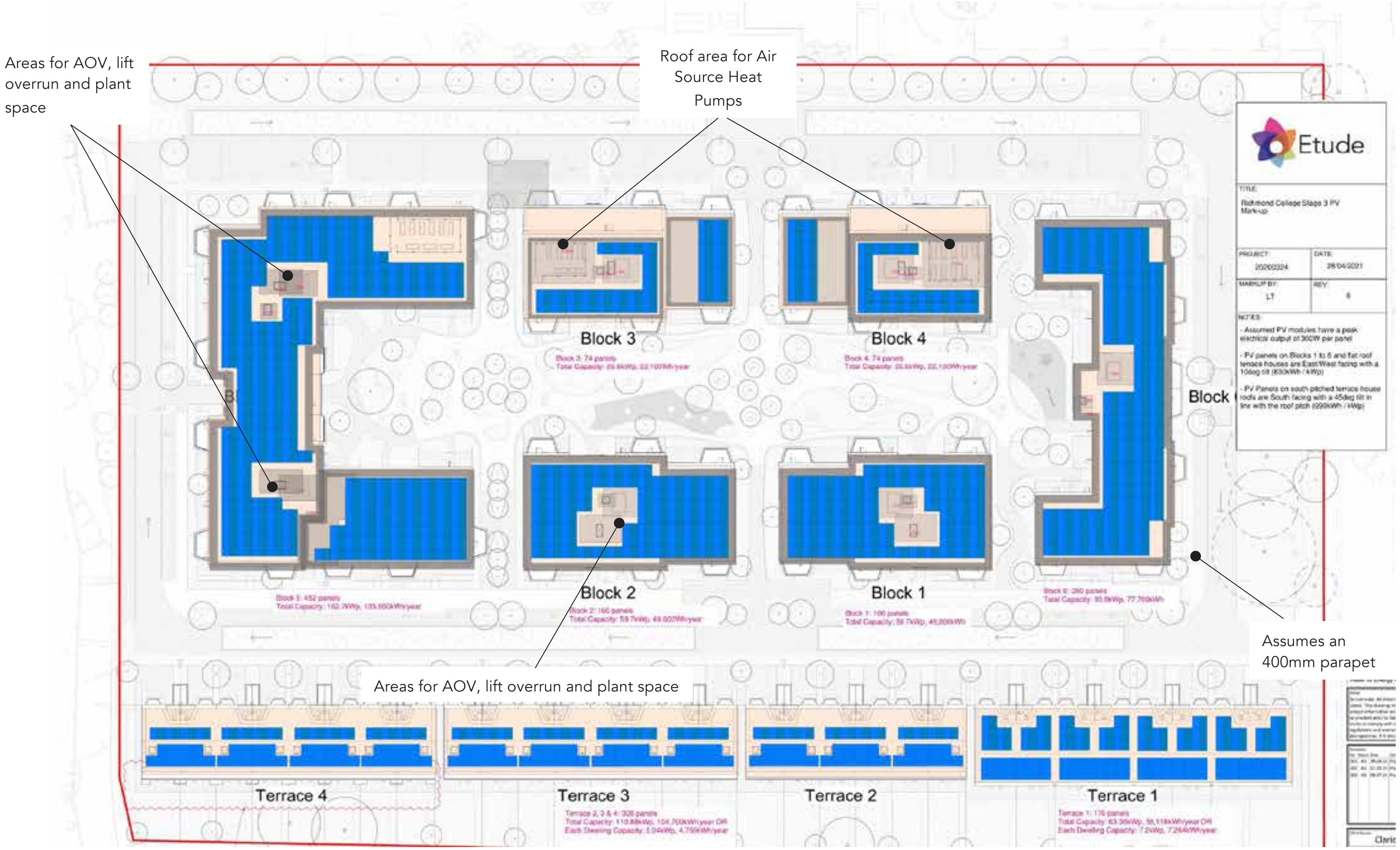
An efficient Mechanical Ventilation with Heat recovery (MVHR) system will be provided in each unit. In the Net Zero Carbon elements (i.e. Block 5 and Terrace 4) it will be located close to the façade to minimise distribution losses.

Roof-mounted PVs

The team has looked at maximising the renewable energy generation at Richmond College whilst considering other services the roof space must provide for. The roof plan to the right shows a potential solar PV layout based on the current roof plan.

In summary, our assessment indicates that the potential PV design could include 1,676 solar panels representing a total capacity of 603.3kWp. This size of and configuration of PV array would be estimated to generate approximately 518,950kWh/yr and provide carbon savings of 120.9 tonnes/yr (assuming SAP10 carbon emission factors).

The PVs will enable the development to achieve 100% improvement over Part L1A 2013 on site



Text and images taken from Etudes Energy & Stainability Statement

3.5 Performance Against Planning Requirements

Energy efficiency (Be Lean)

The proposed design and building fabric specification ensures that the development will exceed the minimum requirements of Part L 2013 through energy efficiency and passive design measures alone, achieving a 26% improvement over Part L (SAP 10) from energy efficiency alone.

Low carbon heat (Be Clean)

It is not proposed that the site will incorporate CHP or connect to a district heat network.

Heat Pumps and Roof-mounted PVs (Be Green)

Individual and communal Air Source Heat Pumps will provide heating and DHW to the Terraced Houses and Apartments, respectively. Photovoltaic panels on the roofs are proposed to generate approximately 518,950 kWh/yr.

Overall on-site performance

The two bar charts opposite comply with the GLA's requirement to report carbon emissions against both:

> the out-of-date carbon factor for electricity currently being used by Part L (i.e. SAP 2012 - 519 gCO2/kWh)

> The up-to-date carbon factor for electricity determined by the GLA (i.e. SAP 10.0 - 233 gCO2/kWh)

Based on the initial Part L1A calculations undertaken for a sample of 37 residential units:

> a 100% improvement over Part L1A 2013 is targeted assuming a carbon factor for electricity of 519 gCO2/kWh.

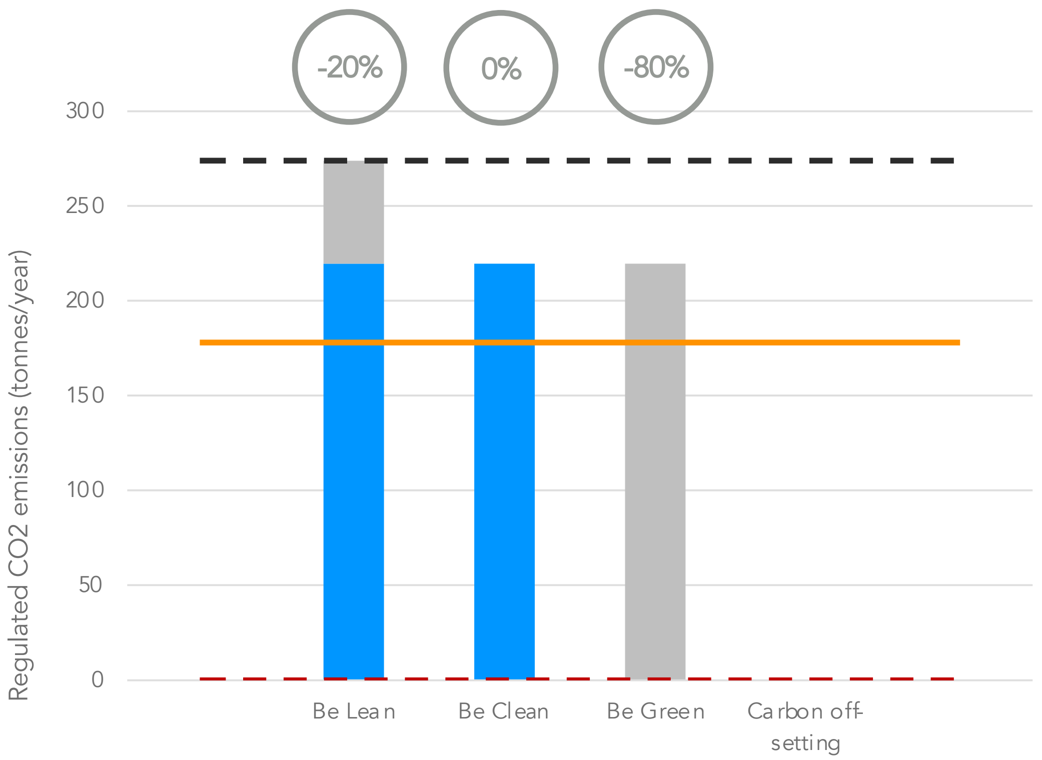
> a 100% improvement over Part L1A 2013 is targeted assuming the SAP 10.0 carbon factor for electricity of 233 gCO2/kWh.

Carbon offsetting

The scheme is targeting the Zero Carbon Homes requirement, as defined by the current London Plan. All on-site carbon emissions will be offset through electricity generated by roof mounted PV arrays resulting in the scheme having net zero carbon emissions. Therefore, no carbon offsetting payment is required.

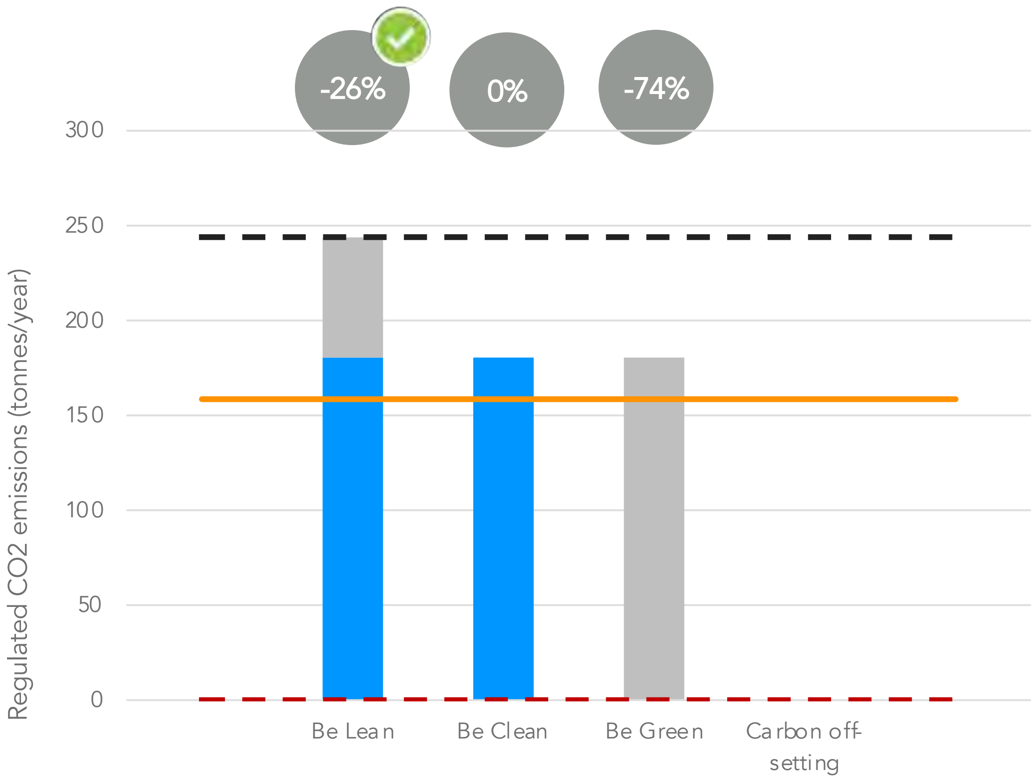
Domestic energy hierarchy and targets for Richmond College – SAP 2012 Carbon Factors

(assuming a carbon factor of electricity of 519gCO_2/kWh)



Domestic energy hierarchy and targets for Richmond College – SAP 10 Carbon Factors

(assuming a carbon factor of electricity of 233gCO_2/kWh)



Site Domestic Emissions (tonnes CO_2 / year)

Carbon savings (tonnes CO_2 / year)

Part L 2013 Target Emissions Rate

Minimum 35% saving on site

	Total regulated emissions (Tonnes CO2/year)	CO2 savings (Tonnes CO2/year)	Percentage saving (%)
Part L 2013 baseline	274.0	-	-
Be lean	219.5	54.5	19.9%
Be clean	219.5	0.0	0.0%
Be green	0.0	219.5	80.1%

Cumulative % reduction in regulated emissions

-100%

	Total regulated emissions (Tonnes CO2/year)	CO2 savings (Tonnes CO2/year)	Percentage saving (%)
Part L 2013 baseline	243.9	-	-
Be lean	180.6	63.4	26.0%
Be clean	180.6	0.0	0.0%
Be green	0.0	180.6	74.0%
Offset		0	

Cumulative % reduction in regulated emissions

-100%

4.0 Terrace Housing

4.1 House Amendment Design Drivers

Improved Thermal Efficiency

Based on Etudes review and recommendations, we wish to revisit the terrace house design to implement Passivhaus principles including rationalising the form and improving the thermal performance.

Alongside internal alterations intended to improve the living spaces, these works can be summarised into three key elements:

1. Reducing the total percentage of external envelope, further reducing the capacity for heat loss.

   Reduce the number of terrace rows to minimise the external envelope

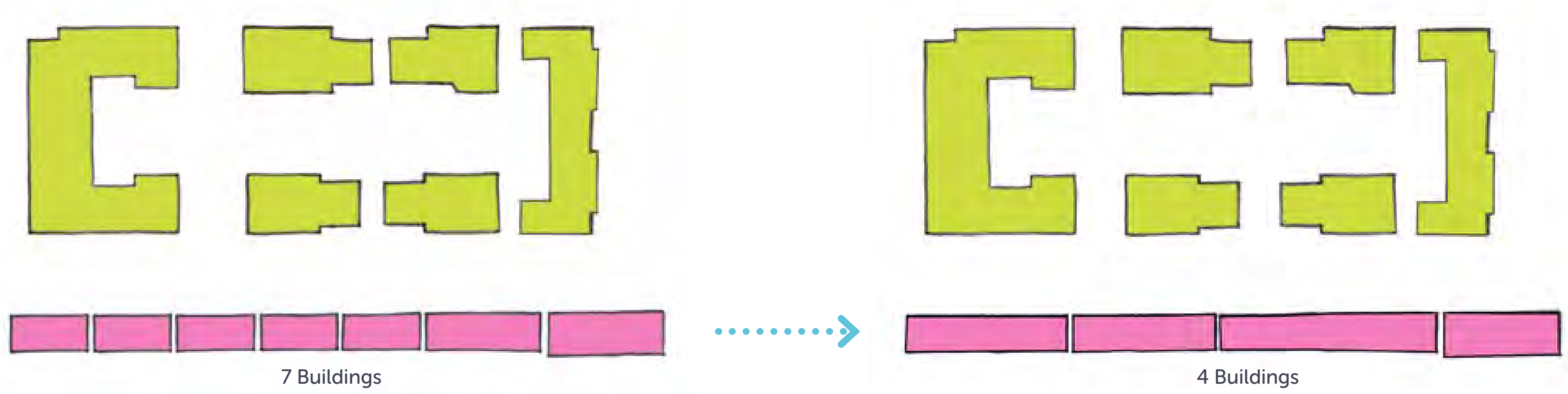
2. Limit wall junctions, insets and overhangs, opportunities for heat loss can be minimised

   Review elevation approach to minimise heat loss, whilst maintaining and attractive streetscape

3. Review the internal layouts, and where possible increase the house widths to allow for better family living spaces.

   Remove two houses to increase the width of the remaining houses for improved functionality.

1



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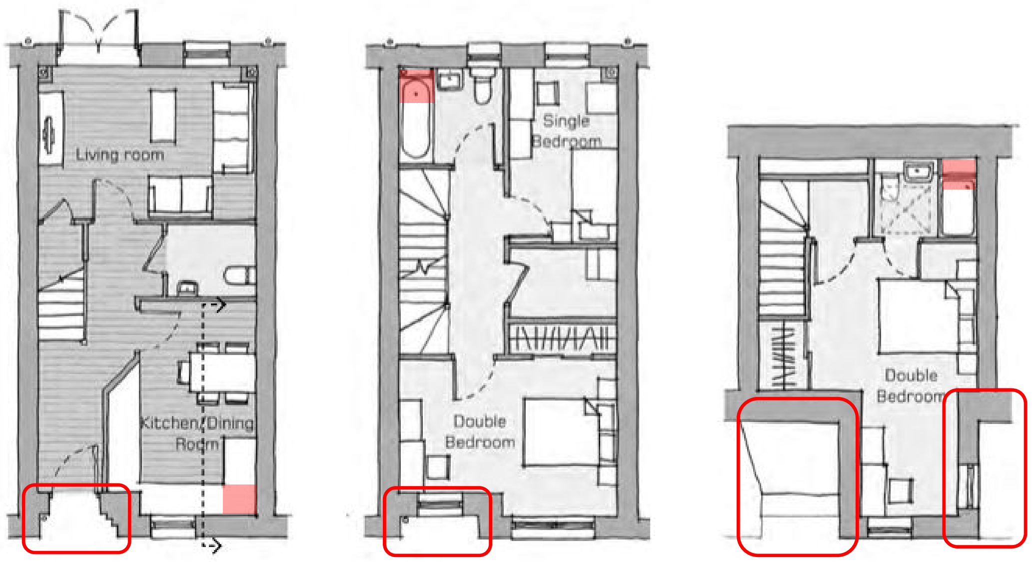
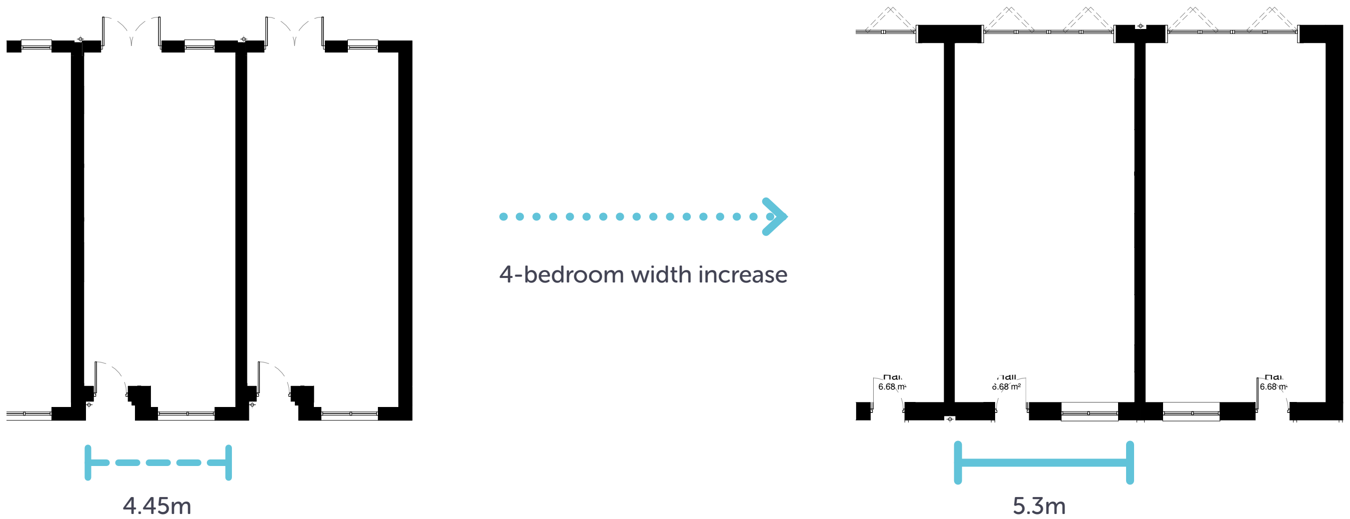


Areas where form could be rationalised

RMA street view of terrace houses

3



4.2 Terrace Grouping

Envelope Efficiency

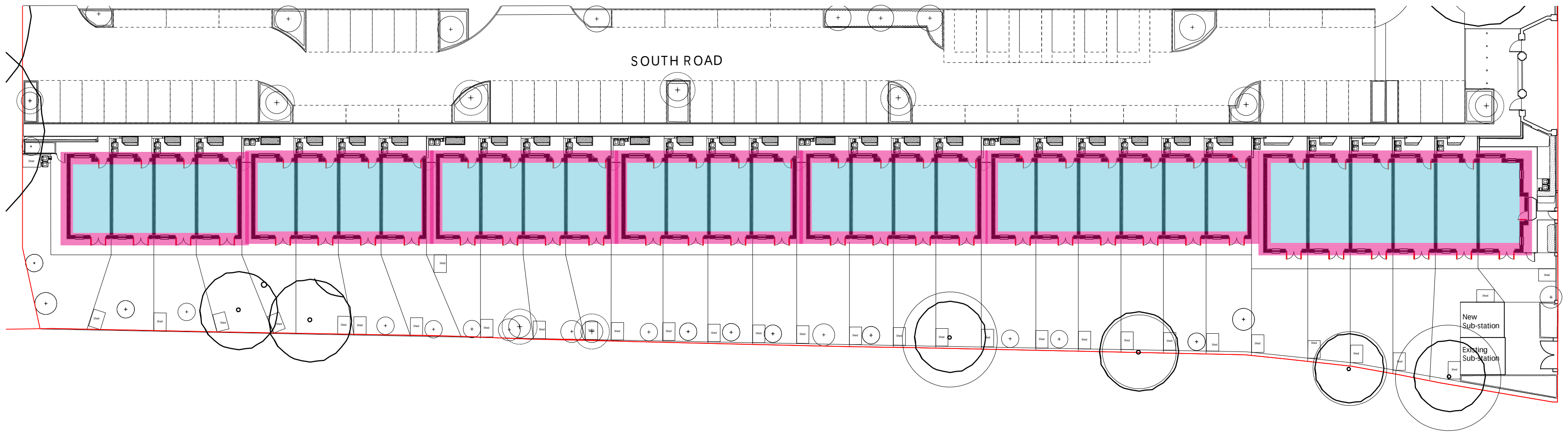
The diagrams below outlines the house plan development which has focused on lessening the percentage of external envelope to improve thermal performance. The number of terrace blocks has been reduced from 7 to 4.

Upon review of the Reserved Matters Approval, Clarion felt that the town houses did not offer a layout that was compatible with modern family living.

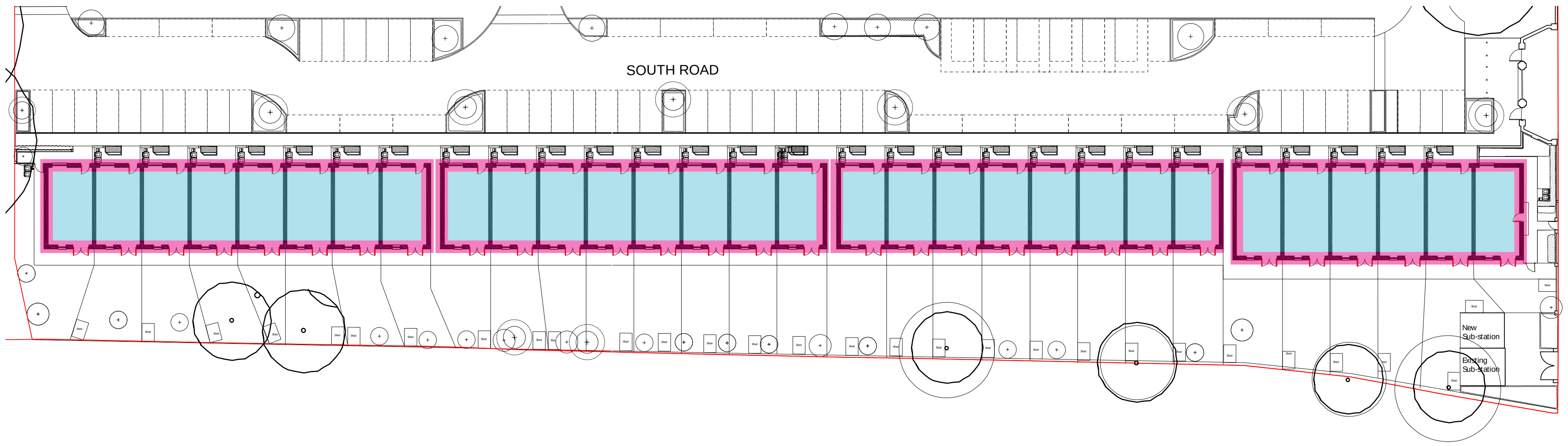
Consequently, each house has slightly increased in width to allow an improved internal layout more suited to family living.

We have also reviewed the parking, cycle and refuse stores and created a more ordered frontage, with on-plot parking and bespoke cycle and refuse stores.

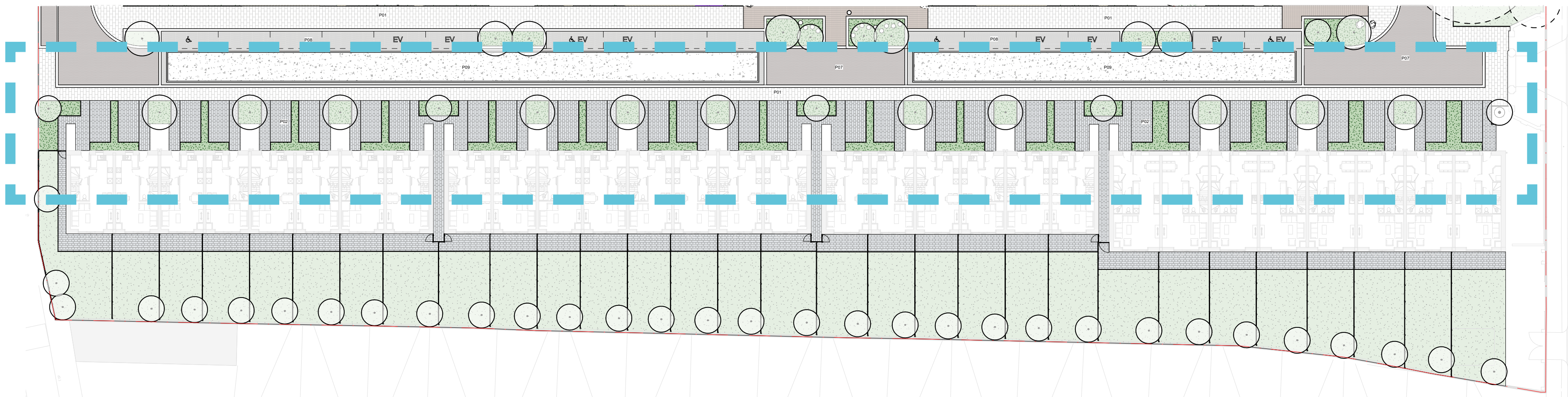
Reserved Matters Application



Rationalised from 7 to 4 buildings



Proposed on-plot parking and roadside cycle & refuse stores



4 Bedroom Houses

As part of the energy efficiency amendments we are also proposing an improved internal layout by increasing the width of the houses and adjusting the plans.

The RMA houses have an internal width of 4.45m, we are proposing increasing these to 5.3m for 4-bedroom homes

Adjacent shows how the 4 bedroom homes have an improved layout with open plan living. These layouts also remove the roadside-facing single bedrooms.

Key amendments:

> Open plan living

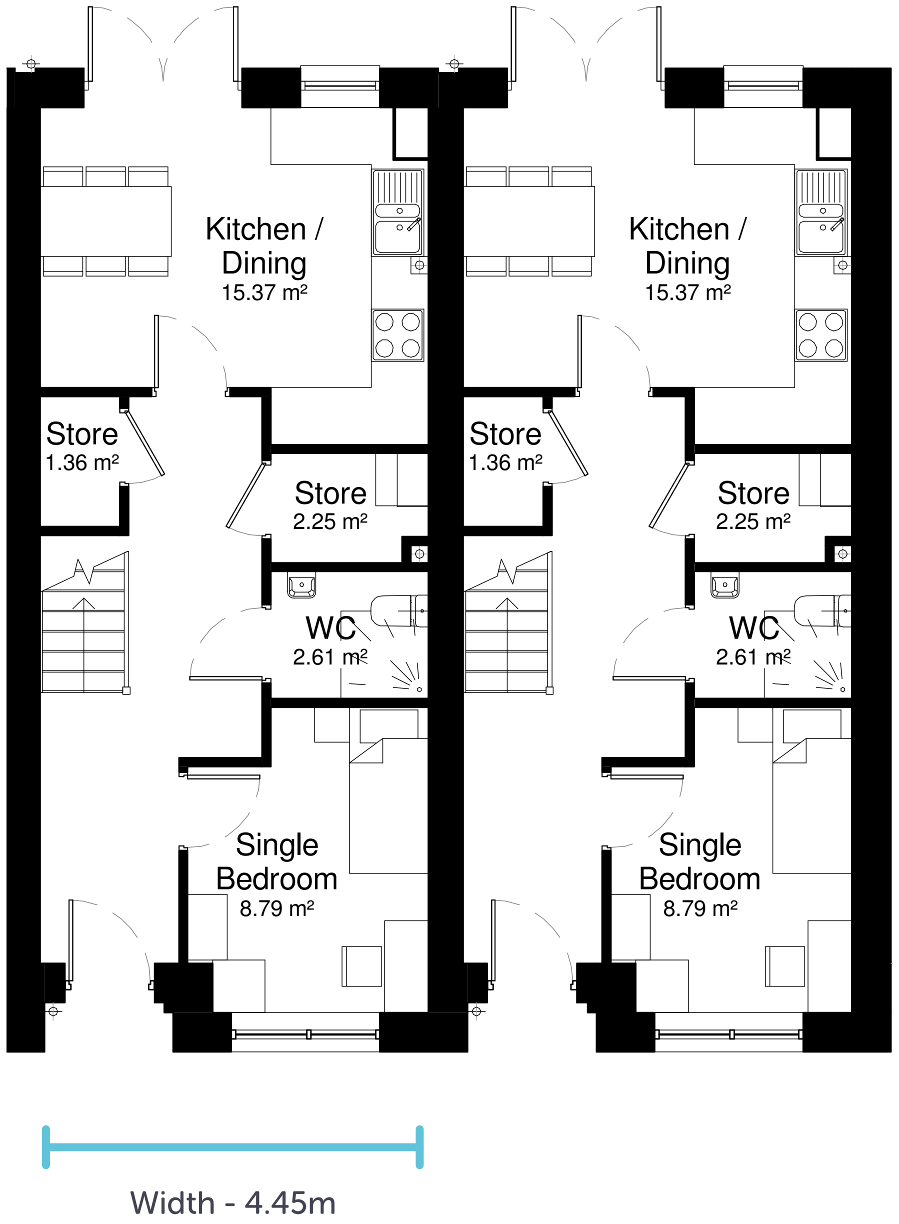
> Larger living room to rear

> Integrated WC and utility allows for enhanced living spaces and moves WM out of Kitchen

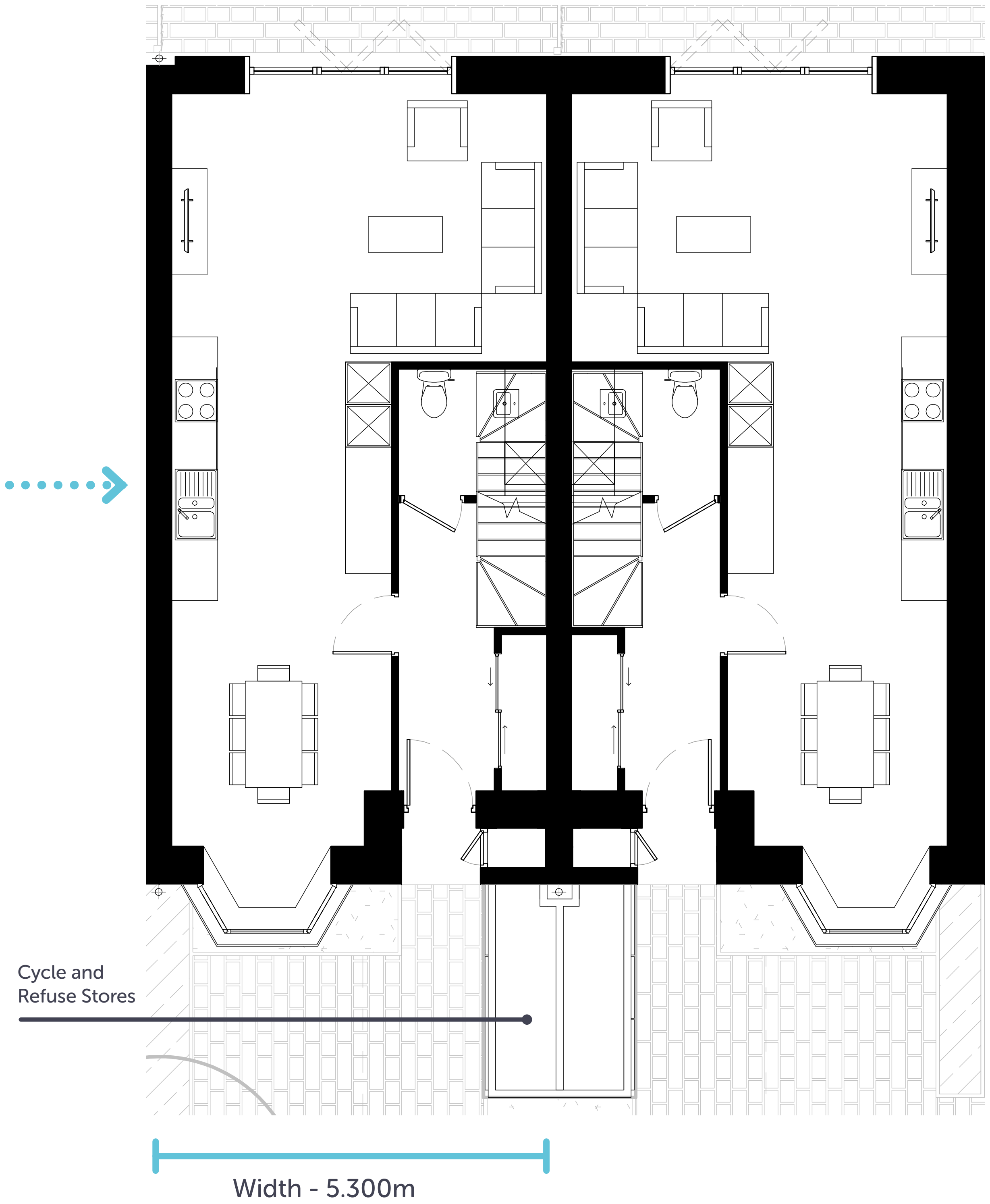
> Refuse and cycle store to street front

> Ground floor road fronting bedroom remove moved to upper level

RESERVED MATTERS APPLICATION



DESIGN PROPOSAL



Location

4.3 Increased Width

3 Bedroom Houses

The RMA houses have an internal width of 4.45m, we are proposing increasing these to 4.875m for all 3-bedroom homes.

Adjacent shows how the 3 bedroom homes have an improved layout with open plan living.

Key amendments:

> Open plan living

> Galley kitchen

> Living room onto garden

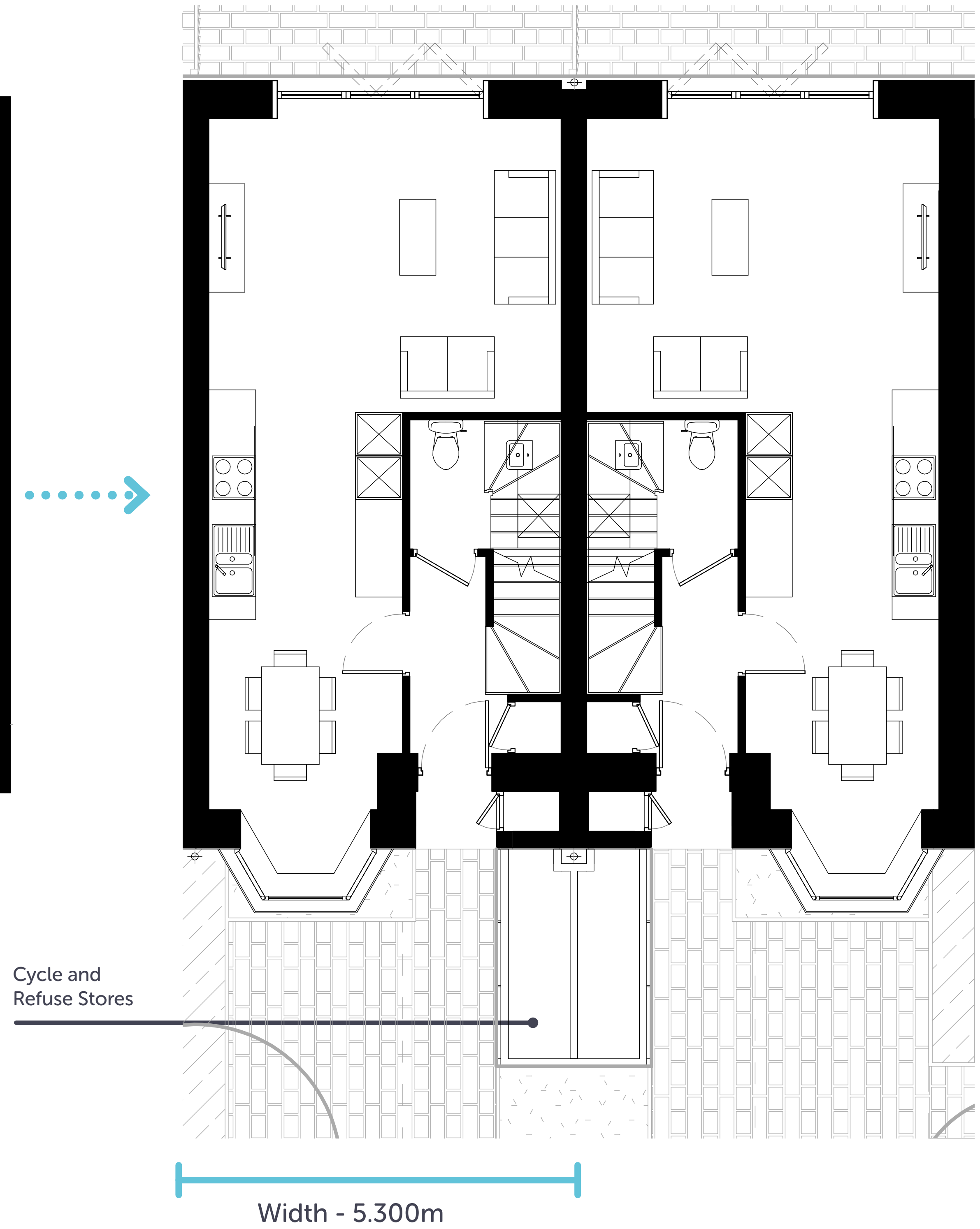
> Integrated WC and utility allows for enhanced living spaces

> Refuse and cycle store to street front

Location

RESERVED MATTERS APPLICATION

DESIGN PROPOSAL



4.4 Design Amendments - Street Scene

Following Etudes energy appraisal and a series of pre-application meetings, we have revised the street scene so that the houses energy performance is increased, as well as delivering 8no. houses as Net Zero Carbon.

We believe that the revised street scene still maintains a strong architectural character that draws on the previous applications 1930's college vernacular.

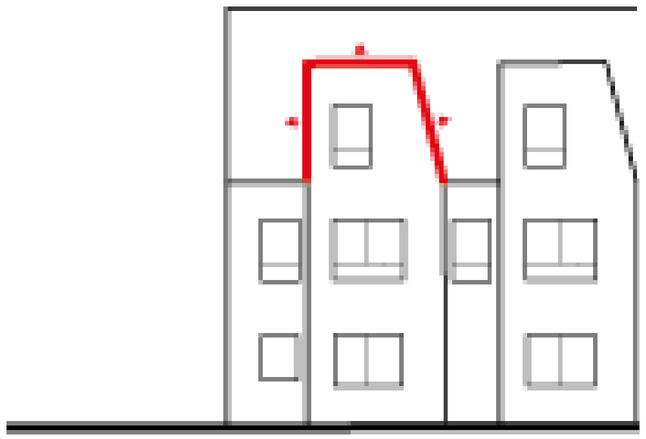
Key drivers

> Pairing of dormer for increased envelope efficiency whereby sharing and internal wall.

> Removal of inset porches to reduce heat loss

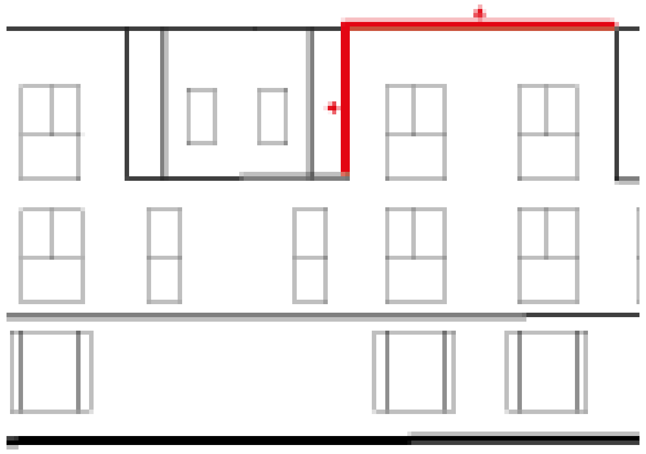
> General rationalised building form to reduce opportunity for heat loss

> Refuse and cycle store to front of property (previously cycles were in the garden with no direct road access).



3no. External Faces

DESIGN EVOLUTION



2no. External Faces

4.5 House Elevations

4 Bedroom Houses

The 8no. 4-bedroom houses have a prominent flat roof bay window at ground and a generous sized terrace off the master bedroom on the 2nd floor.

Glazed Juliet balconies have been added to the bedrooms on the 1st and 2nd floors.

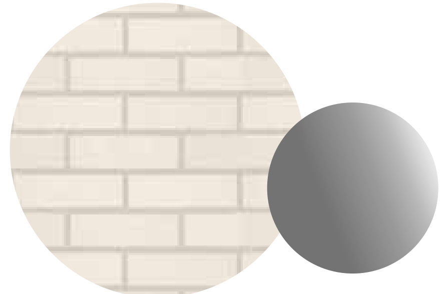
Further embellishment has been applied to tie into the apartment blocks, including double soldier coursing, a reconstituted stone band at base level and Dark Grey window frames and railings.

Rooflights to the South allow light into the ensuite space. In-curtilage cycle and refuse stores allow for easy servicing and access.

T01 - Bay Study

Dark Slate Effect Tile

Buff Multi stock Brick with White coloured mortar



Projecting White Brick Banding with White coloured mortar

4.5 House Elevations

3 Bedroom Houses

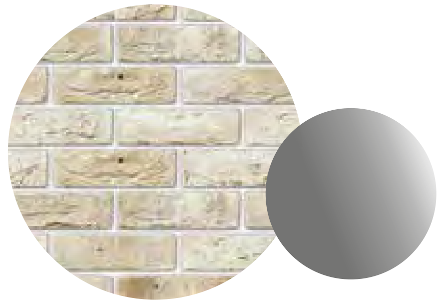
The 28no. 3-bedroom houses have a similar yet paired back proportions that differentiates them from the adjacent larger 4-bedroom terraces.

These houses mirror the detailing applied to the 4-bedroom houses. A glazed Juliet balcony has been added to the bedroom on the 2nd floor.

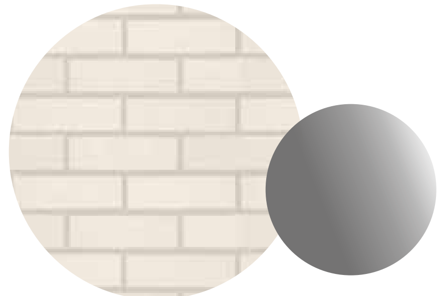
Rooflights to the South allow light into the ensuite space. In-curtilage cycle and refuse stores allow for easy servicing and access.

T4 - Bay Study

Dark Slate Effect Tile



Buff Multi stock Brick with White coloured mortar



Projecting White Brick Banding with White coloured mortar

4.7 CGI - View showing 4 & 3-Bedroom Houses

4.8 CGI - 4-Bedroom Houses

4.9 CGI - 3-Bedroom Houses