SUSTAINABILITY STATEMENT

FOR

18-22 HAVERSTOCK HILL
MIXED USE DEVELOPMENT

VERSION 1.0

Issued by:-

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PROJECT REVISION SHEET

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Date of first issue 01/05/2018….

Prepared by A Sturt

Revision	Date	Details	Changes	Author	Checked
1.0	01/05/2018			A Sturt	P Lindsay

1 INTRODUCTION

The scheme comprises the demolition of an existing building, and the erection of 5 storey building with a ground floor plus basement level comprising of 29 residential (Use Class C3) flats (13 x 1 bed units, 11 x 2 bed units and 5 x 3 bed(Duplex) units) and approximately 278 sqm of commercial space at the ground floor level. The common areas within the apartment block will not be heated and have not been included within this assessment. This Sustainability Statement incorporates the requirements of the Greater London Authority and the London Borough of Camden.

The site is located within the London Borough of Camden and as such the planning application needs to satisfy the requirements of the London Plan 2016. With regards to sustainability, the key elements of this are as follows:

Policy 5.2 (minimising carbon dioxide emissions) explains that developments should try to minimise carbon dioxide emissions by using less energy, supply energy efficiently and use renewable energy.

Policy 5.3 (sustainable design and construction) states that the highest standards of sustainable design and construction should be achieved in London to improve the environmental performance of new developments and to adapt to the effects of climate change over their lifetime.

London Borough of Camden Local Plan

Policy CC1 – Climate Change Mitigation

Policy CC2 – Adapting to Climate Change

Policy CC3 – Water and Flooding

Policy CC4 – Air Quality

Policy CC5 - Waste

This statement provides a summary of sustainability measures proposed along with the BREEAM pre assessment for the shell commercial unit. Detailed reports for each of the topics covered within this statement have been produced by specialist consultants and form part of the application.

2 THE SITE

The existing buildings on the 18-22 Haverstock Hill site consist of three Georgian townhouses (18/18a, 20 & 22) which collectively house 11 apartments (arranged internally in a very convoluted manner). The existing structures are composed of a lower ground floor, ground floor and two upper storeys in a traditional terraced arrangement.

The main facade, which shows evidence of renovation and addition over time, is relatively in distinguished. The only notable feature being the steel entrance canopy, steps and railings. The houses front onto a characterless open space currently used for car parking and refuse bin storage. Two small retail units (A1 & A5) at the east end of this area create a terrace for the first floor flats.

The side elevation, facing Haverstock School, consists of a white render facade and alleyway that gives access to the rear car park.

3 THE PROPOSED APPROACH TO SUSTAINABILITY

This statement sets out the approach that the applicant is proposing to adopt to ensure that the proposal meets the sustainability objectives of the London Plan and Camden planning guidance CPG3. The report includes a discussion of the full range of sustainability issues as shown below:

- Energy and carbon emissions
- Water conservation
- Overheating Risk
- Materials
- Flood risk and surface water management
- Transport
- Minimising pollution
- Waste and Construction site management

4 ENERGY CONSERVATION AND CARBON EMISSIONS

Camden CPG 3 Paragraph 3.20 refers to the CO2 reduction targets stated London Plan Policy 5.2 that new developments needs to follow the given hierarchy using less energy, in particular by adopting sustainable design and construction measures (Policy 5.3), supplying energy efficiently, in particular by prioritising decentralised energy generation (Policy 5.5 and 5.6), and using renewable energy (Policy 5.7).

Policy 5.2A states carbon dioxide emissions should be reduced in accordance with the following energy hierarchy:

- Be lean: use less energy
- Be clean: supply energy efficiently
- Be green: use renewable energy

Policy 5.2B stipulates that the emissions from residential developments are to have zero regulated carbon emissions. The Supplementary Planning Guide 'Sustainable Design and Construction March 2016, provides additional advise stating that dwellings should achieve a minimum of a 35% improvement on Approved Document Part L 2013. The remaining regulated carbon dioxide emissions, to 100%, are then to be off-set through a cash in lieu contribution to the relevant borough to be ring fenced to secure delivery of carbon dioxide savings elsewhere

Non dwelling uses are just required to achieve a minimum 35% improvement below Part L 2013.

A separate Energy Assessment has been prepared by Silcock Dawson & Partners that details the measures to be taken to ensure compliance with the requirements detailed above – see document, 'Energy Assessment for 18-22 Haverstock Hill', a brief summary of this work is supplied below.

Compliance with the building regulations is achieved through energy efficiency measures alone for the residential aspect of the development – see details in Table below.

	Notional Dwelling Building Regulations, Part L1A 2013	Proposed Measures
Air Tightness	5.0 m^3/hr per m^2	4.0 m^3/hr per m^2
Wall U-Value (Long Elevations)	0.18 W/m²°C	0.15 W/m²°C
Apartment walls to unheated common areas.(corridors, stairwells and lift / service shafts)	0.18 W/m²°C	0.18 W/m²°C (uncorrected – as external wall)
Roof U-Value	0.13 W/m²°C	0.12 W/m²°C
Exposed Floor U-Value	0.13 W/m²°C	0.12 W/m²°C
Floor to commercial space	-	0.22 W/m²°C (uncorrected – as external wall)
Window U Value	1.4 W/m²°C	1.1W/m²°C
Glazing G-Value	0.63	0.4
Linear Thermal Transmittance (internal walls to unheated circulation spaces)	Y = 0.05	Equal to or better than Accredited Construction values

The design of the non dwelling uses units will target highly efficient U-values and air tightness, better than those used within the notional building calculation, as shown below:

	Notional Building Building Regulations, Part L2A 2013	Proposed Measures
Air Tightness	5.0 m^3/hr per m^2	5.0 m^3/hr per m^2
Wall U-Value	0.26 W/m²°C	0.15 W/m²°C
Floor U-Value	0.22 W/m²°C	0.12 W/m²°C
Roof	0.18 W/m²°C	0.12 W/m²°C
Glazing U-Value	1.6 W/m²°C	1.5 W/m²°C
Glazing G-Value	0.4	0.55

The development will be served by community condensing boilers, with variable flow controls to promote consistent low flow and return water temperatures around the system and within the primary boiler circuit. The heating system will be designed to operate with water temperatures in the region of 70°C flow, the system will also be designed to meet the recommendations of the Heat Networks Code of Practice and the GLA District Heating manual.

Ventilation to the apartments will be by a balanced system with heat recovery (MVHR).

The non dwelling units will have ventilation plant with an assumed specific fan power is 1.1W/l/s or better and to have a plate heat exchanger with minimum efficiency of 75%.

Within the dwellings, all fixed light fittings will be low energy lamps, including storage and infrequently accessed areas. The lighting to common areas will be provided with PIR movement detectors and daylight control where appropriate.

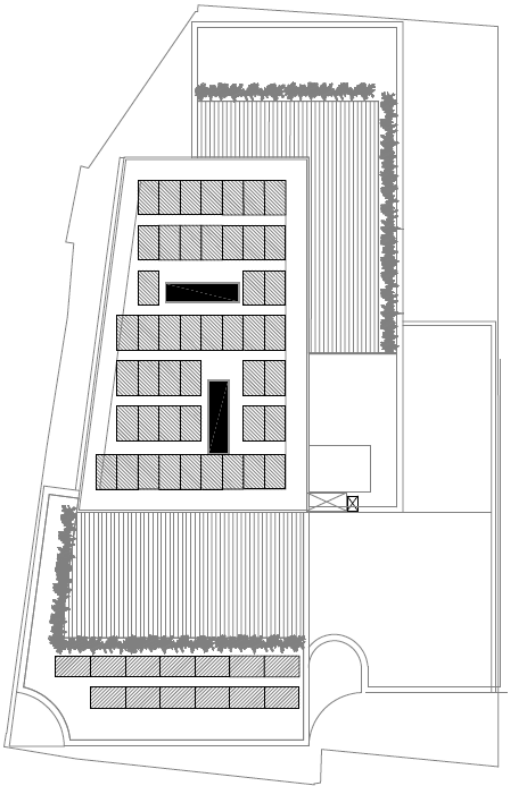
For the non dwelling uses, energy efficient lighting with improved performance relative to the minimum standard is anticipated with an average efficacy of 95 luminaire lumens / circuit watt and 65 LL/CW for display lighting.

The site is not within an area identified has having decentralised energy potential as detailed on the London Heat Map.

It is proposed that a single energy centre will be provided to serve the development, however, due to the low number of apartments it is not viable to install a combined heat and power plant. The design of the plantroom will incorporate features that will ensure connection to any future heat network is possible, this would include adequate space for a heat substation and connection points, and pipework routes to the site boundary.

The focus on ‘lean’ & ‘clean’ with regard to the energy hierarchy in the form of improved energy efficiency and decentralised energy production will take the proposed development a long way towards meeting the requirements of the London Plan, but renewable energy technology will also be required.

The Energy Assessment states that PV panels are technically viable and an installation of 95m² could be installed on the building roof. The drawing below indicates a potential arrangement of the panels on the roofs.



In addition, the Energy Assessment makes the point that air source heat pumps (ASHP) are a viable technology for the commercial units, where the heating loads are relatively small and the likelihood of an incoming tenant wishing to install a reverse cycle Variable Refrigerant Flow air conditioning and heating system is high.

5 WATER CONSERVATION

As highlighted in the London Plan, in dry years London's water consumption already outstrips supply. With a rapidly growing population it is essential to use water efficiently to reduce consumption and the need for large infrastructure schemes to boost supply. The simplest way of reducing water consumption is through the installation of water efficient fittings and plumbing.

It is proposed that this development will incorporate water saving features that will deliver a level of consumption equal to or lower than the requirements of Part G (Sanitation, hot water safety and water efficiency) of the Building Regulations through the specification of water efficient products in both the residential and non residential aspects of the project. Due to the compact nature of the development and the small number of apartments it is not practical to install a grey / rain water recycling installation for the dwellings. The commercial spaces are anticipated to be retail units with very low water demand.

The specification for each apartment therefore will include dual flush WCs, reduced flow taps and showers with low flow aerated shower heads or flow restriction devices. Details are set out in the water calculator below:

Installation Type	Unit of Measure	Capacity /flow rate	Use factor	Fixed use (litres/ person/	litres/ person/day
WC Single Flush	Flush Volume (litres)	0	*4.42*	*0*	0.00
WC Dual Flush	Full flush volume (litres)	6	*1.46*	*0*	8.76
	Part flush volume (litres)	4	*2.96*	*0*	11.84
WC's Multiple fittings	Average effective flushing volume (litres)	0.0	*4.42*	*0*	0.00
Taps (Excluding kitchen/utility room taps	Flow rate (litres/min)	5.0	*1.58*	*1.58*	9.48
Bath (where shower also present)	Capacity to overflow	130	*0.11*	*0*	14.30
Shower (where bath is also present)	Flow rate (litres/min)	8	*4.37*	*0*	34.96
Bath only	Capacity to overflow	0	*0.5*	*0*	0.00
Shower only	Flow rate (litres/min)	0	*5.6*	*0*	0.00
kitchen/utility sink taps	Flow rate (litres/min)	6	*0.44*	*10.36*	13.00
Washing machine	Litres/kg dgy load	8.87	*2.1*	*0*	18.63
Dishwasher	Litres/place setting	1	*3.6*	*0*	3.60
Waste disposal unit	Litres/use (if present=1, if absent=0)	0	*3.08*	*0*	0.00
water softener	Litre/person/day	0	*1*	*0*	0.00
	Total calculated Use				**114.57**
	Contribution from grey water (litres /person/day)				0.00
	Contribution from rain water (litres /person/day)				0.00
	Normalisation factor				0.91
	Total water consumption				**104.26**

With this specification the internal water use will be 104.26l/person/day, which is below the 105.0l/person/day target stated within GLA Supplementary Planning Guidance Sustainable Design and Construction.

For new non-residential developments CPG3 requires that 60% of the available BREEAM water credits are secured at detailed design stage. The BREEAM pre assessment appended to this statement identifies that 100% of the BREEAM credits are anticipated.

Both the residential and non residential aspects of this proposed scheme can be seen to perform strongly in the field of water conservation through the specification of products that remove or restrict the amount of water required within their relevant context. This approach has been taken, as the ability to undertake rainwater or grey water harvesting is limited on this site due to the nature of the design of the buildings, which seek to maximise the use of the land available, making the storage and treatment of rain or waste water a difficult, complex and expensive option to integrate within the scheme.

The provision of water meters is also recognised as an important tool in reducing water usage and in a domestic context they can encourage people to monitor and reduce their water consumption by an average of 10% to 15%. Therefore, all the flats will have an individual, easily accessible water meter installed as part of their specification.

Individual water meters, with pulsed outputs (to allow for connection to a Building Management System) will be supplied to the non residential units, along with leak detection systems to water consuming areas within each unit and on the mains intake to the building.

6 OVERHEATING RISK

Relevant Planning Policies

London Plan Policy 5.9: Overheating and Cooling

Major development proposals should reduce potential overheating and reliance on air conditioning systems and demonstrate this in accordance with the following cooling hierarchy.

1. Minimise internal heat generation through energy efficient design;
2. Reduce the amount of heat entering a building in summer through orientation, shading, albedo, fenestration, insulation and green roofs and walls;
3. Manage the heat within the building through exposed internal thermal mass and high ceilings;
4. Passive ventilation;
5. Mechanical ventilation;
6. Active cooling systems (ensuring they are the lowest carbon options).

Major development proposals should demonstrate how the design, materials, construction and operation of the development would minimise overheating and also meet its cooling needs. New development in London should also be designed to avoid the need for energy intensive air conditioning systems as much as possible.

Energy Efficient Design

The proposed development energy consumption should be minimised through suitable orientation and performance of the building envelope, facades and plant.

The proposed building is of a medium weight construction, comprising light weight walls and concrete slabs.

The nature of the development, and other planning issues with regards to visual building mass, has led to a building design that has a relatively large proportion of dwellings with an open outlook.

The shading effect of adjacent buildings is not significant for the worst case apartments with southwest orientation.

External and recessed balconies will be provided to a selection of dwellings with additional feature walls will provide additional shading to some apartments. The windows are designed to have deep reveals, as indicated over leaf, to improve the shading effect and reduce the direct solar gain. In addition, the building construction will have brick finish providing a degree of thermal mass, and assist to provide more stable temperatures within the apartments.

A very efficient mechanical ventilation system with heat recovery (MVHR) is proposed for the scheme. An efficient unit has been assumed (Specific Fan Power (SFP): 0.42W/L/s and heat recovery efficiency: 90%). The MVHR unit will include a summer bypass in order to provide continuous ventilation during the summer, also helping to mitigate the risk of overheating.

High efficiency low energy lighting and controls will be specified throughout. All residential spaces will utilise 100% low energy lighting. The modelling will be based on the default lighting energy gain of 2 W/m² recommended in CIBSE TM59.

Adaptive Thermal Comfort Assessment Methodology

The overheating assessment is based on the adaptive comfort model following the methodology and recommendations from EN 15251, and modelling has been undertaken following the procedure set out in CIBSE Technical Memoranda 49, 52 and 59.

The thermal modelling has been carried out using EDSL TAS v9.4.2 software. This modelling software is approved by 2013 Building Regulations and is also compliant with CIBSE AM11 requirements. This modelling has been used to test various strategies for ventilation, solar gain reduction, and the use of building's structure to absorb heat.

TM59 tests two criteria to assess overheating risk. One of which is defined in terms of the difference between the actual operative temperature in the room at any time (T_{op}) and the limiting maximum acceptable temperature (T_{max}). The difference between these temperature values is the 'delta T' (ΔT).

DEFINITIONS

Operative Temperature

T_{OP} = 0.5 T_{air} (AirTemp) + 0.5 T_{mrt} (Mean Radiant Temp)

Maximum acceptable temperature

TMAX = 0.33Trm + 21.8

where:

Running Mean Temperature, Trm, is the running average of recent external temperatures. The running mean is calculated using a complicated equation that weights the significance of external temperatures according how recently they occurred. This weighting gives a greater influence for recent days, reducing with time passed as people "forget".

Criterion 1 – Hours of Exceedance (He): *For living rooms, kitchens and bedrooms*: the number of hours during which (ΔT) is greater than or equal to one degree (K) during the period May to September inclusive shall not be more than 3 per cent of occupied hours. (CIBSE TM52 Criterion 1: *Hours of exceedance*).

Criterion 2 – Frequency Assessment: *For bedrooms only*: In addition to criterion 1, to guarantee comfort during the sleeping hours the operative temperature in the bedroom from 10 pm to 7 am shall not exceed 26 °C for more than 1% of annual hours. (*Note*: 1% of the annual hours between 22:00 and 07:00 for bedrooms is 32 hours, so 33 or more hours above 26 °C will be recorded as a fail).

In addition to the adaptive comfort a second test is also carried out for bedrooms to assess comfort conditions during sleeping hours. The operative temperature in bedrooms between 22:00 to 07:00 shall not exceed 26°C for more than 1% of the occupied hours annually. Compliance with the criteria is achieved if the operative temperature does not exceed 26°C for more than 32 hours per year.

Building / Room Categories

TM52 suggests four categories of performance under which buildings should be assessed. The CIBSE suggestion is that designers should aim to remain within the Category II limits for building not used by groups that may be adversely affected by warmer environments.

Category	Explanation	Suggested acceptable range (K)
I	High level of expectation only used for spaces occupied by very sensitive and fragile persons	± 2
II	Normal expectation (for new buildings and renovations)	± 3
III	A moderate expectation (used for existing buildings)	± 4
IV	Values outside the criteria for the above categories (only acceptable for a limited periods)	>4

For the purposes of this study all rooms are assessed as Category II.

Weather Files

The 'London Heathrow' weather file has been selected as the most representative from the data base, due to the inner London location of the development. The exact weather file for the assessment is London_LHR_DSY1_2020 High 50% in accordance with the recommendations within TM59.

Thermal Modelling

The thermal modelling has been carried out using EDSL TAS v9.4.2 software. This modelling software is approved by 2013 Building Regulations and is also compliant with CIBSE AM11 requirements.

Rooms Assessed

A total of 7 apartments have been assessed, taken from a typical floor plan and represents flats of all sizes and orientations. The sample is therefore representative of the majority of dwellings on the development.

Building Construction and Ventilation

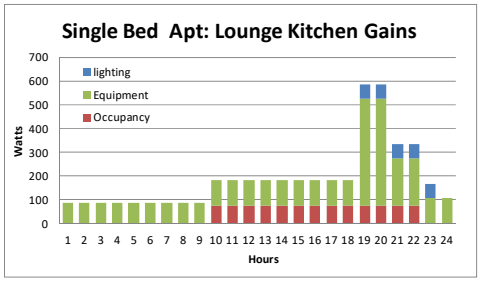
The following table sets out the assumptions made for the calculations for the dwellings.

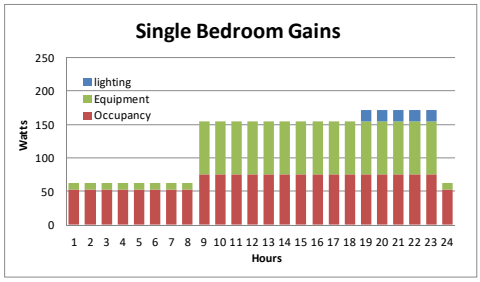
Item	**Dwellings Construction**
Window Properties	Window U value: 1.1W/m^2K Glazing G value: 0.5 Glazing Light Transmittance: 0.621
External wall construction	Brick, cavity, lightweight construction with partial insulation within the cavity and plasterboard on dabs inner surface.
Party wall construction	25mm Plasterboard, cavity, insulation, 25mm plasterboard.
Internal wall construction	Plasterboard stud walls with 15mm plasterboard both sides

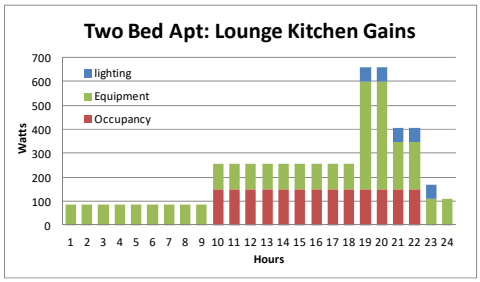
Intermediate floor construction	Plasterboard ceiling, air gap, 200mm concrete/screed, insulation and wood finish.
Ventilation Rates	Background ventilation rate in accordance with Approved Document Part F (approximately 0.4 air changes by MVHR with summer bypass including at least 6l/s extract rate from heat interface unit cupboard). 0.25 air changes by infiltration Additional ventilation is from opening windows to exceed Part F purge ventilation standards when the internal temperature is above 22 ºC. It is assumed that noise will not cause a disturbance to sleep and that windows can be held securely open during sleeping hours with setback of 200mm. Internal doors are fully open during the daytime and open to 100mm whilst the occupants are sleeping. Balcony doors will be held open outside of sleeping hours to promote cross flow ventilation and on set back distance of 100mm in secured position during sleeping hours.

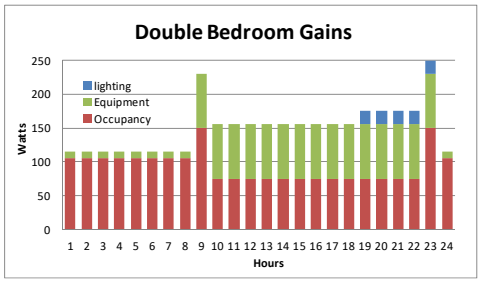
Internal Gains

The following graphs show the internal heat gains for the dwellings and the times at which the gains are present as detailed within TM59.









Lounge heat gains also include heat gains from cooking which are applied from 19:00 to 21:00 the back ground equipment gains are from the refrigerator and other equipment left on standby.

It is apparent from the graphs above that the bedrooms are assumed to be occupied 24 hours, this is intended to reflect the possibility that these rooms could be used as home offices, study areas during the day, or by persons that are confined to the bedrooms for extended periods of time.

Simulation Results

The results for the three weather files are included showing the pass/fail against the TM59 Criteria.

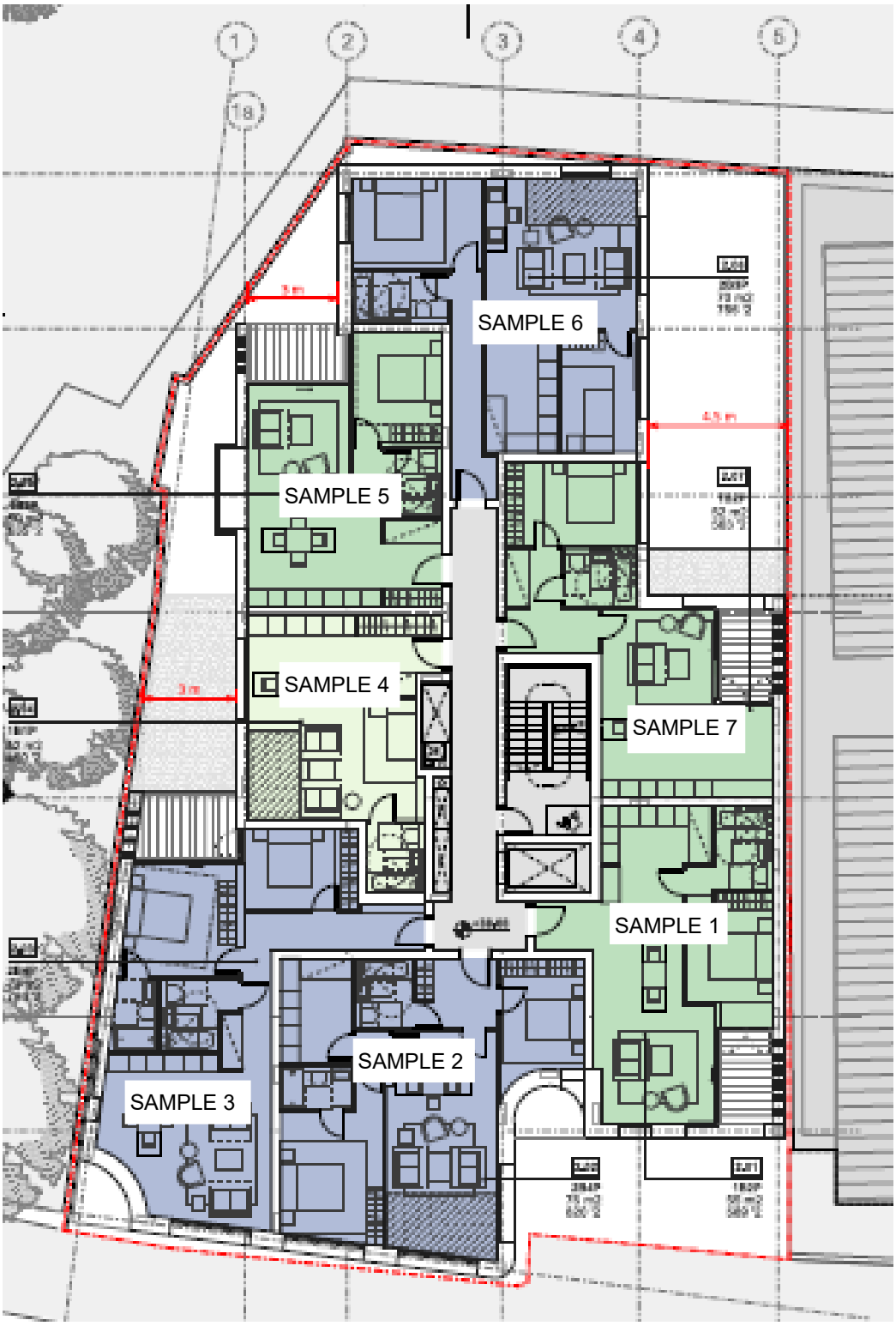
Living Rooms

Apartment	Room Use	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Annual Night Occupied Hours for Bedroom	Max Exceedable Night Hours	Criterion 2: Number of Night Hours Exceeding 26 °C for Bedrooms.	Result
Sample 1 - Lounge	Living Room / Kitchen	1989	59	113	N/A	N/A	N/A	Fail
Sample 2 - Lounge	Living Room / Kitchen	1989	59	79	N/A	N/A	N/A	Fail
Sample 3 - Lounge	Living Room / Kitchen	1989	59	62	N/A	N/A	N/A	Fail
Sample 4 - Lounge	Living Room / Kitchen	1989	59	77	N/A	N/A	N/A	Fail
Sample 5 - Lounge	Living Room / Kitchen	1989	59	38	N/A	N/A	N/A	Pass
Sample 6 - Lounge	Living Room / Kitchen	1989	59	63	N/A	N/A	N/A	Fail
Sample 7 - Lounge	Living Room / Kitchen	1989	59	50	N/A	N/A	N/A	Pass

Bedrooms

Apartment	Room Use	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Annual Night Occupied Hours for Bedroom	Max Exceedable Night Hours	Criterion 2: Number of Night Hours Exceeding 26 °C for Bedrooms.	Result
Sample 1 - Bedroom 1	Bedroom	3672	110	128	3285	32	47	Fail
Sample 2 - Bedroom 1	Bedroom	3672	110	139	3285	32	14	Fail
Sample 2 - Bedroom 2	Bedroom	3672	110	67	3285	32	18	Pass
Sample 3 - Bedroom 1	Bedroom	3672	110	53	3285	32	13	Pass
Sample 3 - Bedroom 2	Bedroom	3672	110	46	3285	32	19	Pass
Sample 5 - Bedroom 1	Bedroom	3672	110	51	3285	32	23	Pass
Sample 6 - Bedroom 1	Bedroom	3672	110	114	3285	32	12	Fail
Sample 6 - Bedroom 2	Bedroom	3672	110	104	3285	32	22	Pass
Sample 7 - Bedroom 1	Bedroom	3672	110	107	3285	32	23	Pass

The tables indicate that the dwellings have a risk of overheating when assessed in accordance with TM59 using the future 2020 weather data.


SAMPLE 6
SAMPLE 5
SAMPLE 4
SAMPLE 7
SAMPLE 1
SAMPLE 2
SAMPLE 3

The units are generally well ventilated though opening windows and balcony doors. The primary contributor to the overheating risk is the solar gain.

This overheating risk assessment responds to Policy 5.9 of the London Plan, and indicates that the majority of the apartments comply or are very close to complying with the CIBSE TM59 with just one apartment type indicating higher temperatures within the lounge.

The overheating identified within Sample 1 lounge is just 20 hours which would equate to four days at just five hours per day above the threshold. It should also be noted that the test methodology assumes that the apartment lounges will be occupied throughout the day.

Of the three bedrooms that fail, two satisfy the overnight criteria indicating that sleep will not be affected, the third exceeds the criteria by 5 hours which is likely to equate to a slightly higher temperature for just one night. The assessment methodology also assumes that bedrooms will be occupied throughout the day, one of the three failing bedrooms exceeds the criteria by just four hours or 0.1% excess over the target value, with the remaining bedrooms exceeding the criteria by 0.8% and 0.5% or up to four days at just five hours per day above the threshold, on the assumption that the bedrooms will be occupied during the daytime.

Solar gain is the major contributor to the overheating effects, and a reduction in the glazed area would be necessary to achieve the significant improvements required to achieve full compliance with CIBSE TM59.

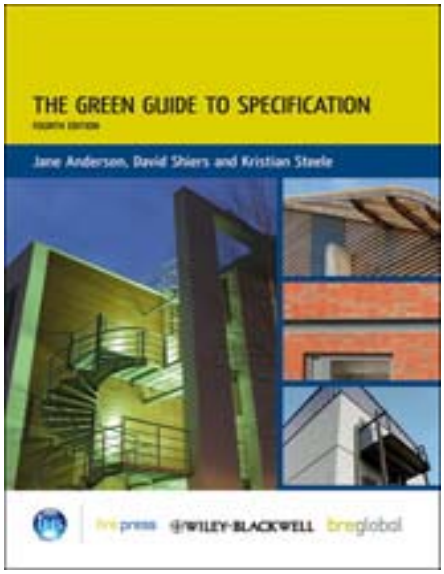
However, further improvements are possible through the use of:

- High performance solar control glazing
- Blinds applied to fixed panes
- Increase thermal mass through the use of exposed heavyweight walls.

7 MATERIALS

The final material specification for this proposal will be clarified once planning permission is granted, although it is proposed that the buildings will be constructed with brick façade and tiles at top floor level with full storey height glazing to the commercial units. It is expected that materials will form a condition attached to the planning permission, however, the developer is committed to ensuring that all materials score as highly as possible in the BRE Green Guide to Specification.

The Green Guide assesses a comprehensive range of construction details for all main building elements to determine the environmental impact of the materials used. Construction details are rated from A+ to G dependent on the assessed impact against a range of environmental indicators. The majority of the materials used in the proposed development for the construction of the walls, roof and windows in particular are expected to achieve an A+ to B rating. In accordance with CPG 3 at least 50% of the material credits will be achieved.



The Green Guide to Specification

In addition, wherever possible all building and finishing materials will be sought from suppliers and manufacturers registered to an environmental management scheme such as FSC or PEFC for timber based products and BES6001 or ISO14001 for all other materials. This will ensure that, as far as possible, the materials have been sourced from suppliers certified as ethical and responsible as far in the supply chain as possible.

All insulation materials selected for this development will have a Global Warming Potential of below 5 in order to minimise the impact on climate change.

Attention will also be paid to materials specified for the internal environment with a focus on materials/finishes containing low/no volatile organic compounds (VoCs) in an effort to improve the internal environment for future residents.

All materials selected will be assessed for their durability in line with their proposed level of use and exposure, with a particular focus on materials that are well adapted to handling climatic variations, long lasting, robust and low maintenance.

8 FLOOD RISK & SURFACE WATER MANAGEMENT

Civil Engineers Engineeria have been employed to provide a detailed Flood Risk and Surface water Management strategy, the following is a summary of their final report.

As confirmed by the EA flood maps the site is located within Flood Zone 1, an area with less than 0.1% annual probability of flooding by rivers and/or the sea. The risk of surface water flooding is also shown as very low.

A medium risk of surface water flooding does exist in the main road (Haverstock Hill) to the south of the site but not within the boundary line. The existing building thresholds are to be approximately 350mm above the adjacent carriageway channel levels. The road falls at approximately 1 in 50 from NW to SE across the site frontage and in extreme storm events storm water will fall away from the buildings before being conveyed SE, along the carriageway.

It is therefore considered that there is a low risk of flooding at the site from all sources.

Nevertheless, suitable measures should be adopted in the design of the new building to mitigate the risk of any localized surface water flooding beaching the site boundary:

The basement should be designed to be of water retaining construction such that any rise in the ground water table or inflow of perched waters cannot pass through the wall into the occupied spaces. A secondary cavity drainage system should also be specified which would collect any leakage and convey the collected water to a sump from where it would be drained to the sewer. It is recommended that advice is sought from a basement tanking specialist.

It is a requirement of The Building Regulations for any pumping systems to provide sufficient storage to accommodate 24 hours storage for the advent of pump or power failure.

Flood-resilient buildings are designed to reduce the consequences of flooding and facilitate recovery from the effects of flooding sooner than conventional buildings. This is typically achieved through the use of water-resistant materials for floors, walls and fixtures and the siting of electrical controls, cables and appliances at higher than normal level.

Food Resilient Construction

It is recommended that flood resilient measures are included in the detailed design and construction of the new building. Government guidance recommends key flood resilient measures as follows:

• Replace timber floors with concrete and cover with tiles,

• Replace window frames and doors with flood protective units of man-made materials

• Fit flood defence barriers to existing doorways and openings,

• Install flood protection plates or replace standard air bricks with special flood resistant ones

• Replace chipboard/MDF kitchen and bathroom units with stainless steel or plastic equivalents,

• Replace gypsum plaster with more water-resistant material, such as lime plaster or cement render,

• Route ground floor services from above and locate service meters and electrical points a minimum of 1500mm above floor level,

• Install main parts of the heating and ventilation system, such as a boiler, upstairs or significantly raised above the ground floor

• Put one-way valves into drainage pipes to prevent sewage backing up into the house

This list is not exhaustive and further advice should be sought from an architect or engineer to obtain site specific flood protection information. More comprehensive guidance on the design of flood resilient buildings is also available via the following link:

http://www.planningportal.gov.uk/uploads/br/flood_performance.pdf

In consideration of the above, a Flood Risk Assessment has not been deemed necessary.

Existing Surface Water Run-off

The site in its current condition is effectively 100% impermeable and the drainage survey has confirmed that two 150mm diameter pipes convey combined water from the site towards the Thames Water Sewer.

The areas contributing to the existing pipes are sufficiently large that during all design events they will be running at full capacity. At an assumed gradient of 1 in 100, the full bore velocity of a 150mm diameter pipe is 17 litres per second.

Qexisting = 2 x 17l/s = 34l/s

This calculated discharge rate is for a 1 in 100 year peak storm event. Current run-off from the site discharges to the existing combined sewer in Haverstock Hill uncontrolled.

Proposed Surface Water Strategy and SUDS Assessment

For new developments current policy advocates that Sustainable Drainage Systems (SUDS) are incorporated in order to control surface water run-off from a site at source.

SUDS promote the use of infiltration systems to allow surface water to drain back into the ground, thereby mimicking natural pre-development conditions.

The London Plan Policy 5.13 Sustainable Drainage states that:

“Development should aim to achieve greenfield run-off rates and ensure that surface water run-off it managed as close to its source as possible in line with the following drainage hierarchy:

• Store rainwater for future use

• Use infiltration techniques, such as porous surfaces in non-clay areas

• Attenuate rainwater in ponds or open water features for gradual release to a watercourse

• Attenuate rainwater by storing in tanks or sealed water features for gradual release to a watercourse

• Discharge rainwater direct to watercourse

• Discharge rainwater to a surface water drain

• Discharge rainwater to the combined sewer”

The Greenfield run-off rate for the site was calculated using the ICP SuDS function of Microdrainage software which is based on Flood Studies Report rainfall data, the rates below include a 0.75 urbanisation factor due to the impermeability of the existing site.

Qbar Urban = 0.8l/s

1 in 1 = 0.7l/s

1 in 30 = 1.4l/s

1 in 100 = 1.6l/s

However the joint Defra and EA R&D Technical Report (Preliminary Rainfall Runoff Management for Developments) states that the minimum limiting discharge for attenuation systems is 5l/sec, as lower flow rates require small diameter flow control devices which are at risk from blockages.

Therefore surface water from the site will be attenuated to 5 l/sec before draining to the public sewer in Haverstock Hill.

To achieve this a SUDS strategy will be incorporated within the development to manage the surface water run-off generated on site. Whilst surface water infiltration systems are promoted to reduce peak run-off rates from a site the proposed development covers the entire footprint of the site at ground floor level. Building Regulations state that 'infiltration devices should not be built within 5m of a building or road…' therefore will not be feasible for this site.

The SUDS strategy for the site will instead rely on surface water attenuation within the site footprint. An attenuation tank will be located beneath the ground floor to the south line of the proposed new basement. The surface water attenuation will incorporate flow control measures which will restrict the allowable outflows from the site to allowable rates.

A storage volume of 20.5m3 is required to attenuate surface water to 5 l/sec for the 1 in 100 year plus 40% (climate change allowance) storm event.

Green roofs may be specified for the development which would reduce runoff volume and reduce the time of concentration, and thus reduce the attenuation requirement. For the purposes of attenuation design, this report assumes that no green roofs are specified.

Maintenance Strategy for SUDS

The successful implementation and operation of a SUDS

Maintenance activities are broadly defined in the CIRIA C753 SuDS manual as:

• Regular maintenance (including inspections)

• Occasional maintenance

• Remedial maintenance

Maintenance will be required to keep the drainage system working efficiently throughout the proposed developments design life. The conventional pipe network should be designed to achieve minimum self-cleansing velocities and access points will be included to carry out maintenance as required by relevant standards.

There should be a suitable maintenance schedule in place for the site covering:

• The onsite gullies and drainage channels which are to be cleaned annually for the lifetime of the development.

• Maintenance checks and identified work should be carried out every six months and in accordance with manufacturer's recommendations for the pumping installations, below ground storage structures, oil interceptors, flow control chamber and any other specific drainage element included during detailed design.

• Maintenance checks should be carried out on all drainage elements following heavy storms.

All on site drainage elements will be maintained by the owner of the site for the lifetime of the development.

9 TRANSPORT

The site currently has a total of 11 flats and two small retails units with an on-site parking provision to both the front and rear of the site, accessible via a dropped kerb on Haverstock Hill which runs for the majority of the site frontage. It is understood that servicing for the two existing retail units is undertaken from the kerbside on Haverstock Hill.

The site is located in a PTAL 6a, zone indicating that it has excellent access to public transport including both public bus services (accessible via the stops on Haverstock Hill) and the London Underground (via Chalk Farm Station on the opposite side of Haverstock Hill). Pedestrian permeability across and along Haverstock Hill is good, with frequent signal controlled crossings including on the site frontage providing access to the opposite side of Haverstock Hill.

The proposed development comprises 29 residential flats and 274m2 of commercial floorspace (Land Use Class A1 / A2 / A3 / A4). The development will be car free, removing the dropped kerb vehicular access and existing parking to the front and rear of the site which will facilitate the works to the Chalk Farm junction to be undertaken by others subject to the appropriate approvals. It is proposed that a timed Loading Bay be located on Haverstock Hill to allow the authority to control the location of delivery vehicles to both the proposed development and the local retail units on Haverstock Hill. The proposals comply with both local and national transport planning policy and guidance, including the relevant cycle and vehicular parking standards.

With reference to the trip generation and attraction of the site, the development is expected to result in a minor increase in vehicular movements across both peak hours. However due to the removal of on-site parking as part of the proposals it is anticipated that a reduction in vehicular movements can be expected in reality.

Conclusion

It is proposed that the development should be acceptable to the local highway authority as it complies with the relevant transport planning policies and is anticipated to result in a reduction in vehicular movements associated with the site.

10 MINIMISING POLLUTION

Air quality consultants ITP Energised have been employed to provide a detailed air quality assessment, the following is a summary of this assessment.

The London Plan1 includes a policy relating to 'air quality neutral development' and aims to bring forward developments that are air quality neutral or better and do not degrade air quality in areas where European Union (EU) limit values (also known as air quality objectives) are not currently achieved.

The Air Quality Neutral Planning Support2 was published in April 2014 to accompany the 2014 publication of the Mayor of London's revised Sustainable Design and Construction supplementary planning guidance (SPG)3. It provides specialist consultants with a methodology to undertake an 'air quality neutral' assessment, as well as emission benchmarks for buildings and transport, against which the predicted values for the considered development will be compared.

With regards to emissions from road traffic and energy plant, the current assessment approach most widely adopted for developments in London is to calculate the change in pollutant concentrations, for the pollutants nitrogen dioxide (NO2) and particulate matter (PM10 and PM2.5). Through the application of physical mitigation (stacks, catalysts, particle traps or ventilation systems), the concentration of pollutants that receptors are exposed to can be controlled so that the effect is not significant. However, the emitted pollutants contribute to the background pollutant concentration in London as a whole, and in combination, are helping to maintain pollutant concentrations higher than legislation requires. To address this, the air quality neutral approach compares the amount of pollutant(s) emitted against a benchmark value, with the aim of minimising the mass of pollutant emitted, instead of solely targeting the ambient concentration of the pollutant.

In accordance with the GLA's Sustainable Design and Construction SPG, an air quality neutral assessment has been undertaken using the latest information about the Proposed Development, as outlined in the Air Quality Impact Assessment and Transport Assessment. The methodology and emission factors are taken from the Air Quality Neutral Planning Support.

The air quality neutral assessment for the Proposed Development compares the building energy related emissions for the energy used in the Proposed Development against calculated benchmark values based upon floor space, land use and energy demand. The assessment shows that the building emissions are within the air quality neutral benchmarks.

The Proposed Development's transport emissions are also within air quality neutral emissions benchmarks for transport.

In addition the boiler plant will comply with the minimum emission standards as set out in the Greater London Authority's (GLA's) Sustainable Design and Construction SPG.

In summary the Proposed Development is considered to be air quality neutral.

[1] Mayor of London (March 2016); The London Plan – The Spatial Development Strategy for London consolidated with alterations since 2011

[2] Air Quality Consultants and Environ (2014), Air Quality Neutral Planning Support Update: GLA 80371.

[3] Mayor of London, (2014); Sustainable Design and Construction Supplementary Planning Guidance, London Plan 2011 Implementation Framework, April 2014.

11 WASTE AND CONSTRUCTION SITE MANAGEMENT

As part of the development proposals the refuse store for the site has been incorporated into the building as is located at basement level, accessible via the internal lift. On collection day refuse will be brought to the highway allowing for refuse collection to be undertaken from the kerbside as in the existing situation.

Haverstock Hill (A502) is part of the Transport for London Road Network and as such delivery vehicles will not be required to leave the network until they reach the site. Vehicles will approach the site utilising the “A Road” network and delivery routes will be identified and provided to the drivers to raise awareness and minimise the impact of construction. The absence of on-site parking, and the existence of local controlled parking zones, will restrict the accessibility of the site by vehicle, thereby limiting the potential impact of construction workers travel on the local network.

A1 APPENDIX 1 - BREEAM PRE ASSESSMENT – TYPICAL COMMERCIAL UNIT (ASSUMED RETAIL)

The developer has targeted a BREEAM rating of Excellent in accordance with the Local Plan. It should be noted that given the size of the units <200m2 p/unit, this serves as a strategic intent rather than definitive. The attached pre assessment provides an indication of how a rating of excellent could be achieved, with each unit subject to individual assessments and strategies. This is not a definitive assessment and the final rating will be subject to detailed design and tenant fit out strategy.

BREEAM : Pre-Assessment Estimator

Total Predicted Score ;	**70.45%**	**Excellent**

BREEAM Rating	% score
Outstanding	≥ 85
Excellent	≥ 70
Very good	≥ 55
Good	≥ 45
Pass	≥ 30
Unclassified	< 30

Project Name; **18-22 Haverstock Hill**

Code Category	Description	Retail Unit		Aim
		Credits	%	
Man 01	Project brief and design	4 of 4	3.13%	To recognise and encourage an integrated design process that optimises building performance. Includes stakeholder consultation and appointment of sustainability champion
Man 02	Life cycle cost and service life planning	4 of 4	3.13%	To deliver whole life value by encouraging the use of life cycle costing to improve design, specification, through-life maintenance and operation , and through the dissemination of capital cost reporting promote economic sustainability. Assumes Life Cycle Costing will be developed.

Code Category	Description	Retail Unit		Aim
		Credits	%	
Man 03	Responsible construction practices	5 of 6	3.91%	To recognise and encourage construction sites which are managed in an environmentally and socially considerate, responsible and accountable manner.
Innovation		0 of 1	0.00%	
Man 04	Commissioning and handover	1 of 2	0.78%	To encourage a properly planned handover and commissioning process that reflects the needs of the building occupants. Assumes Building fabric will be commissioned
Man 05	Aftercare	N/A	N/A	To provide post-handover aftercare to the building owner/occupants during the first year of occupation to ensure the building operates and adapts, where relevant, in accordance with the design intent and operational demands.
Hea 01	Visual comfort	1 of 5	1.00%	To ensure, artificial lighting and occupant controls are considered at the design stage to ensure best practice in visual performance and comfort for building occupants.
Innovation		0 of 1	0.00%	
Hea 02	Indoor air quality	0 of 1	0.00%	To recognise and encourage a healthy internal environment through the specification and installation of appropriate ventilation, equipment and finishes. Assumed not available, building must be designed to be adapted able for natural ventilation.
Hea 04	Thermal comfort	N/A	N/A	To ensure that appropriate thermal comfort levels are achieved through design, and controls are selected to maintain a thermally comfortable environment for occupants within the building.
Hea 05	Acoustic performance	1 of 1	1.00%	To ensure the building's acoustic performance including sound insulation meet the appropriate standards for its purpose.

Code Category	Description	Retail Unit		Aim
		Credits	%	
Hea 06	Safety and security	2 of 2	2.00%	To recognise and encourage effective measures that promote safe and secure use and access to and from the building.
Ene 01	Reduction of energy use and carbon emissions	8 of 12	7.25%	To recognise and encourage buildings designed to minimise operational energy demand, primary energy consumption and CO_2 emissions. Assessment based on Building fabric alone, there is a significant risk that no credits will be available.
Innovation		0 of 5	0.00%	
Ene 02	Energy monitoring	N/A	N/A	To recognise and encourage the installation of energy sub-metering that facilitates the monitoring of operational energy consumption.
Ene 03	External lighting	1 of 1	0.91%	To recognise and encourage the specification of energy efficient light fittings for external areas of the development.
Ene 04	Low carbon design	0 of 3	0.00%	To encourage the adoption of design measures, which reduce building energy consumption and associated carbon emissions and minimise reliance on active building services systems. The only renewables assumed dedicated to retail units are ASHP and these will not generate a 5% CO2 reduction.
Ene 05	Energy efficient cold storage	N/A	N/A	To recognise and encourage the installation of energy efficient refrigeration systems, therefore reducing operational greenhouse gas emissions resulting from the system's energy use.
Ene 06	Energy efficient transportation systems	N/A	N/A	To recognise and encourage the specification of energy efficient transportation systems.
Ene 07	Energy efficient laboratory systems	N/A	N/A	To recognise and encourage laboratory areas that are designed to be energy efficient and minimise the CO_2 emissions associated with their operational energy consumption.

Code Category	Description	Retail Unit		Aim
		Credits	%	
Ene 08	Energy efficient equipment	N/A	N/A	To recognise and encourage procurement of energy efficient equipment to ensure optimum performance and energy savings in operation.
Ene 09	Drying space	N/A	N/A	To provide a reduced energy means of drying clothes.
Tra 01	Public transport accessibility	5 of 5	6.39%	To recognise and encourage development in proximity of good public transport networks, thereby helping to reduce transport-related pollution and congestion. TfL website indicates an AI of 27.
Tra 02	Proximity to amenities	1 of 1	1.28%	To encourage and reward a building location that facilitates easy access to local services and so reduces the environmental, social and economic impacts resulting from multiple or extended building user journeys, including transport-related emissions and traffic congestion. Assumed that amenities are available this stage.
Tra 03	Cyclist facilities	0 of 2	0.00%	To encourage building users to cycle, so promoting exercise and helping reduce congestion and emissions, by ensuring adequate provision of cyclist facilities. Assumes provision will be made for staff to store cycles on site, and that facilities will be provided. Infrastructure to be included within base build.
Tra 04	Maximum car parking capacity	N/A	N/A	To encourage the use of alternative means of transport other than the private car to and from the building, thereby helping to reduce transport-related emissions and traffic congestion associated with the building's operation.
Tra 05	Travel plan	1 of 1	1.28%	To recognise the consideration given to accommodating a range of travel options for building users, thereby encouraging the reduction of reliance on forms of travel that have the highest environmental impact.

Code Category	Description	Retail Unit		Aim
		Credits	%	
Wat 01	Water consumption	N/A	N/A	To reduce the consumption of potable water for sanitary use in new buildings from all sources through the use of water efficient components and water recycling systems.
Wat 02	Water monitoring	1 of 1	2.00%	To ensure water consumption can be monitored and managed, and therefore encourage reductions.
Wat 03	Water leak detection	1 of 1	2.00%	To reduce the impact of water leaks that may otherwise go undetected.
Wat 04	Water efficient equipment	1 of 1	1.33%	To reduce unregulated water consumption by encouraging specification of water efficient equipment.
Mat 01	Life cycle impacts	4 of 5	5.38%	To recognise and encourage the use of construction materials with a low environmental impact (including embodied carbon) over the full life cycle of the building. Calculator tool to applied once materials are determined.
Innovation		0 of 3	0.00%	
Mat 02	Hard landscaping and boundary protection	1 of 1	1.35%	To recognise and encourage the specification of materials for boundary protection and external hard surfaces that have a low environmental impact, taking into account of the full life cycle of materials used. Assumes 80% of external hard standing and boundary protection will have Green Guide rating of A or A+.
Mat 03	Responsible sourcing of materials	3 of 4	4.04%	To recognise and encourage the specification and procurement of responsibly sourced materials for key building elements. The majority of construction elements to be responsibly sourced.
Mat 04	Insulation	1 of 1	1.35%	To recognise and encourage the use of thermal insulation which has a low embodied environmental impact relative to its thermal properties.

Code Category	Description	Retail Unit		Aim
		Credits	%	
Mat 05	Designing for durability and resilience	1 of 1	1.35%	To recognise and encourage adequate protection of exposed elements of the building and landscape, therefore minimising the frequency of replacement and maximising materials optimisation. Assumes measures will be taken to protect vulnerable and exposed parts of the building.
Mat 06	Material efficiency	1 of 1	1.35%	To recognise and encourage measures to optimise material efficiency in order to minimise environmental impact of material use and waste.
Wst 01	Construction waste management	3 of 4	4.13%	To promote resource efficiency via the effective management and reduction of construction waste. Assumes less than 3.4m3 or 3.2tonnes of waste generated per 100m2.
Innovation		0 of 1	0.00%	
Wst 02	Recycled aggregates	0 of 1	0.00%	To recognise and encourage the use of recycled and secondary aggregates, thereby reducing the demand for virgin material and optimising material efficiency in construction. Additional credit may be available if recycled aggregates could be used.
Innovation		0 of 1	0.00%	
Wst 03	Operational waste	1 of 1	1.38%	To recognise and encourage the provision of dedicated storage facilities for a building's operational-related recyclable waste streams, so that this waste is diverted from landfill or incineration. Space to be allocated for operation waste.
Wst 04	Speculative floor and ceiling finishes	N/A	N/A	To encourage the specification and fitting of floor and ceiling finishes selected by the building occupant and therefore avoid unnecessary waste of materials.

Code Category	Description	Retail Unit		Aim
		Credits	%	
Wst 05	Adaptation to climate change	0 of 1	0.00%	To recognise and encourage measures taken to mitigate the impact of extreme weather conditions arising from climate change over the lifespan of the building.
Wst 06	Functional adaptability	0 of 1	0.00%	To recognise and encourage measures taken to accommodate future changes of use of the building over its lifespan.
LE 01	Site selection	1 of 2	1.30%	To encourage the use of previously occupied and/or contaminated land and avoid land which has not been previously disturbed.
LE 02	Ecological value of site and protection of ecological features	1 of 2	1.30%	To encourage development on land that already has limited value to wildlife and to protect existing ecological features from substantial damage during site preparation and completion of construction works. To be confirmed by ecologist.
LE 03	Minimising impact on existing site ecology	2 of 2	2.60%	To minimise the impact of a building development on existing site ecology. To be confirmed by ecologist.
LE 04	Enhancing site ecology	1 of 2	1.30%	To encourage actions taken to enhance the ecological value of the site as a result of development. To be confirmed by ecologist.
LE 05	Long term impact on biodiversity	2 of 2	2.60%	To minimise the long term impact of the development on the site and the surrounding area's biodiversity. To be confirmed by ecologist.
Pol 01	Impact of refrigerants	N/A	N/A	To reduce the level of greenhouse gas emissions arising from the leakage of refrigerants from building systems.
Pol 02	NO_x emissions	N/A	N/A	To contribute to a reduction in national NO_x emission levels through the use of low emission heat sources in the building.

Code Category	Description	Retail Unit		Aim
		Credits	%	
Pol 03	Surface water run-off	4 of 5	4.00%	To avoid, reduce and delay the discharge of rainfall to public sewers and watercourses, thereby minimising the risk and impact of localised flooding on and off-site, watercourse pollution and other environmental damage.
Pol 04	Reduction of night time light pollution	1 of 1	1.00%	To ensure that external lighting is concentrated in the appropriate areas and that upward lighting is minimised, reducing unnecessary light pollution, energy consumption and nuisance to neighbouring properties.
Pol 05	Reduction of noise pollution	N/A	N/A	To reduce the likelihood of noise arising from fixed installations on the new development affecting nearby noise-sensitive buildings.

A2 APPENDIX 2 - Drawings

13528-A-L01-00-101 - First Floor Plan

13528-A-L02-00-102 - Second Floor Plan

13528-A-L03-00-103 - Third Floor Plan

13528-A-L03-00-103 - Third Floor Plan

13528-A-SW-EL-140 - South West Elevation

13528-A-NW-EL-141 - North West Elevation

13528-A-NE-EL-142 - North East Elevation

13528-A-SE-EL-143 - South East Elevation

13528-A-XX-S-150 - Section

13528-A-XX-S-151 - Section

13528-A-XX-S-152 - Section