



Pentavia, Mill Hill

London NW7 2ET

Sustainability Statement

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Contents

1	Executive Summary.....	1	11.3	BREEAM Schemes – Pentavia Mill Hill.....	17
2	Introduction	2	11.4	BREEAM Categories	17
2.1	Site Location & Description.....	2	11.5	BREEAM Levels	17
2.2	Proposed Development.....	2	11.6	BREEAM Minimum Standards	17
2.3	Report Objectives.....	2	11.7	BREEAM Process	18
2.4	Report Structure	2	11.8	BREEAM – Prediction Summary	18
3	Planning Context	3	11.9	Conclusion – Next Steps	20
3.1	National Planning Policy Framework (NPPF) (2012)	3	12	London Borough of Barnet – SPD on Sustainable Design and Construction	21
3.2	The London Plan (2016).....	3	13	Conclusion.....	22
3.3	The Draft London Plan (2018).....	3	14	Appendices.....	23
3.4	Greater London Authority (GLA) Supplementary Planning Guidance (SPG) on Sustainable Design and Construction (April 2014).....	4	14.1	London Borough of Barnet SPD on Sustainable Design and Construction Requirements.....	23
3.5	Barnet’s Local Plan – Core Strategy – Development Plan Document (2012)	4			
3.6	Barnet – Development Management Plan (2012)	4			
3.7	Barnet – Supplementary Planning Document – Sustainable Design and Construction (2016).....	4			
4	Energy	5			
5	Climate Change	7			
5.1	Climate Change Mitigation	7			
5.2	Climate Change Adaptation.....	7			
6	Water, Flood Risk & Drainage	8			
6.1	Flood Risk and SuDS.....	8			
6.2	Water Efficiency.....	8			
7	Sustainable Construction Process / Materials Recycling	10			
7.1	Sustainable Construction	10			
7.2	Construction Materials.....	10			
7.3	Operational Waste	11			
8	Pollution.....	12			
8.1	Noise Pollution.....	12			
8.2	Operational noise pollution.....	12			
8.3	Construction phase noise pollution	12			
8.4	Light Pollution.....	12			
8.5	Air Pollution	12			
8.6	Demolition and Construction Phase.....	12			
8.7	Operational Phase	13			
9	Landscape & Biodiversity.....	14			
9.1	SQE findings and key recommendations	14			
9.2	BREEAM specific guidance	14			
9.3	Landscaping Proposal	14			
10	Sustainable Transport / Accessibility	16			
11	BREEAM Strategy	17			
11.1	Introduction	17			
11.2	Background.....	17			

1 Executive Summary

This Sustainability Statement has been developed to detail the sustainability features of the development and demonstrates how they relate to the following guidance documents:

- The London Plan (2016) and Draft London Plan (2018);
- London Mayor's Supplementary Planning Guidance on Sustainable Design and Construction (2014);
- London Borough of Barnet (LBB) SPD on Sustainable Design and Construction (2016);
- Barnet Core Strategy (2012);
- Barnet Development Management Policies Document (2012);
- Pentavia Retail Park, Mill Hill Draft Planning Brief (2016); and
- BREEAM Sustainability Assessment Tool (2018).

The BREEAM New Construction, Non-domestic 2018 Assessment tool and the London Borough of Barnet SPD – Sustainable Design and Construction have been reviewed and used to optimise the environmental strategy of the development and to demonstrate the sustainability credentials of the scheme. This is in line with the London Borough of Barnet SPD on Sustainable Design and Construction Section 2.20 and Barnet – Development Management Plan (2012) Policy DM-02.

Each of the BREEAM and Barnet's SPD – Sustainable Design and Construction criteria was fully discussed at a Sustainability workshop led by a BREEAM Assessor/Accredited Professional within chapmanbdsp environmental team and attended by the project team on 12th March 2019. This meeting has ensured that all members of the development team have a full understanding of the successful integration of the SPD requirements and BREEAM credits and process into their design.

The pre-assessment shows that a BREEAM 'Excellent' rating is robustly targeted for the retail and for the 'D1 use' part of the scheme with a targeted score of 77.30% and 77.90% respectively.

A formal assessment will take place once the tender documentation is produced and will require submission of a full evidence bundle from the client and the design team to show compliance with the credits. The BREEAM assessor has been and will continue to form an integral part of the design team and a consistent point for reference, review and questions. This approach is proven through experience to offer the surest route to successful BREEAM certification and holistic sustainable design.

The Sustainability Statement for Pentavia, Mill Hill demonstrates that the design will holistically incorporate sustainable principles into the full range of sustainability aspects covered by BREEAM and the London Borough of Barnet SPD on Sustainable Design and Construction: Energy, Climate Change, Water, Flood Risk & Drainage, Transport, Materials, Waste & Recycling, Pollution, Landscaping & Ecology.

2 Introduction

Chapmanbdsp has been commissioned by Meadow Residential to provide a Sustainability Statement in support of the detailed planning application for the proposed Pentavia, Mill Hill development in London Borough of Barnet, London (the Site).

2.1 Site Location & Description

The site is the former Pentavia Retail Park which lies in the Mill Hill ward to the north of the London Borough of Barnet. The site consists of a retail park of 9,053m² unrestricted A1 floorspace. The site is currently occupied by a Kosher Outlet and Together Plan (a charity occupying the former Homebase unit).

2.2 Proposed Development

The proposal is for 844 residential units as well as a mixture of commercial spaces which aims to make better use of the existing Pentavia Retail Park. Redeveloping the site is proposed to ensure it becomes more sustainable for the community. The proposal is based on our aspiration to achieve the following key objectives for the building, many of which we hope align with the Council's own vision for the building as outlined within the Pentavia Retail Park, Mill Hill Draft Planning Brief (2016):

- Redevelop the site to provide much needed housing;
- Create new buildings of high architectural quality;
- Provide a new public realm that promotes community cohesion;
- Improve public connections to the site by providing desired routes;
- Provide Build to Rent apartments of good quality and size, which meet contemporary residential standards;
- Activate and enliven the southern entrance of the site;
- Positively address the challenges presented by the site's proximity to busy motorways;
- Provide a green landscape buffer to Bunns Lane;
- Create a greater variety of landscape and a new sequence of spaces and courtyards throughout the scheme for residents to enjoy;
- Provide a 'traditional' building configuration, which fits in with Mill Hill's local vernacular and character;
- Create a new place where people will choose to live with a range of new homes, including affordable homes that contribute to housing choice;
- Provide a new employment space to serve the needs of modern businesses particularly small to medium enterprises;
- Establish new outdoor amenity space and landscaping of a quality that enhances this location on the edge of Mill Hill;
- Provide new and ancillary small-scale 'non-destination' retail and leisure uses that serves the needs of the new development;
- Develop new and ancillary community space, such as a nursery, that serves the needs of Colindale and Mill Hill;
- Ensure exemplary standards of sustainable design and environmental quality in order to mitigate and adapt to the effects of a changing climate as well as respond to the challenging environmental context of the location; and
- Improve existing transport infrastructure and creation of new pedestrian and cycle links to Mill Hill Town Centre, Colindale, Mill Hill Park, Cophthall and local transport nodes.

2.3 Report Objectives

The objectives of this report are to:

- Demonstrate how the proposed development will meet and exceed the sustainability standards set by London Borough of Barnet and the London Plan;
- Identify areas for consideration at the early stages of the project to facilitate the incorporation of the principles of sustainable design and construction into the design of the development; and
- Summarise the result of the BREEAM pre-assessments exercise carried out for the scheme, detailing the commitments made by the client and the design team.

2.4 Report Structure

This introductory section is followed by a comprehensive review of national/regional/local policies on sustainability. Section 3 summarises the results of the energy strategy. Sections 4 - 10 detail the sustainability strategy for the scheme related to Climate Change Mitigation & Adaptation, Water Efficiency, Flood Risk and SUDs, Pollution, Sustainable Construction Processes/Materials & Recycling, Landscaping & Biodiversity and Sustainable Transport/Accessibility. Section 11 summarises the results of the BREEAM pre-assessment exercise carried out for the non-domestic parts of the scheme whilst Section 13 provides a summary and conclusion on the Sustainability strategy for the scheme.

3 Planning Context

3.1 National Planning Policy Framework (NPPF) (2012)

The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these are expected to be applied. Taken together, these policies articulate the Government's vision of sustainable development, which should be interpreted and applied locally to meet local aspirations. The ministerial foreword of this NPPF highlights that 'the purpose of planning is to help achieve sustainable development' and that sustainable development 'should go ahead, without delay - a presumption in favour of sustainable development that is the basis for every plan, and every decision'.

Sustainable development is defined in the NPPF as comprising developments 'meeting the needs of the present without compromising the ability of future generations to meet their own needs' in line with the definition of the Brundtland Commission ('Our Common Future', 1987). The NPPF also refers to the five guiding principles of sustainable development set out in the UK Sustainable Development Strategy, Securing the Future: living within the planet's environmental limits; ensuring a strong, healthy and just society; achieving a sustainable economy; promoting good governance; and using sound science responsibly.

This sustainability statement has been developed in line with the NPPF.

3.2 The London Plan (2016)

This Spatial Development Strategy for Greater London includes objectives to reduce the capital's impact on, and exposure to, the effect of climate change. The most relevant policies for this Sustainability Statement are:

Policy 5.3: 'Sustainable Design and Construction'

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. Developments should incorporate the following sustainable design principles:

- Minimising carbon dioxide emissions across the site, including the building and services (such as heating and cooling systems);
- Avoiding internal overheating and contributing to the urban heat island effect;
- Efficient use of natural resources (including water), including making the most of natural systems both within and around buildings;
- Minimising pollution (including noise, air and urban runoff);
- Minimising the generation of waste and maximising reuse or recycling;
- Avoiding impacts from natural hazards (including flooding);
- Ensuring developments are comfortable and secure for users, including avoiding the creation of adverse local climatic conditions; and
- Securing sustainable procurement of materials, using local supplies where feasible, and promoting and protecting biodiversity and green infrastructure.

Other relevant policies:

The following other London Plan policies are considered relevant to this Sustainability Statement:

- Policy 5.2: 'Minimising Carbon Dioxide Emissions';
- Policy 5.6: 'Decentralised Energy In Development Proposals';
- Policy 5.7: 'Renewable Energy';
- Policy 5.9: 'Overheating and Cooling';
- Policy 5.10: 'Urban Greening';
- Policy 5.11: 'Green roofs and development site environs';
- Policy 5.12: 'Flood Risk Management';
- Policy 5.13: 'Sustainable Drainage';
- Policy 5.16: 'Waste net self-sufficiency';
- Policy 5.17: 'Waste capacity';
- Policy 6.9: 'Cycling';
- Policy 6.10: 'Walking';
- Policy 7.14: 'Improving Air Quality';
- Policy 7.15: 'Reducing and managing noise, improving and enhancing the acoustic environment and promoting appropriate soundscape'; and
- Policy 7.19: 'Biodiversity and Access to Nature'.

3.3 The Draft London Plan (2018)

The Draft London Plan was published in August 2018. Although yet to be adopted as official planning policy, many of the proposals within have been considered to help to inform the Sustainability Statement. Such policies include:

- Policy G1: Green infrastructure
- Policy G5: Urban greening
- Policy G6: Biodiversity and access to nature
- Policy G1: 'Green infrastructure';
- Policy SI1: 'Improving air quality';
- Policy SI2: Minimising greenhouse gas emissions
- Policy SI3: Energy infrastructure
- Policy SI4: Managing heat risk
- Policy SI5: Water infrastructure
- Policy SI8: Waste capacity and net waste self sufficiency
- Policy SI12: Flood risk management
- Policy SI13: Sustainable drainage
- Policy T5: Cycling

3.4 Greater London Authority (GLA) Supplementary Planning Guidance (SPG) on Sustainable Design and Construction (April 2014)

This Supplementary Planning Guidance (SPG) provides guidance on what measures developers can include in their building designs and operations to achieve the sustainability targets set out in the London Plan. This guidance document includes 3 main sections:

- Chapter 2: 'Resource Management';
- Chapter 3: 'Adapting to climate change and greening the city'; and
- Chapter 4: 'Pollution Management - Land, Air, Noise, Light and Water'

3.5 Barnet's Local Plan - Core Strategy - Development Plan Document (2012)

Barnet's Local Plan embodies spatial planning - the practice of 'place shaping' to deliver positive social, economic and environmental outcomes and provide the overarching local policy framework for delivering sustainable development in Barnet.

- Policy CS13: Ensuring the efficient use of natural resources - The London Borough of Barnet will:
 - Promote the highest environmental standards for development and through our SPD, on Sustainable Design and Construction and Green Infrastructure we will continue working to deliver exemplary levels of sustainability throughout Barnet in order to mitigate and adapt to the effects of a changing climate;
 - Expect all development to be energy efficient and seek to minimise any wasted heat or power;
 - In line with London Plan Policy 5.2 Minimising carbon dioxide emissions, expect major development in accordance with the Mayor's energy hierarchy to reduce carbon dioxide emissions beyond the 2010 Building Regulations.
 - Maximise opportunities for implementing new district-wide networks supplied by decentralised energy (including renewable generation) in partnership with key stakeholders in areas of major mixed-use growth including town centres. Where feasible we will expect all development to contribute to new and existing frameworks;
 - Make Barnet a water efficient borough and minimise the potential for fluvial and surface flooding by ensuring development does not cause harm to the water environment, water quality and drainage systems. Development should utilise Sustainable Urban Drainage Systems (SUDS) in order to reduce surface water run-off and ensure such run-off is managed as close to its source as possible subject to local geology and ground water levels;
 - We will improve air and noise quality by requiring Air Quality Assessments and Noise Impact Assessments from development in line with Barnet's SPD on Sustainable Design and Construction.

3.6 Barnet - Development Management Plan (2012)

Barnet Development Management Plan forms part of Barnet's Local Plan and sets out the policy framework for decision making on planning applications.

- Policy DM-02 - Development standards - Where appropriate, development will be expected to demonstrate compliance with the following national and London wide standards supported by the guidance set out in the Council's suite of Supplementary Planning Documents:
 - BREEAM, the environmental assessment method for non-residential development;
 - By Design, the CABI urban design principles;
 - Lifetime Homes, the 16 design criteria required by the London Plan Policy 3.8;
 - Wheelchair accessibility, the London Plan Policy 3.8;

- Minimum floor space, the London Plan Policy 3.5;
- Outdoor amenity space, the Sustainable Design and Construction SPD;
- Secured by Design, the national Police initiative; and
- Play space, the London Plan Policy 3.6.

3.7 Barnet - Supplementary Planning Document - Sustainable Design and Construction (2016)

The London Borough of Barnet SPD on Sustainable Design and Construction sets out Barnet's technical requirements for environmental design and construction management. The SPD sets out requirements on air, noise, water, energy, water, waste and habitat quality in order to achieve protection and enhancement of the environment. The SPD requirements are linked to existing national standards and guidance.

This document includes specific requirements in the following categories relevant to the Pentavia, Mill Hill scheme:

- Minimum Residential Space Standards;
- Internal Layout and Design;
- Outdoor Amenity Space;
- Daylight, Privacy (minimum distance), Outlook and Light Pollution;
- Microclimate - Wind and Thermal Conditions;
- Accessible and adaptable dwellings;
- Wheelchair User Dwellings;
- Energy Use in New Buildings;
- Decentralised Energy;
- Retrofitting of Existing Buildings;
- Water Efficiency;
- Waste Strategy;
- Air Quality;
- Noise Quality;
- Flood Risk, Sustainable Urban Drainage Systems and Water Quality;
- Biodiversity and Habitat Quality;
- Archaeological Investigation;
- Pollution Prevention, Contaminated Land Remediation and Construction Management;
- BREEAM; and
- Considerate Constructors Scheme.

4 Energy

In line with the London Borough of Barnet Core Strategy, Pentavia, Mill Hill has adopted BREEAM New Construction 2018 Assessment tool and the London Borough of Barnet SPD - Sustainable Design and Construction as the framework to benchmark its wider sustainability performance. The project particularly focuses on carbon emissions reduction in line with the latest London Plan guidance and GLA's Energy Hierarchy with its "Lean-Clean-Green" approach.

The energy strategy for this mixed-use development focuses on providing high quality dwellings and non-domestic spaces that are comfortable throughout the year, but with minimal energy consumption and carbon emissions. The design approach for Pentavia, Mill Hill follows the energy hierarchy i.e. being 'lean, clean and green' to achieve the following targets:

- reduce regulated CO₂ emissions below those of a development compliant with Part L 2013 of the Building Regulations through energy efficiency measures alone (be lean);
- 35% on-site reduction beyond Part L 2013 for non-residential development; and,
- zero carbon target for residential developments, with at least a 35% on-site reduction beyond Part L 2013 and proposals for making up the shortfall to achieve zero carbon, where required.

These targets are in line with the GLA's Sustainable Design and Construction SPG, Barnet's SPD on Sustainable Design and Construction, Barnet's Development Plan Document as well as the London Plan 2016 and the London Borough of Barnet Core Strategy.

The design approach for Pentavia, Mill Hill has targeted demand reduction measures first, giving priority to the optimisation of the building fabric in order to reduce the need for both heating and cooling. The objective was to have a building as energy efficient (i.e. 'lean') as possible and not relying on overly complicated systems or technologies to deliver a low carbon performance.

The design of the buildings together with the MEP systems and sustainability features have been optimised so that demand for energy was minimised. High level of envelope insulation and optimised solid-to-glazing ratios are applied to the façade design to ensure heating demand is minimised and in response to the site's surroundings; whilst window and door openings are provided, where possible, for passive ventilation to reduce the need for cooling. Efficient LED lighting and mechanical ventilation with high rate of heat recovery are implemented throughout to further reduce energy demand. The energy efficiency measures will lead to 5.8% improvement over Part L 2013 for the scheme overall.

In the absence of a viable district energy network connection in close proximity to Pentavia, Mill Hill's site, the current servicing strategy also allows for future connection to district heating scheme by providing a space for heat exchanger in the communal plantroom and a single capped of pipework connection point should one become available.

The development will include a low carbon highly efficient communal heating network serving all domestic and non-domestic areas. A single energy centre will be comprised of communal gas-fired cogeneration scheme with back-up natural gas fired boilers for space heating and domestic hot water. Cooling energy will be supplied from highly efficiency air cooled chillers in the basement for the non-domestic areas of the development. A PV array located on unshaded roofs will further reduce the scheme's electricity demand.

The design of Pentavia, Mill Hill was primarily focused on reducing energy demand ("be lean") and implementation of very low carbon energy generation ("be clean") that includes the use of a good quality CHP that is based on high and stable domestic hot water demand all year round to operate for most of the year and generate significant carbon savings. Reduced demand achieved by a 'fabric first' approach, with good performing fabric combined with efficient and low carbon system has ensured that the development achieves the target carbon emission reduction against Part L 2013 of 41.8% overall, with the remaining emissions for the domestic use being offset elsewhere, secured by a cash in lieu contribution.

Please refer to chapmanbdsp Energy Statement for additional details on the energy strategy.

Domestic energy hierarchy

	Carbon dioxide emissions		
	(Tonnes CO ₂ per annum)		
	Regulated	Unregulated	Total
Part L 2013 compliant building	1014.4	1121.9	2136.3
Be Lean	978.1	1121.9	2100.0
Be Clean	615.2	1121.9	1737.1
Be Green	531.3	1121.9	1653.2

Table 4.1 - CO₂ emissions after each stage of the energy hierarchy for domestic buildings

	Carbon dioxide savings			
	(Tonnes CO ₂ per annum)		%	
	Regulated	Total	Regulated	Total
Be Lean Savings from demand reduction	36.3	36.3	3.6%	1.7%
Be Clean Savings from CHP	362.9	362.9	35.8%	17.0%
Be Green Savings from renewable energy	83.9	83.9	8.3%	3.9%
Total cumulative savings	483.1	483.1	47.6%	22.6%

Carbon shortfall	531.3
Cash-in-lieu contribution	£956,319

Table 4.2 - Regulated CO₂ savings from each stage of the energy hierarchy for domestic buildings

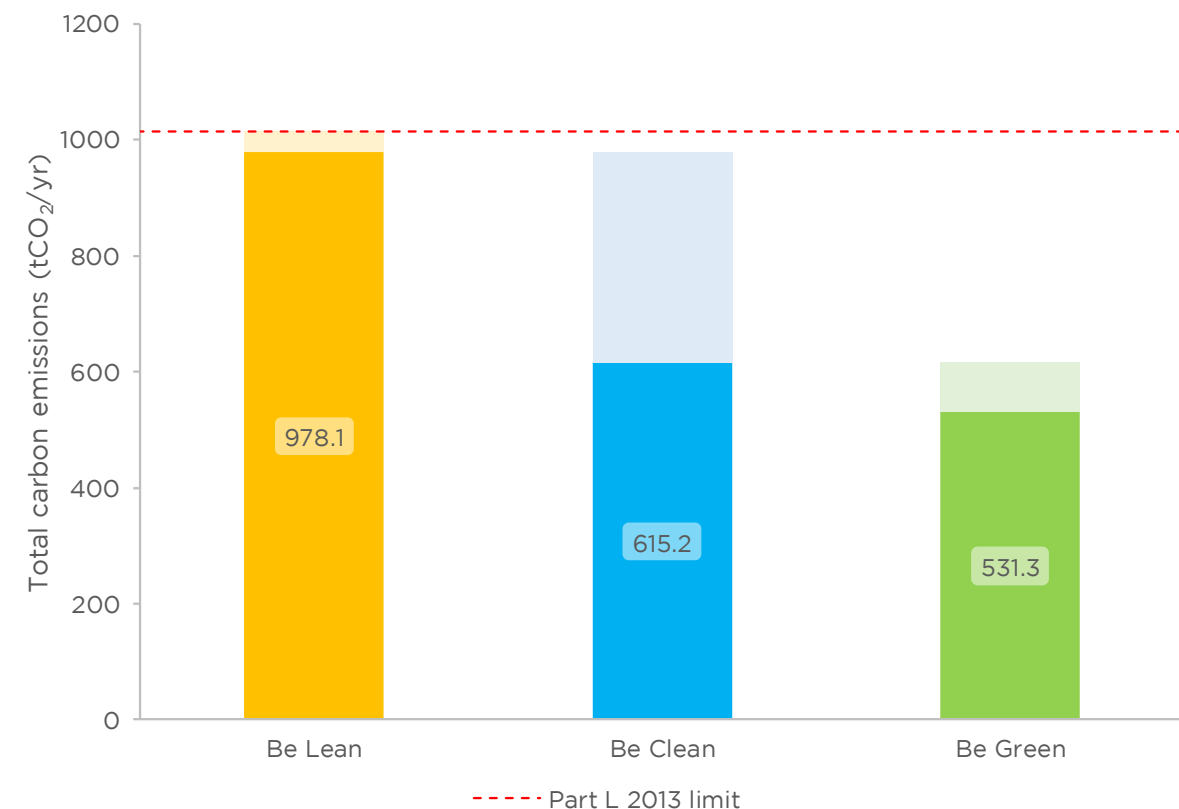


Figure 4.1 - Regulated CO₂ emissions after each stage of the energy hierarchy for domestic buildings

Non-domestic energy hierarchy

	Carbon dioxide emissions		
	(Tonnes CO ₂ per annum)		
	Regulated	Unregulated	Total
Part L 2013 compliant building	301.1	122.1	423.2
Be Lean	260.5	122.1	382.6
Be Clean	234.2	122.1	356.3
Be Green	234.2	122.1	356.3

Table 4.3 - CO₂ emissions after each stage of the energy hierarchy for non-domestic buildings

	Carbon dioxide savings			
	(Tonnes CO ₂ per annum)		%	
	Regulated	Total	Regulated	Total
Be Lean Savings from demand reduction	40.6	40.6	13.5%	9.6%
Be Clean Savings from CHP	26.3	26.3	8.7%	6.2%
Be Green Savings from renewable energy	0.0	0.0	0.0%	0.0%
Total cumulative savings	66.9	66.9	22.2%	15.8%

Carbon shortfall	38.5
Cash-in-lieu contribution	£69,330

Table 4.4 - Regulated CO₂ savings from each stage of the energy hierarchy for non-domestic buildings

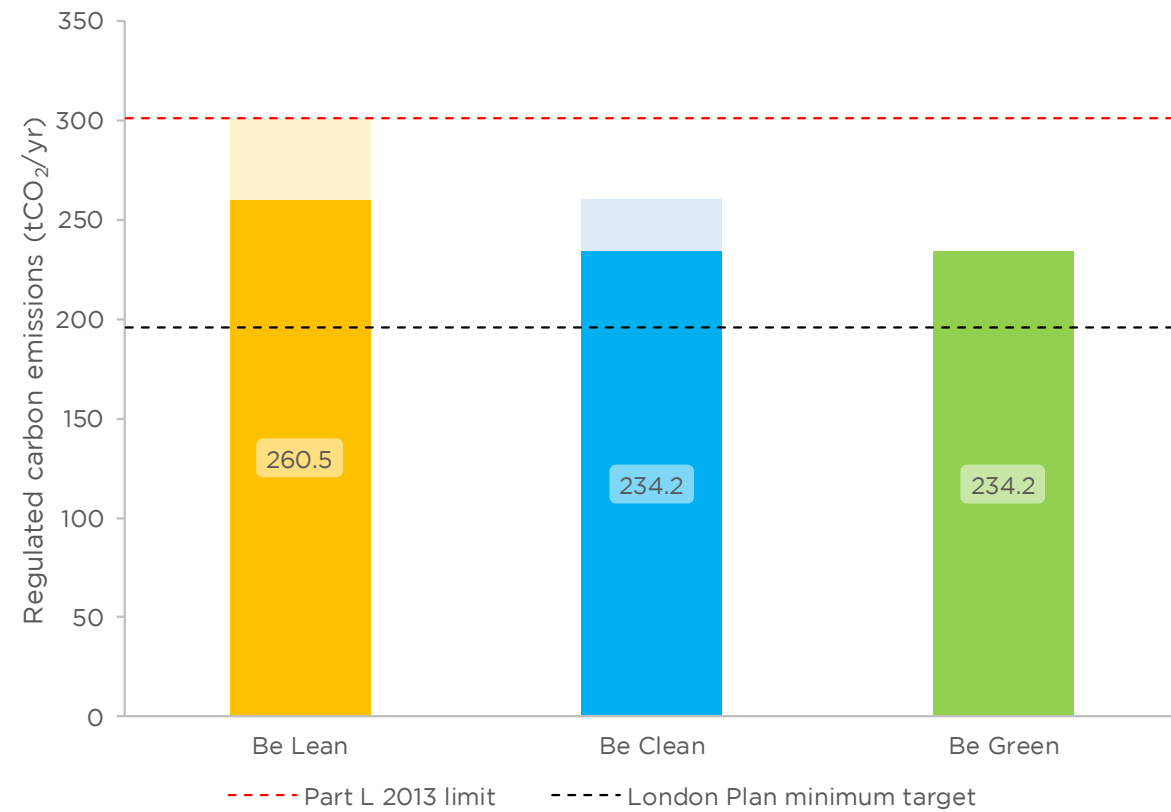


Figure 4.2 - Regulated CO₂ emissions after each stage of the energy hierarchy for non-domestic buildings

Site-wide energy hierarchy

	Carbon dioxide emissions		
	(Tonnes CO ₂ per annum)		
	Regulated	Unregulated	Total
Part L 2013 compliant building	1315.5	1244.0	2559.5
Be Lean	1238.6	1244.0	2482.6
Be Clean	849.4	1244.0	2093.4
Be Green	765.5	1244.0	2009.5

Table 4.5 - CO₂ emissions after each stage of the energy hierarchy for the whole site

	Carbon dioxide savings			
	(Tonnes CO ₂ per annum)		%	
	Regulated	Total	Regulated	Total
Be Lean Savings from demand reduction	76.9	76.9	5.8%	3.0%
Be Clean Savings from CHP	389.2	389.2	29.6%	15.2%
Be Green Savings from renewable energy	83.9	83.9	6.4%	3.3%
Total cumulative savings	550.0	550.0	41.8%	21.5%

Carbon shortfall	569.8
Cash-in-lieu contribution	£1,025,649

Table 4.6 - Regulated CO₂ savings from each stage of the energy hierarchy for the whole site



Figure 4.3 - Regulated CO₂ emissions after each stage of the energy hierarchy for the whole site

5 Climate Change

The GLA SPG on Sustainable Design and Construction – Chapter 3: ‘Adapting to climate change and greening the city’: ‘Design’ and London Borough of Barnet (LBB) SPD on Sustainable Design and Construction – sections: 2.8 – ‘Energy Use in New Buildings’, 2.9 – ‘Decentralised Energy’, LBB Core Strategy (2012) - Policy CS13: ‘Ensuring the efficient use of natural resources’ and LBB Barnet Development Management Policies Document - Policy DM01: ‘Protecting Barnet’s character and amenity’, Policy DM06: ‘Barnet’s heritage and conservation’, provide further guidance on how developers should incorporate climate change adaptation and greening priorities outlined in the London Plan.

Climate change brought about by man-made emissions of greenhouse gases has been identified as the greatest challenge facing human society at the beginning of the 21st century. The effects of climate change are complex, they include:

- Increased average temperatures;
- Rising sea levels;
- Increased precipitation; and
- More frequent extreme weather.

Action to address climate change falls into two categories: mitigation and adaptation. Mitigation measures are designed to reduce greenhouse gas emissions to slow down or stop climate change, whilst adaptation measures are designed to adjust society and buildings to cope with climate changes that are already happening.

The design proposals for both the domestic and non-domestic uses at Pentavia, Mill Hill incorporate the following climate change mitigation and adaptation features in line with the London Plan and London Borough of Barnet planning requirements:

5.1 Climate Change Mitigation

The energy strategy of the scheme has considered measures to mitigate the effects of climate change through the specification of energy efficient systems and LZC technologies (gas CHP and PV panels) to provide a proportion of the energy demand of the development, hence reducing fossil fuel usage and greenhouse gas emissions equivalent to 550 tonnes of CO₂/yr.

Please refer to Pentavia, Mill Hill Energy Statement prepared by chapmanbdsp for details of the energy strategy proposed for the development.

5.2 Climate Change Adaptation

Adapting to heavier rainfall

The scheme is located on a site of low probability risk of flooding in accordance with current best practice guidance. The proposed drainage strategy will comprise a piped network with surface water attenuated to the greenfield equivalent rate to accommodate a 1 in 1 year and 1 in 100 year event plus an allowance of 40% for climate change. Drainage design measures are specified to ensure that the post development run-off volume, over the development lifetime, is no greater than it would have been prior to the assessed site’s development for the 100-year 6-hour event, including an allowance for climate change. The drainage strategy for the scheme will also ensure that flooding of property will not occur in the event of local drainage system failure (caused either by extreme rainfall or a lack of maintenance).

Adapting to drier and hotter summers

The energy strategy of the scheme has considered measures to adapt to the effects of climate change, in particular through an optimised design minimising risk of overheating (compliant with the London Plan Cooling Hierarchy). Please refer to Pentavia, Mill Hill Energy Statement report prepared by chapmanbdsp for details of the features proposed to limit the risk of overheating for the scheme.

The proposed Pentavia, Mill Hill development will significantly reduce its demand on mains water supply through the use of water efficient fittings. The proposed fittings will ensure:

- The non-domestic scheme will consume 50% less potable water than a conventional scheme; and
- The residential scheme will exceed the requirements of the Building Regulations regarding the maximum water use per person per day of 125 Litres (indoor water use < 105 Litres/person/day targeted). Please refer to the Section 6 of this Sustainability Statement (Water, Flood Risk & Drainage) for additional details on the water efficiency strategy of the scheme.

The proposed green areas will contribute to reducing the ‘urban island’ effect and will positively impact on the building users’ wellbeing by providing shade and rising air humidity in hot summer days. Drip-feed subsurface water efficient irrigation will be considered to provide water for landscaping irrigation.

6 Water, Flood Risk & Drainage

Consideration has been made with regards to the conservation of water resources through water efficiency measures, in addition to the risk posed by flooding. This includes the use of Sustainable Urban Drainage Systems (SuDS) to reduce the risk of surface water flooding, in line with GLA SPG on Sustainable Design and Construction – Chapter 2: ‘Resource Management’, Chapter 3: ‘Adapting to climate change and greening the city’, London Plan Policy 5.12: ‘Flood Risk Management, Policy 5.13: ‘Sustainable Drainage’, London Borough of Barnet SPD on Sustainable Design and Construction Sections 2.11 – ‘Water Efficiency’ and 2.15 – Flood risk, Sustainable Urban Drainage System and Water Quality’.

6.1 Flood Risk and SuDS

The Flood Risk Assessment (FRA) carried out by Heyne Tillett Steel confirms that the scheme is located within Flood Zone 1, is defined as having a less than 1 in 1,000 annual probability of river or sea flooding in any year.

The assessment also confirms that the levels of the site will be designed such that surface water flows are directed away from the proposed scheme and that the site does not appear to be underlain by an aquifer in the superficial deposits or in the bedrock layer, the risk of flooding from surface water and groundwater is therefore considered as low.

There are foul and surface water sewers located within the site application boundary. These sewers are assumed to be below the level of the proposed lower ground floor, approximately 10m below the existing ground level, based on TW Asset Plans and CCTV survey information. The existing sewers which cross the proposed lower ground floor extent will be either diverted or maintained among their current routes subject to TW approval. There are no records of sewer flooding within the vicinity of the proposed development. It is therefore considered the risk of flooding from sewers to be low risk for the proposed development. There are also no canals or artificial water sources which may result in flooding of this site. The proposed development is also not located in an area at risk of flooding from reservoirs.

The scheme is therefore considered to be located on a site of low probability risk of flooding in accordance with current best practice guidance. The FRA has taken into account all current and future sources of flooding into considerations.

Surface water discharge rates will be restricted to ensure that the rate of surface water runoff from the site does not increase as a result of the proposed development. This will be accomplished by utilising storage structures and flow control devices. There are two sources of storage currently considered:

- ‘BluRoof’ (ALUMASC, or equivalent, above ground attenuation storage) located within the podium level.
- Geocellular Storage buried below ground level.

The ‘BluRoof’ storage will be utilised to provide storage for the surface water runoff generated at levels above the podium level. The Geocellular storage tank will be used for flows from all other sources. In an event that the storage requirement at the podium level exceeds the capacity of the structure, a proportion of roof runoff will be diverted towards the Geocellular storage buried within the ground. To reduce the size of the buried attenuation a ‘BluRoof’ option (ALUMASC above ground attenuation storage) will be considered as part of the detailed design.

Ultimately the surface water outfalls into the existing Thames Water sewer via a HydroBrake flow control device. The existing site is considered to be 100% impermeable, measuring an area of 3.66ha. The greenfield runoff rates for the site have been calculated using MicroDrainage as 15.9 l/s.

In line with the Sustainable Design and Construction Supporting Planning Guidance (2014) document and The London Plan, there is a minimum requirement to deliver 50% attenuation of site’s (prior to re-development) surface water run-off at peak times and that “on previously developed sites, run-off rates should not be more than three times the calculated greenfield rate”.

Based on the above and the calculated greenfield runoff, the rate which the development will be restricted to is 47.7 l/s for all storm duration up to and including 1 in 100-years + 40% Climate Change.

The proposed drainage strategy will utilise surface water attenuation to allow for discharge at a rate of 47.7 l/s to accommodate a 1 in 100 year event plus an allowance of 40% for climate change.

There will be two main storage types, ‘BluRoof’ located at podium level and a Geocellular storage buried beneath the ground. Each storage will discharge by gravity, independently into existing Thames Water sewer with combined flow from both not exceeding 47.7 l/s.

The podium level ‘BluRoof’ will require approximate capacity of 1,280m³ and the Geocellular tank will provide additional 360m³ of storage. These ratios may change, but a combined volume of 1,640m³ will be provided for an impermeable area of 27,300m² for the whole site.

Foul water from the proposed development will outfall to the adopted foul water sewer as the existing condition. The proposed foul water discharge rate is 33.20 l/s.

The flood risk and drainage strategy for the scheme meets all the Barnet SPD on Sustainable Design and construction flood risk and drainage requirements (Section 2.15) and will also ensure the scheme achieves 4 BREEAM credits for Pol 03 – Surface water run-off credits for the assessment of the non-residential areas of the scheme.

6.2 Water Efficiency

Water consumption in the UK has risen by more than 50% over the last 25 years. This represents a huge strain on natural water resources such as reservoirs and rivers and has a knock-on effect on wetland habitats and ecosystems. Traditionally the response to increasing demand in the UK has been to build new reservoirs, but this is increasingly unacceptable from environmental and social points of view.

Water use can be minimised by installing water efficient equipment and appliances and increasing awareness of water consumption.

The scheme will incorporate water efficient fittings in line with the following BREEAM - Water credits’ and London Borough of Barnet SPD on Sustainable Design and Construction –Sections 2.11 – ‘Water Efficiency’ requirements:

- Non-Domestic Areas: BREEAM New Construction – 4 credits (indoor water use 50% better than baseline); and
- Domestic Areas: Indoor water use ≤ 105 litres/person/day. This requirement is lower than the maximum water consumption level of 125 litres/person/day required by Building Regulations Approved Document Part G.

Water efficient fittings and appliances use significantly less water than their traditional counterparts by limiting water flow through pipes and fittings and by changing conventional design to more ergonomic. The water conservation strategy proposed for the scheme incorporates flexibility in the specification of water fittings and appliances, recognising the rapid industry progress in this field, and allowing the inclusion of new and innovative solutions where they are proven to offer:

- Occupant satisfaction;
- Technical Performance;
- Economic competitiveness.

Please refer to Tables 1 & 2 and Figures 2 & 3 overleaf presenting indicative mix of water fittings achieving the water targets for the scheme. Please note that the exact combination of fittings selected for each residential units and non-domestic areas may vary from the selection included in the tables shown overleaf. White goods provided for the residential units will be water efficient with the highest Eco rating.

The following features will be also included for the non-domestic areas:

- A water meter with a pulsed output will be provided for the water supply of the building;
- Flow control devices that regulate the supply of water to each WC area/facility according to demand will be installed (therefore minimising water leaks and wastage from sanitary fittings);
- A major leak detection system will be installed for the non-domestic scheme.

Additionally, the proposed landscape design and associated irrigation strategy will be designed to be water efficient with the incorporation of rainwater collection or/and drip-feed sub-surface irrigation. In addition to the water conservation measures detailed above, future occupants of scheme will be encouraged to adopt a more responsible attitude to water use. They will be provided with a non-technical guide which details the operation and performance of the building, including information on water efficient fittings, recommendations for their most efficient usage, and details on external water use.

7 Sustainable Construction Process / Materials Recycling

Preference has been given to the selection of sustainable materials with a low environmental impact over their life cycle, as well as sustainable procurement and waste disposal. This review has been undertaken in the context of the GLA SPG on Sustainable Design and Construction – Chapter 2: ‘Resource Management’, London Plan Policy 5.16: ‘Waste net self-sufficiency’, Policy 5.17: ‘Waste capacity’, London Borough of Barnet (LBB) SPD on Sustainable Design and Construction – Sections: 2.12 – ‘Waste strategy’, 2.18 – ‘Pollution Prevention, Contaminated Land Remediation and Construction Management’, 2.21 – ‘Considerate Constructors Scheme’, LBB Core Strategy (2012) – Policy CS14: ‘Dealing with our waste’ and LBB Development Management Policies Document – Policy DM02: ‘Development standards’.

The environmental impact of construction activities will be minimised through the implementation of best practice measures detailed in the following sections below.

7.1 Sustainable Construction

Sustainable construction practices include good site management to encourage resource efficiency, increased materials recovery and the avoidance of the disposal of waste to landfill.

As part of achieving a sustainable approach to construction, the main contractor will be encouraged to commit to reducing the impact of the construction processes on the environment. The contractor will be required to monitor and mitigate construction site impacts throughout the construction period (in particular: energy, water, transport of materials to the site and waste from the site). Best practice pollution prevention policies will be adopted in respect of air (dust) and water pollution arising from site activities. To minimise air (dust) pollution, skips will be covered, dust generating site activities will be dampened down and wet cutters will be used. Low emission and efficient equipment will be used on site.

A construction management plan will be in place prior to commencement of activities on site. The construction management plan will appropriately demonstrate how the impacts of air/water pollution, noise and vibration will be mitigated during the construction of the development. Where feasible timber used on site will be reclaimed, re-used or responsibly sourced.

The contractors will be also required to minimise the ecological impact of construction activities. (Please refer to Section 8 of this Sustainability Statement for additional details on the measures which will be implemented).

Demolition and Construction Waste

The developer is committed to the minimisation of waste and will employ methods such as the acquisition of a Site Waste Inventory prior to the site clearance which will identify any hazardous wastes and the opportunity for the recycling of materials within the construction process.

A Waste Management Strategy will include an Outline Construction Waste Management Plan which will require:

- Management of the construction site in order to provide opportunities to segregate materials for ease of reuse and recycling in order to minimise waste to landfill;
- Where possible, material to be processed at sites as close as possible to the scheme site; and
- The use of resources such as water, diesel and timber will be recorded and managed in a sustainable manner.

The scheme itself has been considered in a manner to design out waste (material optimisation) and the design team has embedded resource efficiency within the overall scheme design with specific reference to WRAP’s Designing out Waste principles.

In line with BREEAM requirements, the following targets have been set for the maximum amount of waste generated from construction activities and for the amount of waste to be diverted from landfill:

- Maximum amount of construction waste generated for the non-domestic areas: 7.5m³ or 6.5 tonnes per 100m² GIA; and

- Non-Domestic Areas (BREEAM New Construction 2018 target): 70% of volume (or 80% of tonnage) of non-demolition waste and 80% of volume (or 90% of tonnage) of demolition waste.

7.2 Construction Materials

The proposed development will give preference to the selection of sustainable materials and the minimisation of waste. The following measures will be considered to demonstrate that the materials specified are sourced, managed and used in a sustainable manner.

- The BRE’s Green Guide to Specification will be used to determine the proposed materials’ green rating and their impact on the environment. Where possible the team will aim to use A and A+ rated materials as these have the lowest environmental impact;
- The use of locally sourced materials will be prioritised, where feasible to reduce transport related emissions and to support local supply chains;
- Responsible sourcing of materials from suppliers that operate an Environmental Management System will be prioritised. 100% of all timber included in the construction of floors, roofs, walls and staircase will be legally sourced;
- Recycled aggregates will be considered for the scheme in particular for the concrete frame elements and foundations;
- The use of insulation materials with low Global Warming Potential (GWP) will be prioritised;
- The use of high VOC content paints, sealants and all ozone depleting materials including insulation will be avoided where feasible; and
- Specific consideration will be given to flexibility, durability and strength of materials selected for the scheme.

7.3 Operational Waste

The scheme has been designed to comply, in the first instance, with the capacity requirements set out with the Building Regulations Drainage and Waste Disposal Approved Document H6. This requires that adequate provision shall be made for the storage of solid waste and that adequate access shall be provided:

For people in the building to the place of storage; and
From the place of storage to a collection point.

The management scheme also takes account of the requirements set out by the London Borough of Barnet within its 'Information for developers and architects - 'Provision of Household Waste & Recycling and Waste Service' guidance.

For the residential operational waste, the following elements are proposed within the current operational waste management strategy which has been development based upon the current guidance and initial consultation with London Borough of Barnet. It sets out the parameters of a pilot study utilising bin storage capacities not currently in operation, combined with management systems accepted in other parts of the borough. This includes the provision of:

- A minimum internal storage capacity of 60 litres per dwelling, which can accommodate containers for the temporary storage of materials to be recycled. Materials will then be transferred to external containers for collection;
- A minimum external storage capacity of 60 litres per dwelling (allowing for segregation) on landings to ensure that residents are not required to carry refuse more than 30 m;
- Basement storage areas will be provided to accommodate an agreed number of 1110 litre bins;
- An agreed portion of these (approx. $\frac{3}{4}$) will be for the storage of recyclable waste which will be moved to the agreed collection point on the appropriate day;
- An agreed portion of these (approx. $\frac{1}{4}$) will be for the storage of non-recyclable waste which will be compacted on site (at the developer's expense) and collected twice a week by Barnet Waste Collection services; and
- A Management Company will be set up at the developer's expense the movement, compaction and preparation for collection of waste materials.

All dedicated storage will be clearly labelled to assist segregation, storage and collection of the recyclable waste streams.

The council offers a food and garden waste collection scheme. It is intended that the development will promote composting by informing residents of the kitchen and garden waste collection scheme within their Home Information Packs. Information on local recycling centres and sustainable living in general will be provided within the Home Information Packs provided to occupants of the dwellings upon completion.

A central, dedicated storage space will be provided for materials that can be recycled. This space will be clearly labelled, to assist with segregation, storage and collection of the recyclable waste streams, accessible to building occupants / facilities operators for the deposit of materials and collections by waste management contractors, and of a capacity appropriate to the development.

For the non-residential development, a minimum of 10 m² designated waste storage space for materials for recycling, such as paper, glass bottles and jars, cans, cardboard and plastic bottles will be provided in line with LBB SPD on Sustainable Design and Construction.

The non-residential areas will provide appropriately designed and labelled facilities for the collection for recycling or reuse of the waste that they, their customers and staff generate. Future tenants will submit a comprehensive waste and recycling management strategy in accordance with the BS5906:2005 Waste Management in Buildings - Code of Practice.

8 Pollution

The development has minimised its impact on noise, air and light pollution in line with the guidance of the GLA SPG on Sustainable Design and Construction - Chapter 4: 'Pollution Management', London Plan Policy 7.14: 'Improving Air Quality', Policy 7.15: 'Reducing and managing noise, improving and enhancing the acoustic environment and promoting appropriate soundscape', London Borough of Barnet (LBB) SPD on Sustainable Design and Construction - sections: 2.4 - 'Daylight, Privacy (minimum distance), Outlook and Light Pollution', 2.13 - 'Air Quality', 2.14 - 'Noise Quality', 2.18 - 'Pollution Prevention, Contaminated Land Remediation and Construction Management', LBB Core Strategy (2012) - Policy CS13: 'Ensuring the efficient use of natural resources' and LBB Development Management Policies Document - Policy DMO4: Environmental considerations for development.

8.1 Noise Pollution

The proposed development is of very high quality, with a standard of accommodation above the baseline requirements suggested by Building Regulations or related British Standards.

8.2 Operational noise pollution

Detailed environmental noise survey work was undertaken at the site by Mayer Brown acoustician to review the suitability of the site for residential development and the extent of mitigation that may be necessary to secure the sustainable design of the site.

Indoor ambient noise level design targets for the development have been set in line with the design recommendations set out in Table 4 of BS 8233: 2014, ProPG guidance and the Council's adopted SPD. External outdoor spaces are being designed to the lowest practicable levels, with an aspiration to maximise the area of amenity space within the development, in line with the design guidance given of BS 8233: 2014, WHO, ProPG guidance and the Council's adopted SPD.

Operational noise emissions from the site will be designed in line with the requirements of Barnet's Sustainable Design and Construction SPD which will avoid any significant impacts in line with the assessment methodology and guidance of BS 4142: 2014.

The proposed development does not include any sources of use classes that have the potential to have an adverse vibration impact on neighbouring land uses. Vibration impacts on the proposed development will be assessed in line with BS 6472: 2008.

Noise impacts on the proposed development are mitigated through the careful siting and massing of buildings on the site to act as barrier blocks and provide acoustic screening, and the use green walls to the M1 and A1 sides of the site to provide additional local acoustic screening. In order to help minimise noise levels in private amenity spaces, balconies will take the form of "winter gardens" or the use of "solid" balustrades (to achieve maximum screening) and acoustically absorptive finishes to the underside of balconies (to minimise sound reflections).

The massing and design of the buildings help create an extensive areas of relatively quiet communal amenity spaces, compliant with the objectives on national planning policy and, where possible, providing spaces compliant with BS8233: 2014; WHO guidance and ProPG guidance.

External building fabric constructions will be specified to be compatible with the indoor ambient noise levels design recommendations of BS 8233: 2014, ProPG guidance and the Council's adopted SPD. This will include:

- Precast Brick and GRC panels on the outside face facing the M1 and A1 and a lightweight SFS solution with GRC and brick panels on the inner surface facing the interior courtyards.
- High performance "acoustic" glazing; and
- The use of whole house mechanical ventilation systems (MVHR to provide means of ventilation and thermal control).

8.3 Construction phase noise pollution

The potential impact construction phase noise and vibration will be controlled through the implementation of Construction Environmental Management Plan (CEMP), which will include detailed noise and vibration control proposals for the site. In particular, the CEMP will require all works to be undertaken implementing the "best practicable means" for noise control, in accordance with general guidance of BS5228:2009+A1:2014 (Parts 1 and 2). This will include the need to carefully consider the selection of appropriate plant; the maintenance of plant; the timing and duration of work activities; the location of plant and construction traffic routing; the use of screening to minimise noise propagation; early and good public relations and an effective complaints procedure.

Any proposed plant and machinery shall be operated so as to ensure that any noise generated is at least 5dB(A) below the background level, as measured from any point 1 m outside the window of any room of a neighbouring residential property. Plant will also be installed to ensure that no perceptible noise or vibration is transmitted through the structure to adjoining premises. Structureborne noise and vibration will be minimised through the provision of good practice vibration isolations techniques (e.g. use of anti-vibration mountings to plant, etc).

8.4 Light Pollution

Light pollution from the scheme will be minimised through careful lighting design.

The external lighting will be designed in compliance with the guidance in the Institution of Lighting Professionals (ILP) Guidance notes for the reduction of obtrusive light, 2011. Lighting will be designed so that it is directed to where it is needed and does not spill into neighbouring residential properties or affect wildlife.

The external lighting for the residential scheme will be controlled via daylight cut-off sensors or timers.

All external lighting specified for the non-domestic scheme (except for safety and security lighting) will include appropriate controls to ensure they can be automatically switched off between 11pm and 7am. Safety and security lighting system will comply with the lower levels of lighting recommended during these hours in the ILP's Guidance notes. Where specified, illuminated advertisements will be designed in compliance with ILE Technical Report 5 - The Brightness of Illuminated Advertisements.

8.5 Air Pollution

An Air Quality Assessment has been prepared for the site by Mayer Brown to support the planning application for the scheme.

8.6 Demolition and Construction Phase

The developer is committed to the minimisation of construction impacts via the application of a Construction Environmental Management Plan (CEMP) in part based upon the result of a site specific Dust Risk Assessment.

The CEMP will include but will not be limited to, the following Best Available Techniques:

- All vehicles should switch off engines when stationary, no idling vehicles;
- On-road vehicles to comply with the requirements of the Low Emission Zone and the London Non-Road Mobile Machinery (NRMM) standards, where applicable;
- All NRMM to use ultra-low sulphur diesel (ULSD) where available;
- Minimise the movement of construction traffic around the site;
- Maximising efficiency (this may include alternative modes of transport, maximising vehicle utilisation by ensuring full loading and efficient routing);
- Vehicles should be well maintained and kept in a high standard of working order;
- Avoid the use of diesel or petrol powered generators by using mains electricity or battery powered equipment where possible; and
- Location of plant away from boundaries close to residential areas

8.7 Operational Phase

The proposed CHP will be designed to comply with the emission targets for CHP contained within Appendix 7 of London SPG on Sustainable Design and Construction (band B) and the requirements for Air Quality Neutrality.

A review of local data indicated air quality in the region of the site to be approaching the Local Air Quality Management objective levels for Nitrogen dioxide. These high levels are due to the proximity of the A1 Watford Way and the M1 to the site boundaries. As a result, a programme of air quality monitoring for both Nitrogen Dioxide (NO₂) and the other traffic pollutant of concern, Particulate Matter (PM₁₀), was undertaken for the three consecutive months of February, March and April last year. The results of this study indicated that whilst air quality at the boundary was approaching and exceeding objective levels (Test data indicates Nitrogen Dioxide, immediately adjacent to the roads are in excess of the health guideline annual average levels of 40µg/m³), air quality within the proposed amenity space of the scheme was well within them. Therefore, it was considered that once the mitigation effect of the development façade was in place, it would be possible to further protect the external amenity of the residents. This view has been confirmed with the air dispersion modelling which has been undertaken.

The poor air quality in the locality has resulted in the declaration of an Air Quality Management Area across the whole borough. As a result, a detailed Air Quality Assessment has been undertaken which takes local meteorology into account within a dispersion model. Air dispersion modelling of the barrier effect of the proposed building façades has demonstrated that the anticipated levels within the amenity space are predicted to decrease. These values are based upon EU limit values which have been transposed into UK legislation and World Health Organisation guidelines.

The use of high VOC content paints, sealants and all ozone depleting materials including insulation will be avoided wherever possible. Where feasible consideration will be made for the use of low emission VOC finishes, furnishings, carpets and construction materials to enhance the indoor air quality and reduce the building user's exposure to chemicals and other pollutants.

The provision of cycle storage spaces will encourage the residents to use public transport and promote cycling, which will also help to limit the use of cars and reduce the emissions of carbon dioxide and other air pollutants. Moreover, car parking spaces have been minimised for the scheme, which will further discourage the use of private car travel to and from the scheme.

9 Landscape & Biodiversity

A Suitably Qualified Ecologist (SQE) from Ecology Solutions has been appointed as part of the development to assess the current ecological value of the site and make recommendations for the protection and enhancement of the site and on-site measures during construction aiming at protecting features of ecological value, in line with the GLA SPG on Sustainable Design and Construction – Chapter 2: ‘Resource Management’, Chapter 3: ‘Adapting to climate change and greening the city’, London Plan Policy 7.19: ‘Biodiversity and Access to Nature’, London Borough of Barnet (LBB) SPD on Sustainable Design and Construction – section: 2.16 – ‘Biodiversity and Habitat Quality’, LBB Core Strategy (2012) - Policy CS1: ‘Barnet’s place shaping strategy – protection, enhancement and consolidated growth – the Three Strands Approach’, Policy CS7: ‘Enhancing and protecting Barnet’s open spaces’, Policy CS13: ‘Ensuring the efficient use of natural resources’ and LBB Development Management Policies Document - Policy DM01: ‘Protecting Barnet’s character and amenity’, Policy DM04: ‘Environmental considerations for development’, Policy DM15: ‘Green Belt and open spaces’ and Policy DM16: ‘Biodiversity’.

9.1 SQE findings and key recommendations

The findings of the ecological survey are presented within the extended phase I survey and ecological appraisal report issued March 2019. This report confirms the following:

- There are no statutory designated sites within or directly adjacent to the site. Statutory sites in the locality are not likely to be affected adversely by the proposed redevelopment;
- There are no non-statutory designated sites within the site itself. Arrandene Open Space and Featherstone Hill Site of Metropolitan Importance (SMI), is the closest such site being located approximately 0.6 km to the north-east of the site. Arrandene Open Space and Featherstone Hill SMI is well buffered from the site by existing built form which is likely to remove any potential adverse effects arising during the redevelopment works;
- The habitats within the site consist of largely built form of negligible nature conservation value, with the small areas of landscape planting comprising largely of non-native ornamental species, and of no intrinsic ecological interest. Their removal to facilitate the proposed redevelopment is of no significance;
- Butterfly Bush has been identified on site and are categorised as invasive species in London by the London Invasive Species Initiative (LISI);
- The site is considered to offer negligible opportunities for protected species;
- The potential for the site to support bats is negligible;
- It is considered that the building may be demolished at any time without the need to obtain a Natural England European Protected Species licence;
- The scrub, amenity planting and limited trees offer some opportunities for nesting birds.
- Overall, and on the basis of the current information, there are no overriding ecological constraints to the redevelopment of the site.

Ecology Solutions have provided the following recommendations for mitigation and enhancement:

- It is recommended that the landscape strategy for the proposed development incorporate native species of local provenance and those of known value to native wildlife in the landscape strategy wherever possible;
- Although the control of species listed under the LISI is not a legal requirement, all reasonable measures should be taken to prevent the spread of these plant species (Butterfly Bush).
- In the unlikely event that any evidence of bats is found during demolition, work should stop and an ecologist be contacted for advice;
- Timing restrictions in the removal of suitable nesting habitat should be taken. If the removal of suitable nesting habitat is scheduled during the acknowledged nesting season (March to July inclusive) checks by an experienced ecologist should be completed prior to any clearance works commencing; and

- Recommendations for mitigation include new planting with native species, to provide foraging and nesting habitats for bird species, together with provision of nest boxes. These measures would deliver benefits for nature conservation in the locality.

9.2 BREEAM specific guidance

In addition to the mitigation measures detailed above, all relevant EU and UK legislation relating to protection and enhancement of ecology will be complied with and the contractors will be required to minimise the ecological impact of construction activities. The following measures will be implemented:

- Nominate a ‘Biodiversity Champion’ with the authority to influence site activities;
- Train all workforce on how to protect site ecology;
- Records actions taken to protect biodiversity; and
- Works conducted at times to minimise ecological disturbance.

9.3 Landscaping Proposal

The following main sustainable features will be provided as part of the landscaping proposals developed by Outerspace:

- The scheme seeks to contribute meaningfully to the emerging ecological regeneration by introducing habitat and food sources for wildlife which can support a wider network of vegetation and migration corridors within this part of Barnet;
- The landscaping proposed is in line with the recommendations detailed in Ecology Solutions report;
- Bird and bug boxes and log piles will be located throughout the site, on posts, hanging from trees or under dense planting. These will be in accordance with RSPB standards and match the criteria set out in the ecology report. New native hedge and tree planting will work with existing trees to create wildlife corridors and flight paths especially suited to birds and bats;
- The southern entrance route will be lined with formal tree planting and mixed species understorey planting.
- Along the avenue and throughout the site private terraces and windows will be defended from the public spaces by formal hedging which is supported by ornamental shrub and herbaceous planting accented by large multi-stem specimen shrubs;
- Communal gardens with native species and biodiverse planting will be accessible from each residential block
- Village Green: A formal central hub with opportunities for socialisation, recreation and biodiversity. This space will also provide an attractive to look down upon from the residences above. The central square is accessible by a shared space perimeter.
- Communal Gardens: Mixed use garden squares with spaces for quiet contemplation, play and socialising. A combination of biodiversity, native and ornamental planting arrangements.
- Village Street: A shared route linking all the spaces within the development, creating an exciting range of experiences along its course.
- Roof terraces: Sunny aspect gardens to be used and accessed by the residents, including communal activities such as vegetable growing and social gathering seating areas.
- Bunns Lane Link: A gradated approach with gently ramped access from Bunns lane and the adjacent A1 footpath.
- Woodland Edge: Woodland species planting to act as a buffer between the development and adjacent roads. The woodland edges will also offer a softening visual amenity and biodiversity enhancement.

- A landscape maintenance strategy has been developed by Outerspace which will play a key role in the success of the landscape, not just aesthetically but also ecologically.
- A five-year landscape management plan will be produced and handed over to the scheme's occupants;
- Wherever possible, materials used on site will have a recycled content. The majority of the block paving specified will have a recycled content of at least 50%; and
- Not only do the materials specified improve sustainability, but by creating spaces for social interaction and allowing the existing and new residents to be involved with the up-keep of the landscape, a sustainable community is created.

It is also worth noting that the amenity space provided for the scheme (16,150 m²) is well in excess of London Borough of Barnet (LBB) SPD on Sustainable Design and Construction – section: 2.3 requirements of 5m² per habitable rooms (3,210 m²).

10 Sustainable Transport / Accessibility

To reduce the dependency on travel by car, consideration has been given as to how the development can be designed to encourage the use of public transport and/or other forms of sustainable transport within the context of the GLA SPG on Sustainable Design and Construction – Chapter 2: ‘Resource Management’, the London Plan Policy 6.9: ‘Cycling’, Policy 6.10: ‘Walking’, London Borough of Barnet (LBB) Barnet Core Strategy (2012) – Policy CS6: ‘Promoting Barnet’s town centres’, Policy CS9: ‘Providing safe, effective and efficient travel’ and LBB Barnet Development Management Policies Document – Policy DM17: Travel impact and parking standards.

Velocity Transport Planning has been appointed to assess the development’s accessibility and develop a transport assessment and travel plan for the scheme. The following measures are proposed to improve access to public transport of the site which is currently low (site specific Public Transport Accessibility Level (PTAL) of 1b for the majority of the site):

- Access to car club vehicles on site;
- Provision of a pedestrian link which will improve access to bus services on Bunns Lane;
- Provision of a pedestrian link which will connect the site to the bottom of the ramp which gives access to a footbridge over the M1 to Grahame Park Way;
- Provision of a pedestrian link to the A1 from the site on its eastern boundary to provide access to bus services on the A1 for all residents, particularly those located on the eastern extents of the site.

Secured and covered residential cycle spaces will be provided for the scheme in accordance with the requirements of the London Plan and of Barnet Policies. Additional space within storage areas has been made available for additional parking to be added should demand indicate a requirement in the future. The cycle provision for the non-residential part of the scheme will exceed the requirements under BREEAM NC 2018.

The provision of cycle storage spaces will encourage the residents to use public transport and promote cycling, which will also help to limit the use of cars and reduce the emissions of carbon dioxide and nitrous oxides.

The site will only include limited car parking space which will discourage the use of private car travel to and from the scheme.

A supporting Travel Plan which has contributed to the design, will also be provided to occupants, highlighting all types of travel relevant to the various building users. This will encourage the use of sustainable mode of transport.

11 BREEAM Strategy

11.1 Introduction

The Pentavia, Mill Hill scheme is targeting a BREEAM rating of 'Excellent', demonstrating it incorporates exemplary standards of sustainable and inclusive urban design and architecture in line with London Borough of Barnet (LBB) SPD on Sustainable Design and Construction section: 2.20 - 'BREEAM' and LBB Barnet Development Management Policies Document - Policy DM02: 'Development standards'.

11.2 Background

BREEAM (Building Research Establishment's Environmental Assessment Method) is the leading environmental assessment method for UK non-residential buildings and UK domestic refurbishments. It sets the standard for best practice design and encourages and certifies the incorporation of best environmental practice within the building design and construction.

The BREEAM assessment process involves the evaluation of the buildings performance against the scheme and its criteria using an independent third party auditor: a BREEAM Assessor. The BREEAM certificate provides formal verification that the Assessor has completed an assessment of the building in accordance with the requirements of the scheme and its quality standards and procedures. A BREEAM certificate verifies that a building's BREEAM rating, at the time of certification, accurately reflected its performance against the BREEAM standards.

11.3 BREEAM Schemes – Pentavia Mill Hill

The BREEAM schemes applicable to Pentavia, Mill Hill are:

- Non-Domestic Areas:
 - BREEAM NC 2018 – Retail; and
 - BREEAM NC 2018 – Other Buildings - D1 uses

11.4 BREEAM Categories

The BREEAM standard assesses and awards credits based on the environmental performance of non-residential and residential refurbishment developments within a framework of seven to nine categories for BREEAM DR scheme and BREEAM NC scheme respectively. These being:

- Management;
- Health and Wellbeing;
- Energy;
- Transport;
- Water;
- Materials;
- Waste;
- Land use and Ecology; and
- Pollution.

BREEAM also awards additional credits in recognition of sustainability related benefits or performances that go beyond best practice. An additional 1% can be added to a building's overall score for each 'Innovation Credit' achieved up to a maximum of 10 credits for any one building. Innovation credits can be awarded regardless of the building's final BREEAM rating.

The categories within BREEAM are weighted according to their level of importance. Each category is allocated a different number of credits and therefore individual credits carry specific weightings, as a percentage of the

total points score. Please refer to Table 3 for BREEAM Categories weighting factors for the different BREEAM schemes applicable to Pentavia, Mill Hill.

Category	BREEAM New Construction (NC) Shell & Core
Management	11.00%
Health & Wellbeing	8.00%
Energy	14.00%
Transport	11.50%
Water	7.00%
Materials	17.50%
Waste	7.00%
Land Use and Ecology	15.00%
Pollution	9.00%
Innovation	10.00%
Total	110.00%

Table 11.7 – BREEAM Categories Weighting Factors

11.5 BREEAM Levels

During the assessment by an independent BREEAM assessor the total number of credits awarded for each of the BREEAM categories is summed and the appropriate category weighting applied. Finally, the weighted score of each category is added together to produce a single environmental score. The BREEAM ratings are divided into five levels of compliance 'Pass', 'Good', 'Very Good', 'Excellent' and 'Outstanding'. Please refer to Table 1.8 for the BREEAM ratings thresholds.

Total Percentage Score (equal to or greater than)	BREEAM Rating
<30 %	Unclassified
30 %	Pass
45 %	Good
55 %	Very Good
70 %	Excellent
85 %	Outstanding

Table 11.8 – BREEAM Rating Thresholds

11.6 BREEAM Minimum Standards

The BREEAM standard includes mandatory minimum performance standards which must be met in order to achieve the BREEAM rating sought. Please refer to Table 5 for the minimum standards required for a 'Very Good' rating for the BREEAM NC scheme.

BREEAM Credits Non-Domestic Scheme	BREEAM NC 2018 Minimum Standard – Excellent Rating
Man 03 Responsible construction practices	Confirmation of responsible construction management
Man 04 Commissioning and handover	Confirmation of commissioning and testing responsibilities
Man 04 Commissioning and handover	Production of a building user guide
Man 05 Aftercare	Inapplicable to Shell and Core assessments
Ene 01 Reduction of energy use and carbon emissions	4 credits equivalent to an EPRNC of at least 0.4

BREEAM Credits Non-Domestic Scheme	BREEAM NC 2018 Minimum Standard – Excellent Rating
Ene 02 Energy monitoring	Metering of at least 90% of annual energy consumption
Wat 01 Water consumption	1 credit Water consumption \geq 12.5% improvement compared to baseline
Wat 02 Water monitoring	The specification of a water meter on the mains water supply to each building
Mat 03 Responsible sourcing of construction products	All timber used on the project must be 'legally harvested and traded timber'
Wst 03 Operational waste	Installation of appropriate recycling facility capacity

Table 11.9 – BREEAM New Construction 2018 Minimum Standards for “Excellent”

The BREEAM rating can only be achieved if the mandatory issues achieve the minimum standards relevant to each scheme. All other credits are tradable (i.e. they are voluntary and a developer/designer can make choices on the most appropriate standards/credits for a given site). It is these tradable credits that provide the flexibility within the BREEAM standard. Once all mandatory credits are achieved the developer is then free to make up the credits required for the target rating from the tradable credits, to give an overall score.

11.7 BREEAM Process

BREEAM may be implemented at different stages of the design, construction and use of a building. BREEAM assessment of a new build, refurbishment or fit-out is split into three main stages

- BREEAM Pre-Assessment at RIBA stage 1/2 which will form the basis for the inclusion of BREEAM principles and awareness in the whole design process;
- Assessment of the design and commitments against the BREEAM criteria- this leads to an Interim Certificate; and
- Review of the building during and post construction to ensure the design and commitments have been fully implemented in the building – this leads to a Final Certificate.

BREEAM assessment of existing buildings is carried out using the scheme BREEAM In-Use. This assesses the environmental performance and management of the building and can be carried out either as a follow up to the BREEAM assessment, for example 2 years after occupation, or as an independent tool to assess the performance of the existing building portfolio

11.8 BREEAM – Prediction Summary

BREEAM Pre-Assessments have been carried out for the non-domestic assets (retail, D1 uses) of Pentavia, Mill Hill. Each of the BREEAM criteria was fully discussed at a Sustainability workshop led by a BREEAM assessor/ Accredited Professional within the chapmanbdsp Environmental team and attended by the project team on 12 July 2016, 19 August 2016 and 7th November 2017. These meetings have ensured that all members of the development team have a full understanding of the successful integration of the BREEAM credits and process into their design.

The current prediction is that an 'Excellent' rating is likely to be achieved, with the following targeted score for each scheme:

- Retail: 77.30%; and
- D1 uses: 77.90%.

The BREEAM pre-assessment checklists provide an approximate indication of how a future formal assessment will score and the rating that will be achieved. The pre-assessment checklists should therefore not be used as a guarantee of a subsequent rating but will inform how credits should be targeted during the formal assessment procedure.

The following pages provide a summary of the BREEAM pre-assessments carried out for Pentavia, Mill Hill.

			Assessment 1		Assessment 2				
			Retail		Other Buildings				
			Shell and Core		Shell and Core				
<p style="text-align: center;">Pentavia, Mill Hill BREEAM NC 2018 Non-domestic areas</p>			Credits available	Targeted	Not targeted	Credits available	Targeted	Not targeted	
Management									
Man 01	Project brief and Design	Project delivery planning	1	1		1	1		
		Stakeholder consultation (interested parties)	1	1		1	1		
		Prerequisite for BREEAM AP (Concept and Developed Design)	-	-		-	-		-
		BREEAM AP (Concept Design)	1	1		1	1		
		BREEAM AP (Developed Design)	1	1		1	1		
Man 02	Life cycle cost and service life planning	Elemental LCC	2		2	2		2	
		Component level LCC options appraisal	1	1		1	1		
		Capital cost reporting	1	1		1	1		
Man 03	Responsible construction practices	Prerequisite - Legally harvested and traded timber	-	-		-	-		
		Prerequisite - For Healthcare NHS buildings only	-	-		-	-		
		Environmental management	1	1		1	1		
		Prerequisite for the BREEAM AP credit	-	-		-	-		
		BREEAM AP (site)	1	1		1	1		
		Responsible construction management	2	2		2	2		
Man 04	Commissioning and handover	Monitoring of construction site impacts	2	2		2	2		
		Commissioning - testing schedule and responsibilities	1	1		1	1		
		Commissioning - design and preparation	1	1		1	1		
		Testing and inspecting building fabric	1	1		1	1		
		Handover	1	1		1	1		
Man 05	Aftercare	Aftercare support	1			1			
		Commissioning - implementation	1			1			
		Post-occupancy evaluation (POE)	1			1			
Total			21	16	2	21	16	2	
Credit value			0.61%			0.61%			

Health & Wellbeing								
Hea 01	Visual comfort	Control of glare from sunlight	1	1		1	1	
		Daylighting	1	0	1	1	0	1
		View out	1	1	1	1	1	1
		Internal and external lighting levels, zoning and control	1	1		1	1	
Hea 02	Indoor air quality	Prerequisite - Indoor air quality (IAQ) plan	PR	PR		PR	PR	
		Ventilation	1		1	1		1
		Emissions from construction products	2	2		2	2	
		Post-construction indoor air quality measurement	1	1		1	1	
Hea 04	Thermal Comfort	Thermal modelling	1	1		1	1	
		Design for future thermal comfort	1	1		1	1	
		Thermal zoning and controls	1	1		1	1	
Hea 05	Acoustic performance	Sound insulation	1	1		1	1	
		Indoor ambient noise level	1	1		1	1	
Hea 06	Security	Room acoustics	1	1		1	1	
Hea 07	Safety and security	Security of site and building						
		Safe access	1	1		1	1	
		Outside space	1	1		1	1	
Total			16	14	3	16	14	
Credit value			0.73%		0.80%			
Energy								
Ene 01	Energy Performance	Energy performance	9	5	4	9	5	
		Prerequisite - Prediction of operational energy consumption	-	-	-	-	-	
		Prediction of operational energy consumption	4	2	2	4	2	
Ene 02	Energy monitoring	Sub-metering of end-use categories	1	1		1	1	
		Sub-metering of high energy load and tenancy areas	1	1		1	1	
Ene 03	External lighting	External lighting	1	1		1	1	
Ene 04	Low Carbon Design	Passive design analysis	1		1	1		
		Free cooling	1		1	1		
		Low and zero carbon technologies	1	1		1	1	
Ene 05	Energy efficient cold storage	Refrigeration energy consumption	N/A		N/A	N/A		
		Indirect greenhouse gas emissions	N/A		N/A	N/A		
Ene 06	Energy Efficient Transportation System	Energy consumption	1			1		
		Energy efficient features	2		1	2	1	
Ene 07	Energy efficient laboratory systems	Design specification	N/A	0	N/A	N/A	0	
		Best practice energy efficient measures	N/A	0	N/A	N/A	0	
Ene 08	Energy efficient equipment	Energy efficient equipment	2	2	0	2	2	
Total			24	13	9	24	13	
Credit value			0.74%		0.74%			
Transport								
Tra 01	Public Transport Accessibility	Travel plan	2	2		2	2	
Tra 02	Cyclist facilities	Prerequisite	-	-	-	-	-	
		Transport options implementation	10	6	4	10	6	
Total			12	8	4	12	8	
Credit value			0.96%		0.96%			
Water								
Wat 01	Water consumption	Water consumption	6	4	1	6	4	
Wat 02	Water monitoring	Water monitoring	1	1		1	1	
Wat 03	Water Leak Detection & Prevention	Leak detection system	1	1		1	1	
		Flow control devices	1	1		1	1	
Wat 04	Water Efficient Equipment	Water efficient equipment	1	1		1	1	
Total			10	8	1	10	8	
Credit value			0.78%		0.78%			
Materials								
Mat 01	Building life cycle assessment (LCA)	Superstructure - Comparison with the BREEAM benchmark during Concept Design	6	4	2	6	4	
		Superstructure - Comparison with the BREEAM benchmark during Technical Design						
		Superstructure - Option appraisal during Concept Design						
		Superstructure - Options appraisal during Technical Design	1	1		1	1	
Mat 02	Environmental Product Declarations (EPDs)	Substructure and hard landscaping options appraisal during Concept Design	1	1		1	1	
		Specification of products with a recognised environmental product declaration	1	1		1	1	
Mat 03	Responsible sourcing of materials	Prerequisite	-	-	-	-	-	
		Enabling sustainable procurement	1	1		1	1	
Mat 05	Designing for durability and resilience	Measuring responsible sourcing	3	2	1	3	2	
		Designing for durability and resilience	1	1		1	1	
Mat 06	Material Efficiency	Material efficiency	1	1		1	1	
Total			14	11	3	14	11	
Credit value			1.25%		1.25%			

Waste							
Wst 01	Construction Waste Management	Pre-demolition audit	1			1	
		Construction resource efficiency	3	2	1	3	2
		Diversion of resources from landfill	1	1		1	1
Wst 02	Use of recycled and sustainably sourced materials	Prerequisite	-	-	-	-	-
		Project Sustainable Aggregate Points	1			1	1
Wst 03	Operational Waste	Operational waste	1	1		1	1
Wst 04	Speculative ceiling and floor finishes	Speculative floor and ceiling finishes	1	1		1	1
Wst 05	Adaptation to Climate Change	Resilience of structure, fabric, building services and renewables installation	1	1		1	1
		Design for disassembly and functional adaptability - recommendations	1	1		1	1
Wst 06	Functional Adaptability	Disassembly and functional adaptability - implementation	1	1		1	1
		Total	11	7	3	11	7
Credit value			0.70%		0.70%		
Land use and ecology							
LE 01	Site Selection	Previously occupied land	1	1		1	1
		Contaminated land	1	1		1	1
LE 02	Ecological value of site	Prerequisite - Assessment route selection	-	-	-	-	-
		Survey and evaluation	1	1		1	1
		Determining the ecological outcomes for the site (Routes 1 and 2)	1	1		1	1
LE 03	Minimising Impact on Existing Site Ecology	Prerequisite - Identification and understanding the risks and opportunities for biodiversity	-	-	-	-	-
		Planning, liaison, implementation and data	1	1		1	1
		Managing negative impacts of the project	2	1	1	2	1
LE 04	Enhancing Site Ecology	Prerequisite - Identifying and understanding the risks and opportunities for biodiversity	-	-	-	-	-
		Enhancement of ecology	N/A		N/A	N/A	
		Liaison, implementation and data collation	1	1		1	1
LE 05	Long Term Impact on Biodiversity	Enhancement of ecology	3	1	2	3	1
		Prerequisite - Roles and responsibilities, implementation, statutory obligations	-	-	-	-	-
		Planning, liaison, data, monitoring and review management and maintenance	1	1		1	1
		Landscape and ecology management plan (or similar) development	1	1		1	1
Total			11	8	4	11	8
Credit value			1.15%		1.15%		
Pollution							
Pol 01	Impact of refrigerants	No refrigerant use	-	-	-	-	-
		Refrigerant pre-requisite	-	-	-	-	-
		Impact of refrigerants: DELC of ≤ 100 CO ₂ -eq/kW	1		1	1	
		Impact of refrigerants: DELC of ≤ 1000 kgCO ₂ -eq/kW	1	1		1	1
Pol 02	Local air quality	Leak detection	1	1		1	1
		Local air quality	2	2		2	2
Pol 03	Surface water run off	Pre-requisite	-	-	-	-	-
		Flood Resilience	2	2		2	2
		Pre-requisite for surface water run-off credits	-	-	-	-	-
		Surface Water Run-Off - Rate	1	1		1	1
		Surface Water Run-Off - Volume	1	1		1	1
Pol 04	Reduction of night time light pollution	Minimising watercourse pollution	1		1	1	
Pol 05	Noise attenuation	Reduction of night time light pollution	1	1		1	1
		Reduction of noise pollution	1	1		1	1
Total			12	10	3	12	10
Credit value			0.75%		0.75%		
Innovation							
Man 03	Responsible construction practices		1	1		1	1
Man 05	Aftercare		1		1	1	
Hea 01	Visual Comfort		1		1	1	
Hea 02	Indoor air quality		2		2	2	
Ene 01	Reduction in CO2 emissions		5		5	5	
Wat 01	Water Consumption		1		1	1	
Mat 01	Life cycle impacts		1		1	1	
Mat 03	Responsible sourcing of materials		1		1	1	
Wst 01	Construction Waste Management		1		1	1	
Wst 02	Recycled aggregates		1		1	1	
Wst 05	Adaptation to Climate Change		1		1	1	
AI	AI - Approved Innovation		1		1	1	
Total			10	1	16	10	16
Credit value			1.00%		1.00%		
Total Target Score							
			77.3%	112.7%	77.9%	114.5%	
			Excellent	Outstanding	Excellent	Outstanding	

Table 2 - Pre-assessment Summary - Pentavia, Mill Hill - Non-Domestic Areas (Retail and D1 Uses)

11.9 Conclusion – Next Steps

The BREEAM pre-assessments of Pentavia, Mill Hill demonstrate that the design will holistically incorporate sustainable principles into the full range of sustainability aspects covered by BREEAM: management, health & wellbeing, energy, transport, water, materials, waste, land use & ecology and pollution.

Formal assessments will take place once the tender documentation is produced and will require submission of a full evidence bundle from the client and the design team to show compliance with the credits.

The BREEAM assessor and BREEAM Accredited Professional have been and will continue to form an integral part of the design team and a consistent point for reference, review and questions. Experience has proved that this approach offers the surest route to a successful BREEAM certification and holistic sustainable design.

12 London Borough of Barnet – SPD on Sustainable Design and Construction

The London Borough of Barnet SPD on Sustainable Design and Construction sets out Barnet's technical requirements for environmental design and construction management. The SPD sets out requirements on air, noise, water, energy, water, waste and habitat quality in order to achieve protection and enhancement of the environment. The SPD requirements are linked to existing national standards and guidance. This document includes specific requirements in the following categories:

- Minimum Residential Space Standards;
- Internal Layout and Design;
- Outdoor Amenity Space;
- Daylight, Privacy (minimum distance), Outlook and Light Pollution;
- Microclimate – Wind and Thermal Conditions;
- Accessible and adaptable dwellings;
- Wheelchair User Dwellings;
- Energy Use in New Buildings;
- Decentralised Energy;
- Retrofitting of Existing Buildings;
- Water Efficiency;
- Waste Strategy;
- Air Quality;
- Noise Quality;
- Flood Risk, Sustainable Urban Drainage Systems and Water Quality;
- Biodiversity and Habitat Quality;
- Archaeological Investigation;
- Pollution Prevention, Contaminated Land Remediation and Construction Management;
- BREEAM; and
- Considerate Constructors Scheme.

Chapmanbdsp has produced an in-house checklist detailing the requirement of the Supplementary Planning Document on Sustainable Design and Construction.

This checklist has been used along with the BREEAM New Construction 2018 pre-assessment to optimise the environmental strategy of the development and to demonstrate the sustainability credentials of the scheme. This is in line with the London Borough of Barnet SPD on Sustainable Design and Construction (2016) Section 2.20 and Barnet – Development Management Plan (2012) Policy DM-02.

The detailed checklist including the response of the different members of the team to the requirements of the London Borough of Barnet SPD on Sustainable Design and Construction can be found in the Appendices.

13 Conclusion

This report has been developed to detail the sustainability features of the development and demonstrates how they relate to the relevant planning policy documents including the London Plan and the London Borough of Barnet (LBB) SPD on Sustainable Design and Construction.

Each of the BREEAM and LBB SPD on Sustainable Design and Construction criteria was fully discussed at a Sustainability workshop led by a BREEAM Assessor/Accredited Professional within chapmanbdsp Sustainability team and attended by the project team on 12th March 2019. This meeting ensured that all members of the development team have a full understanding of the successful integration of the relevant sustainable requirements into their design.

The pre-assessment shows that a BREEAM 'Excellent' rating is robustly targeted for the retail and the 'D1 use' part of the scheme with a targeted score of 77.30% and 77.90% respectively.

The Sustainability Statement for Pentavia, Mill Hill development demonstrates that the design will holistically incorporate sustainable principles into the full range of sustainability aspects covered by BREEAM and the London Borough of Barnet SPD on Sustainable Design and Construction: Energy, Climate Change, Water, Flood Risk & Drainage, Transport, Materials, Waste & Recycling, Pollution, Landscaping & Ecology.

14 Appendices

14.1 London Borough of Barnet SPD on Sustainable Design and Construction Requirements

Barnet SPD on Sustainable Design and Construction - Standard Number	Barnet SPD on Sustainable Design and Construction - Standard Name	Barnet SPD on Sustainable Design and Construction - Standard Requirements (October 2016)	Barnet SPD on Sustainable Design and Construction	Team member responsibility	Other reference documents																													
2.1	Minimum Residential Space Standards	<p>Table 2.1 Minimum residential space standard requirements: Table 3.3 London Plan Minimum space standards for new dwellings</p> <p>The following standards apply to all new residential development including conversion:</p> <table border="1"> <thead> <tr> <th>Bedrooms</th> <th>Bedspace</th> <th>1 storey dwellings</th> <th>2 storey dwellings</th> <th>3 storey dwellings</th> <th>Built-in storage (sqm)</th> </tr> </thead> <tbody> <tr> <td>1b</td> <td>1P 2P</td> <td>39 (37)* 50</td> <td>58</td> <td></td> <td>1 1.5</td> </tr> <tr> <td>2b</td> <td>3P 4P</td> <td>61 70</td> <td>70 79</td> <td></td> <td>2</td> </tr> <tr> <td>3b</td> <td>4P 5P 6P</td> <td>74 86 95</td> <td>84 93 102</td> <td>90 99 108</td> <td>2.5</td> </tr> <tr> <td>4b</td> <td>5P 6P</td> <td>90 99</td> <td>97 106</td> <td>103 112</td> <td>3</td> </tr> </tbody> </table> <p>1. *Where a one person dwelling has a shower room instead of a bathroom, the floor area may be reduced from 39m² to 37m², as shown bracketed. 2. The Gross Internal Area of a dwelling is defined as the total floor space measured between the internal faces of perimeter walls that enclose a dwelling. This includes partitions, structural elements, cupboards, ducts, flights of stairs and voids above stairs. GIA should be measured and denoted in square metres (m²) 3. The nationally described space standard sets a minimum ceiling height of 2.3 meters for at least 75% of the gross internal area of the dwelling. To address the unique heat island effect of London and the distinct density and flattened nature of most of its residential development, a minimum ceiling height of 2.5m for at least 75% of the gross internal area is strongly encouraged so that new housing is of adequate quality, especially in terms of light, ventilation and sense of space.</p>	Bedrooms	Bedspace	1 storey dwellings	2 storey dwellings	3 storey dwellings	Built-in storage (sqm)	1b	1P 2P	39 (37)* 50	58		1 1.5	2b	3P 4P	61 70	70 79		2	3b	4P 5P 6P	74 86 95	84 93 102	90 99 108	2.5	4b	5P 6P	90 99	97 106	103 112	3	AFK	Architectural floor plans
Bedrooms	Bedspace	1 storey dwellings	2 storey dwellings	3 storey dwellings	Built-in storage (sqm)																													
1b	1P 2P	39 (37)* 50	58		1 1.5																													
2b	3P 4P	61 70	70 79		2																													
3b	4P 5P 6P	74 86 95	84 93 102	90 99 108	2.5																													
4b	5P 6P	90 99	97 106	103 112	3																													
2.2	Internal Layout and Design	<p>Minimum room dimensions and floor areas: 1 Single bedroom: minimum area should be 7.5 m² and is at least 2.15m wide to comply with the nationally described space standard. Double/twin bedroom: minimum area should be 11.5 m² and minimum width should be 2.75 m to comply with the nationally described space standard and every other double (or twin) bedroom is at least 2.55m wide.</p> <p>Ceiling heights A minimum ceiling height of 2.5m for at least 75% of the dwelling area is strongly encouraged. Habitable floorspace in rooms with sloping ceilings is defined as that with 1.5 m or more of ceiling height.</p> <p>Development proposals should avoid single aspect dwellings that are north facing or exposed to noise exposure categories C & D or contain three or more bedrooms.</p>	<p>Minor, major and large scale residential</p> <p>Minor, major and large scale residential</p> <p>Minor, major and large scale residential</p>	AFK	Architectural floor plans and elevations/sections																													
2.3	Outdoor Amenity Space	<p>For Flats 5m² of space per habitable room</p> <p>For Houses: 40m² of space for up to four habitable rooms. 55m² of space for up to five habitable rooms 70m² of space for up to six habitable rooms 85m² of space for up to seven or more habitable rooms</p> <p>Development proposals will not normally be permitted if it compromises the minimum outdoor amenity space standards.</p>	<p>Minor, Major and Large scale</p> <p>Minor, Major and Large scale</p> <p>Householder</p>	AFK	Architectural floor plans																													
2.4	Daylight, Privacy (minimum distance), Outlook and Light Pollution	<p>Glazing to all habitable rooms should not normally be less than 20% of the internal floor area of the room.</p> <p>Bedrooms and living rooms/kitchens should normally have a reasonable outlook with clear glazed windows</p> <p>In new residential development there should be a minimum distance of 21m between properties with facing windows to habitable room to avoid overlooking, and 10.5m to a neighbouring garden.</p> <p>New development should take into account neighbouring properties to ensure that nuisance will not be caused from lighting during night time hours.</p>	<p>All development</p> <p>All development</p> <p>All development</p> <p>All development</p>	AFK	Architectural floor plans and elevations																													
2.5	Microclimate - Wind and Thermal Conditions	<p>Acceptable Wind Conditions: Lawson's Distress and Comfort</p> <table border="1"> <thead> <tr> <th>Hourly Average Wind Speed</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0-4m/s</td> <td>Long term sitting</td> </tr> <tr> <td>4-6m/s</td> <td>Standing or short term sitting</td> </tr> <tr> <td>6-8m/s</td> <td>Walking and strolling</td> </tr> <tr> <td>8-10m/s</td> <td>Business walking</td> </tr> </tbody> </table> <p>Reading a newspaper, eating or drinking Appropriate for bus stops, window shopping and building entrances General areas of walking and sightseeing Local areas around tall buildings where people are not likely to linger Business walking</p> <p>Microclimate, Wind and Thermal Conditions Requirements Developers should demonstrate that appropriate comfort levels can be achieved for all pedestrian public and communal outdoor spaces using the Lawson Criteria for Distress and Comfort as a guide to the appropriate level of amenity for the expected use of those areas.</p>	Hourly Average Wind Speed	Description	0-4m/s	Long term sitting	4-6m/s	Standing or short term sitting	6-8m/s	Walking and strolling	8-10m/s	Business walking	<p>Large scale (Residential development over 200 units or a site of 4 hectares or more. Non residential development over 10,000 m²) and all tall buildings (Buildings which in Barnet are either eight or more storeys high, or which are 26 m above ground level.)</p>	BMT Fluid Mechanics / AFK	Architectural floor plans and elevations																			
Hourly Average Wind Speed	Description																																	
0-4m/s	Long term sitting																																	
4-6m/s	Standing or short term sitting																																	
6-8m/s	Walking and strolling																																	
8-10m/s	Business walking																																	
2.6	Accessible and adaptable dwellings (Draft SPD name) Lifetime Homes (Adopted standard name)	90% of new dwellings should comply with building regulation M4 (2) 'accessible and adaptable dwellings'.	Minor, Major and Large scale	AFK	Design and Access Statement																													
2.7	Wheelchair User Dwellings	10% of new dwellings to meet building regulation M4 (3) 'wheelchair user dwellings'.	Major and Large scale residential	AFK	Design and Access Statement																													
2.8	Energy Use in New Buildings	<p>Proposed development should provide an Energy Assessment which demonstrates compliance with the London Plan energy hierarchy, cooling hierarchy, the London Plan carbon dioxide requirements and where relevant decentralised energy.</p> <p>Development proposals should make the fullest contribution to minimising carbon dioxide emissions in accordance with the London Plan energy hierarchy.</p> <p>Proposed development to ensure that every 1 car parking space in 5 has provision or is future proofed to provide a suitable electrical charging point or as agreed in a Travel Plan.</p>	<p>Major, Large scale</p> <p>Minor</p> <p>Minor, Major, Large scale</p>	ChapmanBOSP	Energy Strategy																													
2.9	Decentralised Energy	<p>In order to establish a DE network large scale development in the priority areas identified in the heat mapping study should deliver an energy centre. Where the energy centre already exists or is planned for construction within five years then suitable related infrastructure should be provided to facilitate connection to the DE network. Where capacity at the energy centre needs to be increased to meet the needs of the new proposed development then a legal agreement should set out the investment needed in the energy centre, where the network is not completed commitments to undertake future connections should be made by the applicant.</p> <p>Where a proposed development is within 500m of an existing or proposed DE network the potential for connection should be investigated as part of the Energy Statement.</p> <p>Where a DE network is proposed but unlikely to be constructed within next 5 years, development should where feasible provide a suitable means for connection for future use or be future proofed with a commitment to connect.</p>	<p>Large scale</p> <p>Major</p> <p>Major, Large scale</p>	ChapmanBOSP	Energy Strategy																													
2.10	Retrofitting of Existing Buildings	<p>Solid wall insulation (external) For most houses planning permission is not required provided the cladding material on the front and side elevations does not protrude significantly. For flats planning permission is required. Double or triple glazing For most houses planning permission is not required except in Conservation Areas. For flats planning permission is required. Solar panels or Photo Voltaic panels Planning permission is not normally required (except for Article 4 conservation areas). Where the panels are attached to a building they should not project more than 200mm from the roof slope and should not preclude above the highest part of the roof (excluding the chimney). Air source heat pumps Planning permission is normally required Ground source heat pumps Planning permission is not required Biomass heating system or Combined Heat and Power system Planning permission is normally required where an external flue is required Wind turbine Planning permission is normally required</p>	All	N/A	N/A																													
2.11	Water Efficiency	New dwellings should be designed to ensure that a maximum of 105 litres of water is consumed per person per day.	Minor, Major, Large scale	AFK / ChapmanBOSP	Sanitaryware schedule																													

Barnet SPD on Sustainable Design and Construction - Standard Number	Barnet SPD on Sustainable Design and Construction - Standard Name	Barnet SPD on Sustainable Design and Construction - Standard Requirements (October 2016)	Barnet SPD on Sustainable Design and Construction	Team member responsibility	Other reference documents	
212	Waste Strategy	<p>In consultation with the Council developers should comply with the standards set out in the council's guidance document "Information for developers and architects - provision of household recycling and refuse waste collection services".</p> <p>https://www.barnet.gov.uk/citizen-home/rubbish-waste-and-recycling/information-for-developers-and-architects.html</p> <p>A minimum internal storage capacity of 60 litres per dwelling (flats and houses) should be provided which can accommodate containers for the temporary storage of materials to be recycled. Materials will then be transferred to external containers for collection. (This standard is subject to change over time, so consultation with the council at the design stage is essential.)</p> <p>All non-residential developments should provide a minimum of 10m² designated waste storage space for materials for recycling, such as paper, glass bottles and jars, cans, cardboard, and plastic bottles.</p> <p>Proposals that employ or attract a large number of people, such as supermarkets or commercial buildings should provide appropriate designed facilities for the collection for recycling or reuse of the waste that they, their customers and staff generate. Applicants for such developments should submit a comprehensive waste and recycling management strategy in accordance with the BS5906:2005 Waste Management in Buildings - Code of Practice.</p> <p>Prior to commencement of work, all construction sites should put in place a Site Waste Management Plan in accordance with the DTI's Site Waste Management Plans - Guidance for Construction Contractors & Clients - Voluntary Code of Practice.</p>	<p>Minor, Major and Large scale</p> <p>Residential Minor, Major, Large scale</p> <p>Non residential minor, major, large scale</p> <p>Large scale</p> <p>Major and Large scale</p>	<p>Demolition and Construction Waste</p> <p>The developer is committed to the minimisation of waste and will employ methods such as the acquisition of a Site Waste Inventory prior to the site clearance which will identify any hazardous wastes and the opportunity for the recycling of materials within the construction process.</p> <p>A Waste Management Strategy will include an Outline Construction Waste Management Plan which will require:</p> <ul style="list-style-type: none"> Management of the construction site in order to provide opportunities to segregate materials for ease of reuse and recycling in order to minimise waste to landfill; Where possible, material to be processed at sites as close as possible to the scheme site; and The use of resources such as water, diesel and timber will be recorded and managed in a sustainable manner. <p>The scheme itself has been considered in a manner to design out waste (material optimisation) and the design team has embedded resource efficiency within the overall scheme design with specific reference to WRAP's Designing out Waste principles.</p> <p>In line with BREEAM requirements, the following targets have been set for the maximum amount of waste generated from construction activities and for the amount of waste to be diverted from landfill:</p> <ul style="list-style-type: none"> Maximum amount of construction waste generated for the non-domestic areas: 7.5m³ or 6.5 tonnes per 100m² GIA; and Non-Domestic Areas (BREEAM New Construction 2018 target): 70% of volume (or 80% of tonnage) of non-demolition waste and 80% of volume (or 90% of tonnage) of demolition waste. <p>Operational Waste</p> <p>The scheme has been designed to comply, in the first instance, with the capacity requirements set out with the Building Regulations Drainage and Waste Disposal Approved Document H6. This requires that adequate provision shall be made for the storage of solid waste and that adequate access shall be provided:</p> <ul style="list-style-type: none"> For people in the building to the place of storage; and From the place of storage to a collection point. <p>The management scheme also takes account of the requirements set out by the London Borough of Barnet within its 'Information for developers and architects - Provision of Household Recycling & Waste Service' guidance.</p> <p>For the residential operational waste, the following elements are proposed within the current operational waste management strategy which has been developed based upon the current guidance and initial consultation with London Borough of Barnet. It sets out the parameters of a pilot study utilising bin storage capacities not currently in operation, combined with management systems accepted in other parts of the borough. This includes the provision of:</p> <ul style="list-style-type: none"> A minimum internal storage capacity of 60 litres per dwelling, which can accommodate containers for the temporary storage of materials to be recycled. Materials will then be transferred to external containers for collection; A minimum external storage capacity of 60 litres per dwelling (allowing for segregation) on landings to ensure that residents are not required to carry refuse more than 30m; Basement storage areas will be provided to accommodate an agreed number of 110 litre bins; An agreed portion of these (approx. 50%) will be for the storage of recyclable waste which will be moved to the agreed collection point on the appropriate day; An agreed portion of these (approx. 50%) will be for the storage of non-recyclable waste which will be compacted on site (at the developer's expense) and collected twice a week by Barnet Waste Collection services; A Management Company will be set up at the developer's expense the movement, compaction and preparation for collection of waste materials. <p>All dedicated storage will be clearly labelled to assist segregation, storage and collection of the recyclable waste streams.</p> <p>The council offers a food and garden waste collection scheme. It is intended that the development will promote composting by informing residents of the kitchen and garden waste collection scheme within their Home Information Packs. Information on local recycling centres and sustainable living in general will be provided within the Home Information Packs provided to occupants of the dwellings upon completion.</p> <p>A central, dedicated storage space will be provided for materials that can be recycled. This space will be clearly labelled, to assist with segregation, storage and collection of the recyclable waste streams, accessible to building occupants / facilities operators for the deposit of materials and collections by waste management contractors, and of a capacity appropriate to the development.</p> <p>For the non-residential development, a minimum of 10m² designated waste storage space for materials for recycling, such as paper, glass bottles and jars, cans, cardboard, and plastic bottles will be provided in line with LBB draft SPD on Sustainable Design and Construction.</p> <p>The non-residential areas will provide appropriately designed and labelled facilities for the collection for recycling or reuse of the waste that they, their customers and staff generate. Future tenants will submit a comprehensive waste and recycling management strategy in accordance with the BS5906:2005 Waste Management in Buildings - Code of Practice.</p>	Mayer Brown / AFK	Waste Strategy
213	Air Quality	<p>Where development could potentially contribute to a worsening of local air quality an air quality assessment will be required.</p> <p>Developers are to design their schemes so that they meet the Air Quality Neutral emission benchmarks for Buildings and Transport as set out in appendix 5 and appendix 6 of the Mayor of London's Sustainable Design and Construction SPG.</p> <p>Developers shall select plant that meets the standards for emissions from combined heat and power and biomass plants set out in Appendix 7 of the Mayor of London's Sustainable Design and Construction SPG.</p> <p>Proposals may be required to demonstrate how the development is designed to reduce people's exposure to air pollutants to acceptable levels through an air quality assessment.</p> <p>Restaurants or other odour emitting premises will be required to locate air extracts appropriately to avoid nuisance to neighbouring occupiers</p> <p>Developers should comply with the minimum standards on construction dust management that are detailed in the Mayor of London's Control of Dust and Emissions During Construction and Demolition SPG providing an Air Quality and Dust Risk Assessment and where necessary an Air Quality and Dust Management Plan</p> <p>Non Road Mobile Machinery used on construction sites should meet Stage IIIA of EU Directive 97/68/EC and its subsequent amendments as a minimum. Details should be registered at www.nrrmlondon/register</p>	<ul style="list-style-type: none"> Minor Major, Large scale with the potential to increase and/or change road traffic. Commercial or industrial use requiring environmental permitting. Development proposing a biomass boiler. <p>Mixed user major and large scale developments.</p> <p>Mixed user major and large scale development proposing a Combined Heat and Power Plant or biomass boiler</p> <p>Minor, Major, Large scale</p> <p>All Class A3, A4 and A5 development</p> <p>Minor, Major, Large scale</p> <p>Major, Large scale</p>	<p>The developer is committed to the minimisation of construction impacts via the application of a Construction Environmental Management Plan (CEMP) in part based upon the result of a site specific Dust Risk Assessment.</p> <p>The CEMP will include but will not be limited to, the following Best Available Techniques:</p> <ul style="list-style-type: none"> All vehicles should switch off engines when stationary, no idling vehicles; On-road vehicles to comply with the requirements of the Low Emission Zone and the London Non-Road Mobile Machinery (NRMM) standards, where applicable; All NRMM to use ultra-low sulphur diesel (ULSD) where available; Minimise the movement of construction traffic around the site; Maximising efficiency (this may include alternative modes of transport, maximising vehicle utilisation by ensuring full loading and efficient routing); Vehicles should be well maintained and kept in a high standard of working order; Avoid the use of diesel or petrol powered generators by using mains electricity or battery powered equipment where possible; and Location of plant away from boundaries close to residential areas <p>The proposed CHP will be designed to comply with the emission targets for CHP contained within Appendix 7 of London SPG on Sustainable Design and Construction (band B) and the requirements for Air Quality Neutrality.</p> <p>A review of local data indicated air quality in the region of the site to be approaching the Local Air Quality Management objective levels for Nitrogen dioxide. These high levels are due to the proximity of the A1 Watford Way and the M1 to the site boundaries. As a result, a programme of air quality monitoring for both Nitrogen Dioxide (NO₂) and the other traffic pollutant of concern, Particulate Matter (PM₁₀), was undertaken for the three consecutive months of February, March and April 2014. The results of this study indicated that whilst air quality at the boundary was approaching and exceeding objective levels (Test data indicates Nitrogen Dioxide, immediately adjacent to the roads are in excess of the health guideline annual average levels of 40µg/m³), air quality within the proposed amenity space of the scheme was well within them. Therefore, it was considered that once the mitigation effect of the development facade was in place, it would be possible to further protect the external amenity of the residents. This view has been confirmed with the air dispersion modelling which has been undertaken.</p> <p>The poor air quality in the locality has resulted in the declaration of an Air Quality Management Area across the whole borough. As a result, a detailed Air Quality Assessment has been undertaken which takes local meteorology into account with a dispersion model. Air dispersion modelling of the barrier effect of the proposed building facades has demonstrated that the anticipated levels within the amenity space are predicted to decrease by around a further 13%. (TO BE CONFIRMED) These values are based upon EU limit values which have been transposed into UK legislation and World Health Organisation guidelines.</p> <p>The use of high VOC content paints, sealants and all ozone depleting materials including insulation will be avoided wherever possible. Where feasible consideration will be made for the use of low emission VOC finishes, furnishings, carpets and construction materials to enhance the indoor air quality and reduce the building user's exposure to chemicals and other pollutants.</p> <p>The provision of cycle storage spaces will encourage the residents to use public transport and promote cycling, which will also help to limit the use of cars and reduce the emissions of carbon dioxide and other air pollutants. Moreover, car parking spaces have been minimised for the scheme, which will further discourage the use of private car travel to and from the scheme.</p>	Mayer Brown	Air Quality Report
214	Noise Quality	<p>To help consider noise at a site at an early stage an initial noise risk assessment should assess the Noise Risk Category of the site to help provide an indication of the likely suitability of the site for new residential development from a noise perspective.</p> <p>A Noise Impact Assessment is required for proposed residential development which is likely to be exposed to significant noise and/or vibration or cause a noise and/or vibration impact. For all noise-sensitive and noise creating developments the council will refer to the standards set out for internal and external noise levels in BS8233 (2014) and to the approach of BS4142:2014.</p> <p>The adverse impacts of noise should be minimised, using measures at source or between source and receptor (including choice and location of plant or method, layout, screening and sound absorption) in preference to sound insulation at the receptor, wherever possible.</p> <p>Any proposed plant and machinery shall be operated so as to ensure that any noise generated is at least 5dB(A) below the background level, as measured from any point 1m outside the window of any room of a neighbouring residential property. Plant should also be installed to ensure that no perceptible noise or vibration is transmitted through the structure to adjoining premises.</p>	<p>Minor, Major or Large scale developments</p> <p>Minor, Major, or Large scale developments</p> <p>All development</p> <p>All development with plant and machinery or activity which potentially has a noise impact</p>	<p>Noise Pollution</p> <p>The proposed development is of very high quality, with a standard of accommodation above the baseline requirements suggested by Building Regulations or related British Standards.</p> <p>Operational noise pollution</p> <p>Detailed environmental noise survey work was undertaken at the site by Mayer Brown acoustician to review the suitability of the site for residential development and the extent of mitigation that may be necessary to secure the sustainable design of the site.</p> <p>Indoor ambient noise level design targets for the development have been set in line with the design recommendations set out in Table 4 of BS 8233: 2014, ProPG guidance and the Council's adopted SPD. External outdoor spaces are being designed to the lowest practicable levels, with an aspiration to maximise the area of amenity space within the development, in line with the design guidance given of BS 8233: 2014, WHO, ProPG guidance and the Council's adopted SPD.</p> <p>Operational noise emissions from the site will be designed in line with the requirements of Barnet's Sustainable Design and Construction SPD which will avoid any significant impacts in line with the assessment methodology and guidance of BS 4142: 2014.</p> <p>The proposed development does not include any sources of use classes that have the potential to have an adverse vibration impact on neighbouring land uses. Vibration impacts on the proposed development will be assessed in line with BS 6472: 2008.</p> <p>Noise impacts on the proposed development are mitigated through the careful siting and massing of buildings on the site to act as barrier blocks and provide acoustic screening, and the use of green walls to the M1 and A1 sides of the site to provide additional local acoustic screening. In order to help minimise noise levels in private amenity spaces, balconies will take the form of "winter gardens" or the use of "solid" balustrades (to achieve maximum screening) and acoustically absorptive finishes to the underside of balconies (to minimise sound reflections).</p> <p>The massing and design of the buildings help create an extensive area of relatively quiet communal amenity spaces, compliant with the objectives on national planning policy and, where possible, providing spaces compliant with BS8233: 2014, WHO guidance and ProPG guidance.</p> <p>External building fabric constructions will be specified to be compatible with the indoor ambient noise levels design recommendations of BS 8233: 2014, ProPG guidance and the Council's adopted SPD. This will include:</p> <ul style="list-style-type: none"> Precast brick and GRC panels on the outside face facing the M1 and A1 and a lightweight SFS solution with GRC and brick panels on the inner surface facing the interior courtyards; High performance "acoustic" glazing and The use of whole house mechanical ventilation systems (MVHR) to provide means of ventilation and thermal control. 	Mayer Brown	Acoustic Report
215	Flood Risk, Sustainable Urban Drainage Systems and Water Quality	<p>Flood risk, Sustainable Urban Drainage and water quality requirements</p> <p>Proposed development will need to demonstrate application of the sequential test and exception test where inappropriate development is proposed in areas of flood risk.</p> <p>Proposed development will need to provide a Flood Risk Assessment on the known flood risk potential from all sources of flooding to the planning application site, the risk to others, how it will be managed and taking climate change into account.</p> <p>Developments will be required to demonstrate how they have considered the London Plan drainage hierarchy (Policy 5.13: Sustainable Drainage) and achievement of a maximum run-off rate which is equivalent to greenfield rates (typically 2 litres per second hectare). The Barnet LLFA pro-forma detailing SUDs strategy should be submitted with the application.</p> <p>Developers should consult with Thames Water and confirm that their scheme will not increase the risk of sewer flooding to other properties.</p> <p>Where planning permission is required for hardsurfacing porous materials should normally be used.</p>	<p>Minor, Major and large scale.</p> <p>All development over 1 hectare in Flood Zone 1 Development in Flood Zone 2 & 3 except for minor development</p> <p>Major, Large scale</p> <p>Large scale</p> <p>Householder, Minor, Major, Large scale</p>	<p>The Flood Risk Assessment (FRA) carried out by Heyne Tillett Steel confirms that the scheme is located within Flood Zone 1, is defined as having a less than 1 in 1,000 annual probability of river or sea flooding in any year.</p> <p>The assessment also confirms that the levels of the site will be designed such that surface water flows are directed away from the proposed scheme and that the site does not appear to be underlain by an aquifer in the superficial deposits or in the bedrock layer, the risk of flooding from surface water and groundwater is therefore considered as low.</p> <p>There are foul and surface water sewers located within the site application boundary. These sewers are assumed to be below the level of the proposed lower ground floor, approximately 10m below the existing ground level, based on TW Asset Plans and CCTV survey information. The existing sewers which cross the proposed lower ground floor extent will be either diverted or maintained among their current routes subject to TW approval. There are no records of sewer flooding within the vicinity of the proposed development. It is therefore considered the risk of flooding from sewers to be low risk for the proposed development. There are also no canals or artificial water sources which may result in flooding of this site. The proposed development is also not located in an area at risk of flooding from reservoirs.</p> <p>The scheme is therefore considered to be located on a site of low probability risk of flooding in accordance with current best practice guidance. The FRA has taken into account all current and future sources of flooding into considerations.</p> <p>Surface water discharge rates will be restricted to ensure that the rate of surface water runoff from the site does not increase as a result of the proposed development. This will be accomplished by utilising storage structures and flow control devices. There are two sources of storage currently considered:</p> <ul style="list-style-type: none"> "BlueRoof" (ALUMASC, or equivalent, above ground attenuation storage) located within the podium level. Geocellular Storage buried below ground level. <p>The "BlueRoof" storage will be utilised to provide storage for the surface water runoff generated at levels above the podium level. The Geocellular storage tank will be used for flows from all other sources. In an event that the storage requirement of the podium level exceeds the capacity of the structure, a proportion of roof runoff will be diverted towards the Geocellular storage buried within the ground. To reduce the size of the buried attenuation a "BlueRoof" option (ALUMASC above ground attenuation storage) will be considered as part of the detailed design.</p> <p>Ultimately the surface water outfalls into the existing Thames Water sewer via a HydroBrake flow control device.</p>	Heyne Tillett Steele	Flood Risk Assessment (which includes drainage strategy)

Barnet SPD on Sustainable Design and Construction - Standard Number	Barnet SPD on Sustainable Design and Construction - Standard Name	Barnet SPD on Sustainable Design and Construction - Standard Requirements (October 2016)	Barnet SPD on Sustainable Design and Construction	Team member responsibility	Other reference documents
			<p>The proposed drainage strategy will utilise surface water attenuation to allow for discharge at a rate of 47.7 l/s to accommodate a 1 in 100 year event plus an allowance of 40% for climate change.</p> <p>There will be two main storage types, 'BlueRoof' located at podium level and a Geocellular storage buried beneath the ground. Each storage will discharge by gravity, independently into existing Thames Water sewer with combined flow from both not exceeding 47.7 l/s.</p> <p>The podium level 'BlueRoof' will require approximate capacity of 1.280m³ and the Geocellular tank will provide additional 360m³ of storage. These ratios may change, but a combined volume of 1.640m³ will be provided for an impermeable area of 27,300m² for the whole site.</p> <p>Foul water from the proposed development will outfall to the adopted foul water sewer as the existing condition. The proposed foul water discharge rate is 33.20 l/s.</p> <p>The flood risk and drainage strategy for the scheme meets all the Barnet SPD on Sustainable Design and construction flood risk and drainage requirements (Section 2.15) and will also ensure the scheme achieves BREEAM credits for Pol 03 - Surface water run-off credits for the assessment of the non-residential areas of the scheme.</p>		
2.16	Biodiversity and Habitat Quality	A development proposal should provide an ecological statement as part of a submission which demonstrates how protection of biodiversity and habitat quality will be achieved. This statement should provide recommendations on where enhancements to biodiversity can be made.	<p>Major & Large scale</p> <p>The suitably qualified ecologist from Ecology solutions has been appointed in October 2015 (during RIBA stage 1) to provide a phase 1 habitat survey and to provide appropriate recommendations relating to protection and enhancement of ecological features for the site.</p> <p>The extended phase 1 survey and ecological appraisal for the scheme provides a list of recommendation for ecological protection and enhancement for the site:</p> <ul style="list-style-type: none"> • Invasive species - where works are proposed within or close to the boundary vegetation all reasonable measures should be taken to prevent the spread of these plant species. Where vegetation is to be removed the material should be disposed of at an approved facility. • As part of the proposals efforts should be taken to provide suitable area of open space and as feasible promote green infrastructure in the site and local area. • Bats - In the unlikely event that any evidence of bats is found during demolition, work should stop and an ecologist be contacted for advice. • Birds - Nonetheless due to the legislation afforded to nesting birds it is recommended that removal of suitable nesting habitat is completed outside of the nesting season (March to July inclusive). Should removal be scheduled within the nesting season checks should be completed by an experienced ecologist with any active nests retained and buffered until the fledglings have flown the nest. • As part of the redevelopment new nesting opportunities could be secured through new landscape planting together with nest box targeting opportunities species of conservation concern known to be present within the local area, such as Starling, Swift and House Sparrow. • It is recommended that the landscape strategy for the proposed development incorporate native species of local provenance, and those of known value to native wildlife in the landscape strategy wherever possible. • Recommendations for mitigation include new planting with native species, to provide foraging and nesting habitats for bird species, together with provision of nest boxes. <p>The landscape architect has confirmed that these recommendations have been incorporated within the proposed landscaping proposal.</p> <p>The recommendation for ecological enhancement includes recommendation for ecologically valuable habitats to be created that contribute to local biodiversity action plan targets.</p> <p>Outerspace have confirmed that they will develop a compliant five year landscape management plan for the scheme completed in accordance with BS 42020:2013 Section 11.1. This is to be handed over to the building owner/occupants for use by the grounds maintenance staff.</p> <p>The contractor will be required to implement best practices measures with regards to ecology:</p> <ol style="list-style-type: none"> Nominate a 'Biodiversity Champion' with the authority to influence site activities; Train all a personnel on how to protect site ecology; Records actions taken to protect biodiversity; Works conducted at times to minimise ecological disturbance. 	Ecology Solutions / Outerspace	Extended phase 1 survey and ecological appraisal Landscaping proposal
2.17	Archaeological Investigation	Development within the 19 Local Areas of Archaeological Significance in the borough should provide detail of how they will investigate, catalogue and where possible preserve the remains in situ or in a museum. Development outside the 19 Local Areas of Archaeological Significance should assess whether the site is known or is likely to contain archaeological remains.	<p>Householder, Minor, Major & Large scale</p> <p>All sites larger than 0.4 hectares</p> <p>Site not located in an area of Archaeological Significance</p>	N/A	N/A
2.18	Pollution Prevention, Contaminated Land Remediation and Construction Management	Applicants should prepare and implement a Construction Management Plan signed-off by the council prior to commencement of any demolition or construction activities on site. Where contamination is suspected then applicants should submit a Preliminary Risk Assessment. Where contamination is found a full site investigation and remediation strategy will need to be agreed with the council before development can commence.	<p>Minor, Major, Large scale. Applications for basements.</p> <p>Minor, Major, Large scale</p> <p>A Construction Management Plan will be completed and signed-off by the council prior to commencement of any demolition or construction activities on site.</p>	Contractor / Heyne Tillet Steele	Construction Management Plan
2.19	Code for Sustainable Homes	Code for Sustainable Homes level three. (superseded) Code for Sustainable Homes level four. (superseded)	<p>Residential Minor</p> <p>Residential Major & Large scale</p> <p>Requirement superseded.</p>	N/A	N/A
2.20	BREEAM	Development proposals should achieve a minimum 'Very Good' rating.	<p>Major & Large scale</p> <p>A BREEAM pre-assessment for the non-residential part of the scheme has been carried out which indicate that a rating of 'Excellent' is likely to be achieved for the scheme, exceeding the requirements of London Borough of Barnet, with a predicted score of 77.3% and 77.9% for the retail and D1 use class building(s) respectively. This predicted score include a number of credits which are currently considered possible which will require careful monitoring and review as the design progresses to ensure they can be achieved when a formal BREEAM assessment is undertaken.</p> <p>This prediction has been based on a BREEAM workshop held on the 12th March 2019 with the project team and the BREEAM Assessor / BREEAM AP where each criterion was reviewed. This ensured all members of the team gained an understanding of the successful integration of the BREEAM credits and process into each element of the design.</p> <p>A formal assessment will take place when tender documentation is produced and will require submission of a full evidence bundle from the client and the design team to show compliance with the credits.</p> <p>The BREEAM assessor / Accredited Professional (AP) has been and will continue to form an integral part of the design team and a consistent point for reference, review and questions. This approach is proven through experience to offer the surest route to successful BREEAM certification and holistic sustainable design.</p>	ChapmanBDS	BREEAM / Sustainability statement
2.21	Considerate Constructors Scheme	Applicants are encouraged to sign up to the Considerate Constructors Scheme will be expected prior to commencement of any demolition or construction activities	<p>Minor, Major & Large scale</p> <p>The project will be registered under the CCS scheme and will achieve a very good score under this scheme. These requirements will be included in the contractor pre-regs. See also BREEAM pre-assessment - Credit Man 03.</p>	Contractor	CCS certificate (in due course)