CAMDEN GOODS YARD

SUSTAINABLE DESIGN AND CONSTRUCTION STATEMENT

Volume 1

Main Report

30 June 2017

Site address

Camden Goods Yard

Chalk Farm Road, London NW1 8AA

Sustainable Design and Construction Statement

Prepared by

BBS Environmental

For

Safeway Stores Limited and BDW Trading Limited

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Contents

About Bespoke Builder Services Ltd

Bespoke Builder Services Ltd is a construction consultancy specialising in sustainability, energy conservation and the application of renewable energy technologies. As a consultancy, we do not sell products, so we are able to take an objective view of a development to assist developers in incorporating the most cost effective and practical solutions.

Our range of services includes specialist pre-planning reports, energy consumption calculations for Building Regulations purposes, and broader environmental and sustainability studies and reports and, BREEAM Assessments. Our team of consultants includes registered SAP and SBEM Assessors, registered BREEAM Assessors, Planning Specialists, Renewable Energy Specialists, Chartered Engineers and Chartered Surveyors.

A sister consultancy is a Corporate Approved Inspector, approved to provide Building Control services in both the residential and commercial sectors, and where necessary we are able to draw on this additional expertise to ensure that all advice given in respect of energy conservation and sustainability will also meet all other constraints imposed by the Building Regulations.

Established in 2001 by two directors with many years' experience in the construction industry, the practice has grown steadily, and to date has carried out hundreds of EcoHomes, BREEAM and CSH assessments, and many thousands of SAP assessments. In early 2016, and with the full support of the existing BBS directors and senior management, the business became part of the Stroma Group, although it continues to operate as a separate entity with the same directors, management and staff.

By applying this expertise to assist developers to understand and meet the obligations to ensure that developments are sustainable, and incorporate energy conservation and on-site renewable energy technologies, we are able to help ensure that these vitally important issues are addressed in a transparent way, where the needs and responsibilities of all the stakeholders are fully respected.

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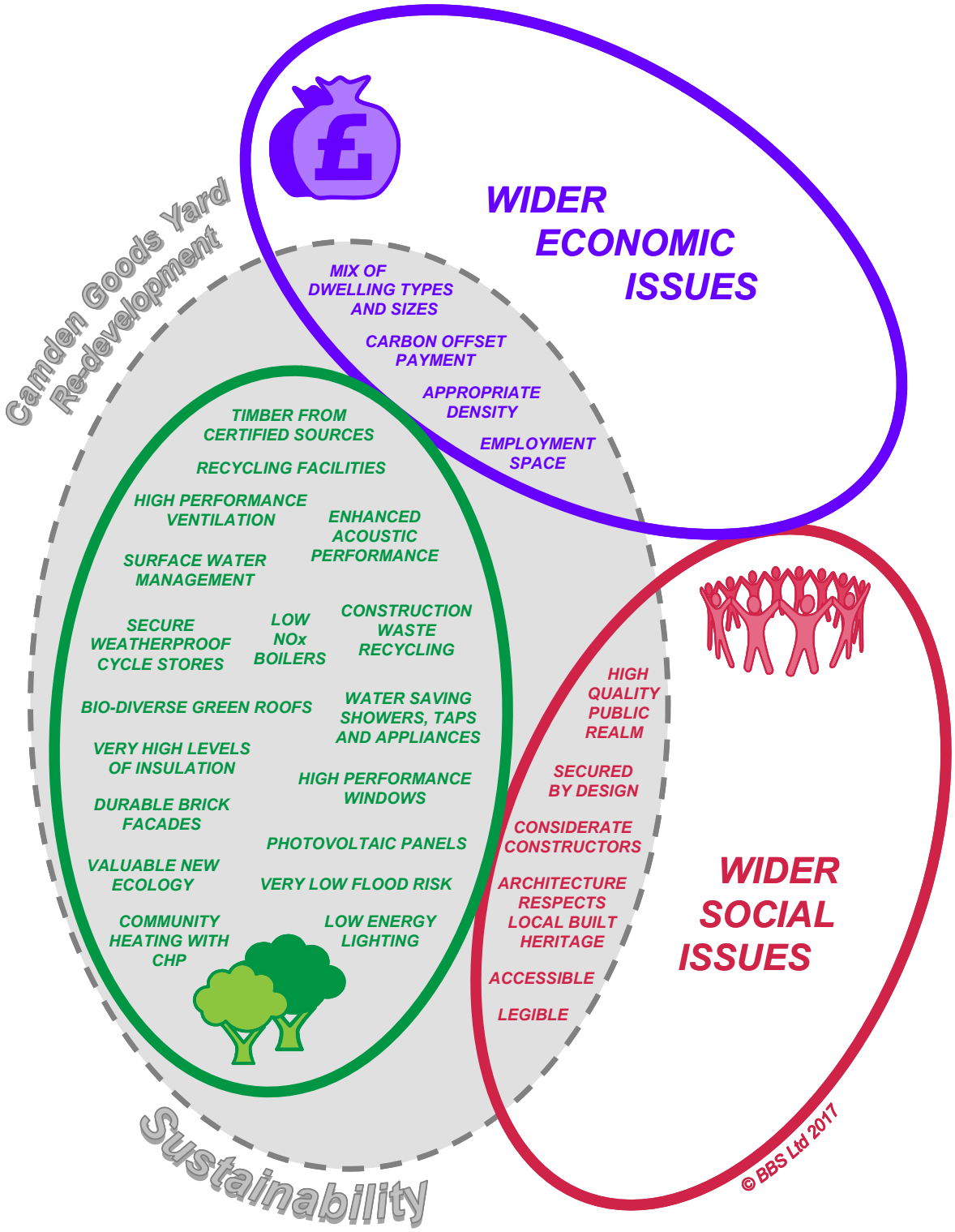

A diagrammatic representation showing the extent and limits to which the design, specification and implementation of a development can contribute to wider sustainability objectives.

1. Executive Summary

Introduction

This Sustainability Statement has been prepared for the joint Applicants, Safeway Stores Limited Ltd and BDW Trading Limited, by BBS Environmental, a construction consultancy specialising in sustainability, energy conservation and the application of renewable energy technologies. It has been prepared to accompany a detailed planning application for the redevelopment of a site currently occupied by a Morrison's supermarket and a petrol filling station, located just off Chalk Farm Road in the London Borough of Camden.

The proposals for the site comprise the following:

Demolition of existing buildings (Class A1 foodstore and Sui Generis petrol filling station) and associated highways and site works including removal of existing surface level car parking and retaining walls along with road junction alterations.

Redevelopment of petrol filling station site to include the erection of a new building of up to six storeys and up to 11,243 sq m GEA floorspace to accommodate a petrol filling station (Sui Generis), flexible Class A1, A3 and A4 floorspace, Class B1 floorspace and a winter garden; associated cycle parking; public green space; public toilets and other associated works and highways works. For a temporary period of up to thirty months part of the ground and all of the 1st floor of the building will be used for a Class A1 foodstore with associated car parking.

Redevelopment of the main supermarket site to include the erection of buildings (Blocks A to F, including Blocks E1 and E2) of up to 14 storeys accommodating up to 573 homes and up to 60,568 sq m GEA of residential floorspace together with up to 28,333 sq m GEA non-residential floorspace within Class A1 (foodstore), flexible Class A1 and A3, Class B1a and B1c, Class D2 community centre, Sui Generis use at roof level of "Block B" for food and plant growing and production facility (including small scale brewing and distilling) with associated ancillary office, storage, education, training, café and restaurant activities; together with associated new streets and squares; hard and soft landscaping and play space; lifts; public cycle parking and cycle hire facility; and other associated works, including highways works.

Throughout this report, the petrol filling station site is referred to as the "PFS Site" and the main supermarket site is referred to as the "Main Site".

The development proposals satisfy the key environmental targets set out in the London Borough of Camden *Core Strategy (November 2010)*, and specifically, *Policy CS13: Tackling climate change through promoting higher environmental standards.* The emerging replacement *Camden Local Plan Submission Draft (2016) Policy 8: Sustainability and climate change* contains a broadly similar range of requirements.

Table 1: Camden Goods Yard Sustainability Targets

Overall emissions reduction	**35% reduction in emissions (2013 baseline)**
Connect to a heating network	**Creation of a site-wide communal heating network**
On-site low carbon technologies	**165 kWp of PV panels and 230 kWth CHP system**
Surface water run-off reduction	**Run-off attenuated to < 50% of the current level**
Potable water use	**Domestic water use to be < 105 L/p/d**

In addition to meeting the key targets listed above the proposals incorporate many other measures and features that will result in a development that conserves natural resources, limits pollution and environmental damage and is adapted to cope with the potential impacts of a changing climate, both during construction, and when in operation.

The development will be subject to Part L1A/L2A: 2013 of the Building Regulations and the principle non-residential units will be assessed to BREEAM NC2014.

Location, land use and urban design

The Planning Statement and the Design and Access Statement address these issues and specifically London Plan 2016(1) polices 7.1; 7.4 and 7.6. The planning application is for 573 dwellings, together with 39,576 m^2 of non-residential floorspace. The Main Site is currently occupied by a Morrison's supermarket, and the petrol filling station site is also currently operated by Morrison's.

Note 1: *The Spatial Development Strategy for London, consolidated with alterations since 2011*, GLA (March 2016)

The development will enable a valuable centrally-located site to be utilised in a far more efficient manner, and create a new residential and employment hub on a site that is currently very under-used. The development site, which is on the site of the former Camden railway goods yard, and is currently occupied only by the modern supermarket building and an adjoining surface-level carpark, was artificially elevated by up to 4.5 m to permit the main line railway to be carried over the Regents Canal at a height sufficient to allow passage of barges. In some areas vaults and tunnels were constructed to carry the loads of the buildings built above. Some of the tunnels remain in use as the Horse Tunnel Market below the eastern end of the site.

The proposed scheme provides for the excavation of the central elevated section of the Main Site to create a single-level of basement parking beneath the original ground level, and a new supermarket, residential-ancillary and services spaces, and further parking in an undercroft at the original ground level. Above this, the scheme features two large podium blocks with mixed use at the lower levels, two taller apartment buildings, two smaller apartment buildings and a terrace containing duplex apartments and town houses. The massing and scale of the scheme has been carefully designed to respond to the surrounding buildings and reduces towards the south-east where the site adjoins streets of low-rise terraced housing. The proposal for the PFS Site includes a new filling station facility and other retail space on the ground floor and office space on the upper five floors.

The layout of the Main Site will create a highly pedestrian-permeable development and maintain the access to Gilbeys Yard and the Regents Canal towpath to the south of the site, and an improved access to the Horse Tunnel Market will be created at the eastern corner of the site. The design also utilises the opportunity provided by the construction of the extensive two-level basement to conceal most of the servicing, and cycle parking provision, and all of the car parking, including all the supermarket customer parking in in basement locations, thereby maximising the area of landscaped open space within the scheme and greatly improving the overall appearance.

Great care has been taken in the planning of the buildings to ensure that the development is as fully accessible and adaptable as possible, and 88% of the dwellings have step-free access to the entrance level, and to private amenity spaces, and the required living space and facilities to satisfy Part M4(2) – the successor to Lifetime Homes. In addition, 10% of the dwellings comply with the more demanding Part M4(3) – the successor to a variety of local and regional wheelchair housing standards. Just 12 dwellings, 2%, have stepped access, and therefore comply only with Part M4(1).

All of the communal facilities across the development have been designed to be accessible in accordance with *BS8300: 2009 Design of buildings and their approaches to meet the needs of disabled people: Code of practice.*

Energy and carbon dioxide emissions

The dwellings will be designed to exceed the requirements of Part L1A: 2013 by means of insulation and energy efficiency measures alone. All of the residential buildings and the non-residential space on the Main Site will be heated by a community heating system with condensing gas boilers and a gas Combined Heat and Power (CHP) unit. Comfort cooling will be provided to a proportion of the residential and non-residential units using local roof-mounted air source heat pump (ASHP) chillers. The PFS building will be heated by ASHPs, which will also supply cooling when required. In addition, substantial photovoltaic panel (PV) arrays are proposed across the development with a combined rating of 165 kWp, and these will contribute a further significant reduction in carbon dioxide emissions. The combination of the energy efficiency measures, the CHP unit and the PV panels will result in overall emissions for the development that are 35% below the 2013 regulatory baseline.

Adaptation to climate change

The development includes a range of features which will enable it to adapt to the potential effects of climate change including windows with deep reveals, and sized to provide good daylight, while avoiding excessive solar gain, balcony overhangs which provide significant summer shade, and where necessary, solar control glazing. These measures mean that no risk of overheating of the residential units was identified following a detailed assessment.

Bio-diverse roofs or landscaped amenity roofs are generally proposed for all concrete frame buildings where there are flat roofs with the exception of Block B, where the roof is occupied by glasshouses to be used for a food and plant growing and production facility, and a café. The pitched roofs proposed for parts of Blocks E2 and F will use a lightweight structure with a high-albedo standing seam metal finish to reduce the amount of solar heat absorbed in summer. The roofs will also contribute to reducing rainwater run-off as part of a range of measures that will enable the development to cope with increased rainfall intensity, and reduce the overall run-off rate from the site to less than 50% of the current levels in accordance with the London Plan 2016.

Avoiding pollution and environmental nuisance

An Air Quality Impact Assessment has been prepared for the development. The assessment concludes that the proposed development will have a negligible impact on local air quality taking account of all factors including the emissions from the community heating boilers and CHP unit, and the revised traffic profiles that will occur with the increased intensity of use.

A Noise Impact Assessment has been carried out and the development will incorporate appropriate design measures to ensure that both the internal noise levels and the impact of the development on external noise-sensitive receptors, including those created within the new development, are acceptable. This will be subject to a technical assessment.

The Applicant will prepare and implement a Construction Environmental Management Plan in line with the Mayor's best practice guidance to minimise the local environmental impact during the construction phase. This will be supported by registering the development with the Considerate Constructors Scheme and subjecting the site to the regime of rigorous external audits that this entails.

Avoiding waste and minimising landfill

Prior to the commencement of the construction phase the Applicant will prepare a Site Waste Management Plan in accordance with best practice. They have an excellent track record of minimising and recycling construction waste, and evidence from previous projects demonstrates that typically over 85% of construction waste is recycled.

A strategy for managing operational waste has been developed and is being submitted in support of the application. Separate bin stores with space for refuse bins and bins for recycling of dry materials, and food waste together with space for bulk waste, will be provided in accordance with LBC guidance.

Nature conservation and biodiversity

The whole of the application site, including the PFS Site, which has a total area of approximately 3.4 Ha, historically fell within the boundary of the Camden railway goods yard, which was first developed in the 1830's. Over the following decades massive retaining walls were constructed and the northern part of the site to both the east and west of the Roundhouse was artificially elevated to raise the railway to the height necessary for the main line to cross the Regents Canal. This elevated northern section remained in place for over a century, although it has since been cut back to the position of the current railway line, resulting in the PFS Site now being at the original ground level again.

There is therefore no natural habitat on the site, it having been fully developed for industrial and transport hub use, and the existing soft landscaping and trees date only from time when alternative uses for the site were developed following the closure of the railway goods operations. An arboriculture survey of the existing trees has nevertheless been undertaken and some of the existing trees along the site boundaries will be retained where possible.

Across the rest of the site the landscaping scheme has been designed to achieve the maximum possible ecological benefit, and incorporates bio-diverse roofs, grassland, and shrub, tree, hedge and ground flora planting.

Water conservation

A range of water conservation measures will be implemented to reduce the calculated residential water consumption to below 105 litres per day for each resident, and each dwelling will have an individual water meter.

The landlord's areas and the individual tenanted commercial units will be similarly metered, and all non-residential sanitary facilities will use low-water fittings in accordance with BREEAM guidance.

Rainwater harvesting systems are planned for the two large podium blocks: on Block B a roof-level system will be provided to collect water for the roof-top food and plant growing and production facility, and on Block F, water will be collected to be used to irrigate the podium and terrace levels.

Flood risk and surface water management

The whole of the site is in a Zone 1 flood risk zone. The risk of groundwater and sewer flooding is also considered to be low.

The larger part of the site is currently occupied by impermeable buildings and hardstandings, and less than 9% of the site is soft landscaping. The proposed development will increase the area of soft landscaping to approximately 14% of the total site area. In addition, substantial areas of semi-pervious surface including roof gardens, amenity spaces, courtyards and bio-diverse roofs have been incorporated into the scheme and these areas amount to a further 9% of the site area.

The proposed surface water drainage system incorporates a number of SuDS measures as noted above, together with underground attenuation tanks, in accordance with the London drainage hierarchy. The use of infiltration is not feasible due to the underlying made ground and clay geology. All run-off from the site is routed via a series of attenuation tanks prior to eventual discharge at controlled rates to the Thames Water combined sewer that crosses the site.

The total discharge rate of surface water for all outfalls will be limited to 50% of the current rate from the site, in accordance with the London Plan 2016.

2. Introduction

Background

This Sustainability Statement has been prepared for the joint Applicants, Safeway Stores Limited and BDW Trading Limited, by BBS Environmental, a construction consultancy specialising in sustainability, energy conservation and the application of renewable energy technologies. It has been prepared to accompany a detailed planning application for the redevelopment of the site of the former Camden Goods Yard that is currently occupied by a Morrison's supermarket, car park, and petrol filling station.

This document outlines the measures that have been taken to contribute to the sustainability of the proposals, including matters relating to the use and layout of the site, the design of the buildings, and the construction and operational phases of the development. It draws extensively on the more detailed technical reports commissioned from specialist consultants and submitted in support of the application. Additional information contained in this report has been assembled from extensive discussions with the Applicant and the Design Team.

Development proposals

Demolition of existing buildings (Class A1 foodstore and Sui Generis petrol filling station) and associated highways and site works including removal of existing surface level car parking and retaining walls along with road junction alterations.

Redevelopment of petrol filling station site to include the erection of a new building of up to six storeys and up to 11,243 sq m GEA floorspace to accommodate a petrol filling station (Sui Generis), flexible Class A1, A3 and A4 floorspace, Class B1 floorspace and a winter garden; associated cycle parking; public green space; public toilets and other associated works and highways works. For a temporary period of up to thirty months part of the ground and all of the 1st floor of the building will be used for a Class A1 foodstore with associated car parking.

Redevelopment of the main supermarket site to include the erection of buildings (Blocks A to F, including Blocks E1 and E2) of up to 14 storeys accommodating up to 573 homes and up to 60,568 sq m GEA of residential floorspace together with up to 28,333 sq m GEA non-residential floorspace within Class A1 (foodstore), flexible Class A1 and A3, Class B1a and B1c, Class D2 community centre, Sui Generis use at roof level of "Block B" for food and plant growing and production facility (including small scale brewing and distilling) with associated ancillary office, storage, education, training, café and restaurant activities;

together with associated new streets and squares; hard and soft landscaping and play space; lifts; public cycle parking and cycle hire facility; and other associated works, including highways works.

The site is located on part of the former Camden Goods Yard, a large elevated railway goods terminal that had extensive sidings and warehouses, as well as engine and carriage maintenance facilities, and at various times, coke production kilns and housing for live cattle that were brought into London by rail. It also had extensive underground facilities for the hundreds of draft horses that were used for the onward transportation of the goods to the nearby Regents Canal, or elsewhere in the city.

The development site, which has an area of approximately 3.4 Ha, occupies only a small part of the former goods yard which originally extended to approximately 13 Ha and incorporated the Roundhouse to the west, originally a circular engine shed with a central turntable, and now a thriving venue for concerts and the performing arts. To the east it extended as far the Regents Canal. The whole of the largest extent of the goods yard remained in intensive use for railway purposes until the 1960's, when the withdrawal of steam traction, and the transfer of much freight haulage to the road network meant that its facilities were no longer required. The draft London Borough of Camden Planning Framework for the area has identified the site as suitable for a residential-led mixed use re-development, that while retaining the supermarket space and providing a substantial number of new homes, should also cultivate commercial activity and business start-ups by providing a range of unit types and sizes including affordable workspace, space for small scale creative industries, and a range of office accommodation.

A dominant feature of the goods yard, that has had a very substantive impact on the nature of this development proposal, is that it was constructed with the railway tracks elevated at some 4.5 m above the natural ground level. This work, which commenced at the beginning of the railway era in the 1830's was done to permit the railway tracks to be at a height that would allow the main lines to cross the Regents Canal, with clearance for the passage of barges below. The elevated surface buildings were supported by vault and tunnel structures, and the whole area of the goods yard was in-filled with predominately London clay, reportedly excavated from the Primrose Hill Tunnel and its approach cuttings. The goods yard configuration was changed as railway technology rapidly developed, and the North London Railway main line was opened and crossed the site, with major alterations taking place in 1847 and again in 1856, by which time locomotives has become too long to use the Roundhouse, and it was converted to be used as a goods warehouse.

From the 1960's the goods yard use for railway purposes diminished, and parts were successively sold for alternative uses, most notably the area to the north-west of Juniper Crescent. As part of this previous redevelopment, the levels of some areas, including the PFS Site, were reduced back down to the original ground level and access to the remaining elevated part, currently occupied by the supermarket building

and the car park, was achieved by means of an inclined approach road. To the north and south-west, the development site is bounded by the main railway lines, which remain at the elevated level, and to the south-east it is bounded by the Gilbeys Yard residential development, and the remaining re-purposed historic railway and warehouse buildings that occupy the space between the goods yard and Camden Lock or the Regents Canal. Within the development site boundary at the eastern end, some of the original tunnel structures remain in use as the Horse Tunnel Market.

A key feature of the development proposal is the excavation of a large central part of the site to form a single-level of basement parking below the original ground level, and a new supermarket, residential-ancillary and services spaces, and further undercroft parking at the original ground level. Above this, the scheme features two large podium blocks with mixed use at the lower levels, and at the roof level of the largest, glasshouses for a food and plant growing and production facility. There will also be two taller apartment buildings, two smaller apartment buildings and a terrace containing duplex apartments and town houses. The massing and scale of the scheme has been carefully designed to respond to the surrounding buildings and reduces towards the south-east where the site adjoins streets of low-rise terraced housing. The PFS Site is to be re-built with a new building that includes a petrol filling station facility and adjoining additional retail units, and with five further floors of office space above.

The proposal will a result in mixed-use development of the highest quality that will reflect the local built environment and contribute positively to the character of the neighbourhood; use the latest technologies and construction practices to create a development that has the lowest possible environmental impact; and provide much needed high-quality homes and employment opportunities for local people.

Sustainability statement outline

This Sustainability Statement includes the following parts:

- A summary of the local and regional planning policies relating to sustainability and applicable to the development (Section 3);
- An examination of how the design of the proposed development responds to these policies and guidelines (Section 4).

This document makes frequent reference to other technical reports that are being submitted separately in support of the application. Reference should be made to these documents for further detailed information.

3. Planning policy context

3.1 Introduction

The development proposals have been considered in the context of national, regional, and local planning policy. The National Planning Policy Framework (NPPF), published on 27th March 2012, sets out the current national policy on land use planning. Paragraphs 6 to 17 of the NPPF set out how the government expects the planning system to contribute to the achievement of sustainable development, and the subsequent paragraphs, 18 to 219, taken as a whole, constitute the government's view of what sustainable development in England means in practice for the planning system.

At the heart of the NPPF is a presumption in favour of sustainable development. This presumption must guide decision-taking, and means that development proposals that accord with the applicable development plan must be approved without delay. Where a development plan is absent, silent, or relevant policies are out of date, approval should also be granted unless any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in the NPPF taken as a whole, or where specific policies in the NPPF indicate that development should be restricted. It follows therefore that where an adopted development plan or emerging policies are in place, both at a regional and local level, the NPPF requires that the application is determined in the light of these policies. The key policy and planning guidance documents that are relevant to the proposals in this application are detailed below.

3.2 Regional planning policies (Greater London Authority policies)

The current overarching spatial planning document for London is the London Plan: Spatial Development Strategy for London (consolidated with alterations) (GLA) (March 2016).

This contains a substantial number of individual policy sections that relate to sustainable design and construction, and these are all brought together, with additional guidance, in the GLA London Plan Supplementary Planning Guidance document: *Sustainable Design and Construction SPG (GLA) (April 2014)*. The content is arranged under three general categories: Resource Management; Climate Change Adaptation and Pollution Management. Therefore, this Sustainability Statement has been arranged to reflect this structure and uses the same three categories. However, where there are distinctive local policy requirements, these are noted.

3.3 Local planning policies (London Borough of Camden policies)

The local spatial planning document for the London Borough of Camden is the *Camden Core Strategy 2010 – 2025 (November 2010)*, and specifically, *Policy CS13: Tackling climate change through promoting higher environmental standards.* The strategy is supported by a range of detailed development policies, and *Development Policy DP22 Promoting sustainable design and construction* is particularly relevant. Further local guidance is provided in the supplementary planning document *CPG3 Sustainability (July 2015).* The emerging local policy is *Policy CC1 Climate change mitigation* in the submission draft of the *Camden Local Plan (2016),* and this contains a broadly similar range of requirements.

These current and emerging policies are all aligned to the *London Plan 2016,* and broadly follow the form and content of the *GLA Sustainable Design and Construction SPG (GLA) (April 2014)* although where this latter document contains more demanding requirements, particularly with regard to energy efficiency and air quality, these have been given precedence ahead of the local policies.

With regard to the major non-residential elements, including the supermarket and the PFS office building, local LBC policy requires that these should seek to achieve an “Excellent” rating under the BRE Global BREEAM assessment methodology. Accordingly, a BREEAM Pre-assessment has been completed and this is submitted as Appendix B to this Sustainability Statement. The BREEAM scheme requires that developers implement a wide range of measures that affect the whole of the design and construction process, and these requirements have directly informed many of the specific proposals put forward. Furthermore, and notwithstanding the withdrawal of the CSH (Code for Sustainable Homes) – see Section 3.4 below – where the measures required for BREEAM compliance affect the design or the site operations generally, the whole of the development will benefit from their implementation.

3.4 Changes to national planning policy

A specific paragraph within supplementary planning document CPG3 Sustainability (July 2015) deals with the CSH and notes that notwithstanding the requirements of the earlier adopted policies, CSH compliance is no longer required following an amendment to *National Planning Policy* issued in the form of a *Written Ministerial Statement (WMS)* on 25th March 2015. The WMS announced the withdrawal of the CSH and a general prohibition on local planning authorities requiring CSH compliance with immediate effect. This change has been reflected in the emerging local policies including *Policy CC1 Climate change mitigation* in the submission draft of the *Camden Local Plan (2016)* from which all references to the CSH have been deleted.

The WMS also announced the introduction of new *National Technical Standards* (NTS) including new standards on energy and emissions, water conservation, access and internal space, and a new *Part Q* of the Building Regulations on *Security.* It further stated that these standards can be applied by local planning authorities that have in place an existing policy requirement for CSH Level 4 compliance. The new standards for energy and water are described as being equivalent to compliance with the mandatory requirements of CSH Level 4, section Ene1 which requires (for dwellings subject to Part L1A: 2013) a 19% reduction in emissions, and section Wat1 which requires that internal water use does not exceed 105 L/p/d. The LBC *CPG3 Sustainability (July 2015)* duly confirms that there is a continuing requirement for compliance with the previous CSH Level 4 target for residential water conservation, as now re-stated in the NTS, and the development proposals as set out in this and the other supporting documents fully satisfy this standard. The new NTS on energy and emissions, whilst being applicable in principle, is significantly less onerous than the requirements of the London Plan 2016, so compliance with the latter requirements means that compliance with the NTS is assured.

Finally, the WMS announced a general prohibition on local planning authorities imposing requirements that relate to *the construction, internal layout or performance* of new dwellings apart from the new National Technical Standards. Therefore, notwithstanding any existing policies or guidance on Sustainable Design and Construction, for the purpose of this application and except as otherwise described in this Statement, the Developer is not submitting for approval details of matters that relate the construction, internal layout or performance of the individual dwellings within the scheme, nor should the local planning authority attempt to impose these by means of Planning Conditions.

4. Design response

4.1 Introduction

This Sustainability Statement addresses issues that relate to local and regional planning policy and each section identifies relevant policies and an explanation of how the proposed development responds to these policies. The information presented is based on documentation prepared by and discussions held with the Design Team.

4.2 Resource management

4.2.1 Introduction

London is a growing city with a limited supply of land for economic, residential, recreational and natural land uses. This section outlines how the proposals make the most of the opportunities provided by the site, based on its specific circumstances, and how they have been designed to improve the local and wider environment and minimise their demand on wider resources including land, energy, water and materials.

4.2.2 Land

MAYOR'S PRIORITIES

Optimising the use of land (London Plan policy references: 3.4, 4.3, 7.6)

Developers should optimise the scale and density of their development, considering the local context, to make efficient use of London's limited land.

Design response

The development site is very under-used, with just a single-storey supermarket building and extensive surface-level car parking. The existing area of supermarket retail space will be fully replaced, and the necessary retail car parking will be moved underground. The very substantial areas of residential, commercial and small retail / craft (makers) space are all additional to the current uses, and will return the site to the level of intense use last seen some 60 years ago when the site was occupied by a goods transport hub.

The proposed density is within the appropriate density range in the London Plan 2016 guidance for an urban site, given the PTAL and the nature of the proposed buildings. The Planning Statement and the Design and Access Statement address these issues and specifically London Plan polices 7.1; 7.4 and 7.6. During the development of the scheme the Architects have consulted extensively with the GLA and the LBC, residents' groups and other local stakeholders, and have held public consultation meetings. The feedback received has been taken into account in the final form of the proposals.

The proposals contain the following key provisions of land uses:

- 573 residential units
- 39,576 m^2 of non-residential space (including supermarket car park)
- 320 car parking spaces (including supermarket car park)
- 34 active electric vehicle charging points (EVCPs) and 34 passive EVCPs
- 1,031 cycle spaces (including 119 for non-residential purposes)

The underlying objectives of the proposal are to increase the intensity of use on the site to a level commensurate with its central, accessible location; to create a mixed-use development of the highest quality that will contribute positively to the character of the neighbourhood; to use the latest technologies and construction practices to create a development that has the lowest possible environmental impact; to expand the use for employment purposes; and to provide much-needed dwellings for local people.

4.2.3 Site layout and building design

MAYOR'S PRIORITIES

Site layout and design (2.18, 5.2 – 5.13, 5.16, 5.18, 5.21, 6.1, 6.7 – 6.13, 7.1, 7.6, 7.14 – 7.22)

The design of the site and building layout, footprint, scale and height of buildings as well as the location of land uses should consider:

Existing features

- *the possible retention and reuse of existing buildings and structures; and*
- *the retention of existing green infrastructure, including trees and potential for its improvement and extension;*
- *access routes to public transport and other facilities that minimise the use of private transport;*

New design of development

- *the existing landform;*
- *the potential to take advantage of natural systems such as wind, sun and shading;*
- *the principles set out London Plan policies 7.1 and 7.6;*
- *the potential for adaption and reuse in the future;*
- *potential for incorporating green infrastructure;*
- *potential for incorporating open space, recreation space, child play space;*
- *energy demands and the ability to take advantage of natural systems and low and zero carbon energy sources;*
- *site wide infrastructure;*
- *access to low carbon transport modes;*
- *potential to address any local air quality, noise disturbance, flooding and land contamination issues; and*
- *the potential effect on the microclimate.*

Design response

The development history of the site, which dates back nearly 180 years, has had a direct impact on the development proposal. While archaeological studies have confirmed that the majority of the historic structures within the main artificially elevated section of the site have been destroyed, the residual tunnels of the Horse Tunnel Market under the eastern tip of the site will not be affected, and an enhanced pedestrian link will be created to reconnect the site with its history. The existing modern supermarket building on the site has no architectural merit and cannot be incorporated into the new development, so will be removed. The artificial elevation has also dictated the approach to the form of the buildings – just as it has directly affected the surrounding buildings as they developed over many years – and the proposals take advantage of this landform, using construction techniques in concrete and steel that would have been unimaginable even to the visionary Engineer Robert Stephenson, who in 1833 was appointed to build the 112-mile railway from the site to Birmingham.

The main feature of the site layout is the excavation into the centre of the elevated section, to form an extensive “undercroft” at the natural ground level that will run under all of the buildings apart from Block D, and a second, deeper, level to provide the necessary quantum of retail car parking. The new supermarket will therefore be sited at the original ground level, and have an at-grade pedestrian entrance accessed from the lower northern end of the inclined approach road. The entrance plaza thus created will also provide access to a series of non-residential units including affordable workspaces and

a resident's sports facility. The plaza also provides the access route for delivery vehicles to the supermarket service yard, loading bay and warehouse which are all located at the store level. Also at this level, the necessary space has been set aside for the Energy Centre and other plant and tank rooms required to serve the commercial and residential buildings above. The remaining space at this level will provide 150 retail parking bays, and a further 150 retail parking bays are provided in the lower basement beneath the store.

Above this, at the railway level, the development has six new buildings each with a distinct yet harmonious style, surrounded by hard and soft landscaping to create a fully pedestrian-permeable site that incorporates a series of useful and varied spaces and places: designed for activity, relaxation, and enjoyment; and to be used by residents, workers, and the visitors to the many and varied commercial and retail facilities. The topography of the PFS Site is more straightforward, as this area, although historically elevated, and part of the goods yard, has long since been lowered again to the natural ground level: on this site, a new filling station facility is proposed, with adjoining retail units, and five levels of office space above.

No natural habitat has been preserved anywhere within the site, and the extensive nature of the works means that it is not possible to retain the majority of the semi-mature ornamental trees that were planted when the current car park was laid out. However, where possible, the trees around the site perimeter will be retained and incorporated into the landscaping scheme.

Other highlights of the design include:

- Designing the façades to achieve a balance between daylight, heat loss and overheating;
- Designing 88% of the dwellings to be accessible and adaptable, to Part M4(2)
- Designing 10% of the dwellings for wheelchair users, to Part M4(3)
- Using concrete frame construction which allows future re-use of the frame;
- Specifying fabric thermal performance to a level that exceeds current standards;
- Constructing a CHP-based communal heating network to serve the Main Site;
- Installing a series of substantial PV panel arrays on most flat and some pitched roofs;
- Implementing a sustainable drainage system with significant on-site water storage; and
- Providing bio-diverse roofs to the new apartment blocks where possible.

All of the above are covered in much greater detail in the specialist reports that accompany the application. Please refer specifically to the Design and Access Statement; the Energy Statement, and the Flood Risk Assessment and Drainage Strategy.

4.2.4 Energy and carbon dioxide emissions

MAYOR'S PRIORITIES

Energy and carbon dioxide emissions (5.2, 5.3)

The overall carbon dioxide emissions from a development should be minimised through the implementation of the energy hierarchy set out in ***London Plan policy 5.2.***

Developments should be designed to meet the following Regulated carbon dioxide standards, in line with ***London Plan policy 5.2.***

Residential buildings	
Year	*Improvements beyond 2020 Building regulations*
2013 - 2016	*40 percent*
2016 - 2031	*Zero carbon*
Non-domestic buildings	
Year	*Improvements beyond 2020 Building regulations*
2013 - 2016	*40 percent*
2016 - 2019	*As per the Building regulation requirements*
2019 - 2031	*Zero carbon*

Energy demand assessment (5.2)

Development applications are to be accompanied by an energy demand assessment.

Use less energy (5.2, 5.3, 5.9)

The design of developments should prioritise passive measures.

Developers should aim to achieve Part L 2013 Building Regulations requirements through design and energy efficiency alone, as far as is practical.

Efficient energy supply (5.5, 5.6)

Developers should assess the potential for their development to:

- *connect to an existing district heating or cooling network;*
- *expand an existing district heating or cooling network, and connect to it; or*
- *establish a site wide network, and enable the connection of existing buildings in the vicinity of the development.*

Design response

One of the fundamental objectives of any development that embraces sustainable design principles is to reduce operational carbon dioxide emissions. This is of course to reduce the rate at which the level of atmospheric carbon dioxide is increasing as well as to conserve finite fossil fuel reserves.

An Energy Statement has been prepared for the development and this is being submitted as Appendix A to this document. The statement adheres to the principles set out in the London Plan 2016 and has been prepared in accordance with the *GLA Guidance on preparing energy assessment (March 2016).*

The starting point in developing the energy strategy for the proposed buildings was to determine and then design-in specifications that would minimise the intrinsic energy demand of the development. The National Calculation Method (NCM) for dwellings, SAP2012, was used for the apartments, for other buildings SBEM2013 was used. An extensive and fully representative range of building types were modelled and assessed.

The specifications proposed will ensure that the buildings exceed the requirements of Part L1A/L2A: 2013 of the Building Regulations prior to the application of low and zero carbon technologies, and that the average improvement in predicted carbon dioxide emissions for the whole development at this point compared to the compliance level is 14.12%.

Further details are provided in the Energy Statement, but key efficiency measures proposed for the residential part of the development are as follows:

- Significantly reduced U-values (compared to the compliance reference values) for external walls, roof, floors and windows for all buildings;

- Careful detailing of non-repeating thermal bridges to reduce the linear thermal transmittance figures as far as possible and minimise surface condensation risk;
- Careful detailing to create a robust airtight building envelope for each dwelling with an air leakage rate of <4m^3/hour/m^2, verified by an appropriate scheme of testing;
- Optimised window sizes and recessed windows designed to benefit from desirable winter solar gains, but avoid problems with summer overheating;
- Low energy lighting throughout the development;
- Automatic controls using PIR or daylight sensors for all common area and external lighting, including ancillary areas such as bin and cycle stores;
- High performance hot water cylinders with declared loss factors of less than 0.01 kWh/L/day;
- High efficiency EST "best practice compliant" mechanical balanced ventilation systems with heat recovery and summer bypass;
- Low water showers and taps to reduce as far as possible the consumption of domestic hot water.

As a further energy saving measure – albeit one that does not affect the *regulated energy use* as defined by the Building Regulations – all relevant white goods, namely fridges, freezers, washing machines, washer-dryers and dishwashers will have "best in class" EU energy ratings (typically "A" or A+") as specified to gain credits in the CSH2010 Technical Guide.

The non-residential spaces, as is generally the case for uses of the type proposed, have significant regulated energy demands for heating and lighting and limited demands for hot water. The efficiency measures proposed include the very high levels of insulation and the low air leakage rate proposed for the buildings generally together with a range of efficiency measures relating to lighting and other services. The fit-out specification is likely to include the following:

- Power factor correction;
- Occupant sensors and automatic dimming of lighting where there is also natural light;
- All services separately metered, with warning for "out of range values"; and
- Ventilation speed controlled by occupancy density.

In addition to adopting the extensive range of efficiency measures listed above, the Design Team reviewed the options for heating systems in the context of the constraints of the scheme itself, including the architecture of the buildings, the location of the site, the latest planning guidance and substantial practical experience of low and zero carbon heating systems.

The possibility of connecting to an existing district heating system was considered but a review of existing schemes revealed that there are none within a reasonable distance of the site. The nearest existing scheme is the Gospel Oak network, but this is over 1000 m distant at its nearest point. The site is just south of the area identified in a Camden 2015 Heat Mapping Study as the Kentish Town cluster – an area with sufficient heat demand density to be potentially feasible for an expansion of the Gospel Oak network. So, although there are no current plans for connection to a district network the necessary space will be allowed within the local Energy Centre to permit a future connection to be made.

The options for the on-site systems were evaluated as set out in the Energy Statement and the final proposals are as follows:

- A communal heating system will provide heat to the all the buildings on the Main Site using a heat-led gas CHP unit as the lead heat source, and condensing low NOx gas boilers to satisfy peak heat demands;
- The CHP system will be specified to deliver at least 60% of the annual heat demand, and to satisfy the CHPQA (Quality Assurance for Combined Heat and Power) criteria;
- Comfort cooling will be provided to the commercial units on the Main Site where necessary using high performance roof-mounted ASHPs;
- Comfort cooling will be provided a proportion of the residential units using roof mounted ASHPs, but the cooling demand has been minimised and the overall impact of the additional cooling-related emissions will be less than 0.6%;
- The commercial units on the PFS Site will be heated using high performance roof-mounted ASHPs which will also supply the necessary comfort cooling and pre-heat the domestic hot water supplies; and
- This approach is wholly consistent with The London Plan 2016 *Policy 5.6 Decentralised Energy Networks*, and the equivalent LBC policies.

The location of the Energy Centre, in the undercroft below the taller 14-storey element of Block A, has been selected because it will allow the boiler and CHP unit flues to be taken up in a riser and discharge above the roof level, at a height that is well above the lower surrounding buildings. It also allows a straightforward route for a future connection to a district heating network along the inclined approach road, and the ducts and other builders work necessary for a future connection will be incorporated into the undercroft structure.

To summarise therefore, the combination of the use of very high thermal performance building fabric for every building, including the non-residential buildings; a wide range of efficiency measures in both the

residential units and the non-residential units; ASHP heating and cooling for the PFS building; and a low carbon community heating system with a heat-led gas-fired CHP unit, will achieve emissions for the whole of the scheme that are 29.39% lower than the total emissions permitted by the 2013 Building Regulations. This total saving is composed of a 14.12% saving from efficiency measures and ASHPs, and 15.27% from the low carbon CHP-based communal heating.

4.2.5 Renewable energy

MAYOR'S PRIORITIES

Renewable energy (5.4, 5.7)

Major developments should incorporate renewable energy technologies to minimise overall carbon dioxide emissions, where feasible.

Carbon dioxide off-setting (5.2, 5.4)

Where developments do not achieve the Mayor's carbon dioxide reduction targets set out in London Plan policy 5.2, the developer should make a contribution to the local borough's carbon dioxide off-setting fund.

Monitoring energy use (5.2, 5.3)

Developers are encouraged to incorporate monitoring equipment, and systems where appropriate to enable occupiers to monitor and reduce their energy use.

Design response

There is often limited scope for renewable energy systems on high density urban residential developments where CHP-based communal heating is employed. And this scheme is no exception. Indeed, the design of the Block F with its eclectic roof-scape; the pitched roofs on parts of Block E2 and the glasshouses for the food and plant growing and production facility on Block B, all mean that this scheme has less roof available than is normally the case for the photovoltaic (PV) panel arrays that are the one type of renewable technology that will always be compatible with a communal heating scheme. Notwithstanding the limitations noted above, a review of the roof plans demonstrated that PV arrays of various sizes can be installed on most of the residential blocks, and on the PFS Site commercial building.

The only block that has no suitable space is Block B, as it is not possible to mount the panels on the roofs of the glasshouses as they would create too much shade to the growing area below, and the lightweight structure would mean that safe access could not be ensured.

The proposed arrays will have a total nominal rating of 165 kWp, and together contribute carbon dioxide emissions savings of 88 Tonnes per year, and increase the overall savings to 35.17% referenced to the 2013 Building Regulations. The scheme therefore complies with the principles of Policy 5.2 of the London Plan 2016, and with the associated GLA guidance dealing with on-site emissions reductions and carbon offset calculations. Full details are contained in the Energy Statement, submitted as Appendix A to this document.

4.2.6 Water efficiency

MAYOR'S PRIORITIES

Water efficiency (5.3, 5.4, 5.13, 5.15)

Developers should maximise the opportunities for water saving measures and appliances in all developments, including the reuse and using alternative sources of water.

Developers should design residential schemes to meet a water consumption rate of 105 litres or less per person per day.

New non-residential developments, including refurbishments, should aim to achieve the maximum number of water credits in a BREEAM assessment or the 'best practice' level of the AECB (Association of Environment Conscious Building) water standards.

All developments should be designed to incorporate rainwater harvesting.

All residential units, including individual flats / apartments and commercial units, and where practical, individual leases in large commercial properties should be metered.

Design response

A range of water conservation measures will be implemented to reduce the calculated water consumption to below 105 litres per day for each resident as calculated using the methodology defined in Part G: 2010 of the Building Regulations.

The following sanitaryware and fitting specifications are typically used by the Applicant:

- 4.5/3 Litres dual flush WCs
- Bath capacity 155 Litres to overflow
- Showers regulated to 9 Litres/minute
- Basin taps regulated to 4 Litres/minute
- Kitchen sink taps regulated to 6 Litres/minute

In addition, low water appliances are typically specified with consumption figures not exceeding 8.17 Litres/kg of wash load for washing machines and 1.3 Litres/place setting for dishwashers. Each dwelling will have an individual water meter. Landlord's area and the individual tenanted commercial units will be similarly metered, and all non-residential sanitary facilities will use low-water fittings in accordance with BREEAM guidance.

Rainwater harvesting systems for irrigation purposes are planned for the two large podium blocks, Blocks B and F. On Block B, the rainwater would be collected from the roof of the glass houses and stored in a roof-level harvesting tank to provide a source of water for horticultural purposes. On Block F there are significant areas of pitched metal roof, and hence there will be a reasonable volume of summer run-off. If feasible, the water would be collected and stored in a harvesting tank located in the basement under the building and pumped back up to feed the irrigation system provided for the planting at the podium and terrace levels on the building. Both systems would be automatically topped up from the mains water supply during periods of low rainfall. Water butts will be provided to the terraced houses in Block E2 as these units have individual gardens.

Rainwater harvesting will not be provided to the other buildings as these generally have deep-substrate bio-diverse roofs. This means that the summer run-off is very limited for normal rainfall events, so the amount of water collected during the summer when water could be used for irrigation purposes would not be sufficient to justify providing such systems. Rainwater harvesting for WC flushing in either residential or commercial units was discounted for similar reasons.

Grey water recycling is identified as a priority in local Camden policy, but it is neither commercially or technically feasible in complex buildings built over a basement due to the space required for the additional separated soil pipe systems, and for the waste water treatment plant required. Furthermore, guidance from the Environment Agency notes that such small scale communal systems are unproven, and the operating costs are high, and that studies have found considerable resistance to them among potential residents.

4.2.7 Materials and waste

MAYOR'S PRIORITIES

Design phase (5.3, 5.20, 7.6, 7.14)

The design of development should prioritise materials that:

- *have a low embodied energy, including those that can be re-used intact or recycled;*
- *at least three of the key elements of the building envelope (external walls, windows roof, upper floor slabs, internal walls, floor finishes / coverings) are to achieve a rating of A+ to D in the BRE's The Green Guide to specification;*
- *can be sustainably sourced;*
- *at least 50% of timber and timber products should be sourced from accredited Forest Stewardship Council (FSC) or Programme for the Endorsement of Forestry Certification (PEFC) source;*
- *are durable to cater for their level of use and exposure; and*
- *will not release toxins into the internal and external environment, including those that deplete stratospheric ozone*

Construction phase (5.3, 5.20)

Developers should maximise the use of existing resources and materials and minimise waste generated during the demolition and construction process through the implementation of the waste hierarchy.

Occupation phase (5.3, 5.17)

Developers should provide sufficient internal space for the storage of recyclable and compostable materials and waste in their schemes.

The design of development should meet borough requirements for the size and location of recycling, composting and refuse storage and its removal.

As noted in Section 3, the Written Ministerial Statement (WMS) issued on 25th March 2015, that constitutes a revision to National Planning Policy, announced a general prohibition on local planning authorities imposing requirements that relate to the construction, internal layout, or performance of new

dwellings. Accordingly, this Statement contains no details of the proposed construction materials to be used for the residential buildings. Details pertinent to the non-residential buildings are set out below, and those pertinent to the appearance of the development are contained in the Design and Access Statement.

Design response

Prior to the commencement of the construction phase, the Applicant will prepare a Site Waste Management Plan (SWMP). The SWMP will include policies that relate to the monitoring, reduction, and recycling of construction waste. Typical materials groups that are recycled include inert materials, plasterboard, ceramics, metals, concrete and timber. The policy follows guidance issued by BRE such as the SMARTWASTE^{TM} system and the WRAP knowledge base, now hosted by CIRIA. As far as possible, inert material will be re-used on site for landscaping purposes. The Applicant has an excellent track record of minimising and recycling construction waste, and evidence from previous projects demonstrates that typically over 85% of construction waste is recycled.

Prior to the commencement of any demolition works, the Applicant will conduct a Pre-demolition Audit to identify the most appropriate approach to demolition and ways to maximise the amount and value of materials that can be recycled. The demolition works will be carried out in accordance with the ICE Demolition Protocol.

The height and scale of the non-residential buildings on the Main Site dictates that concrete frame construction is used with concrete floors and roof, and where possible lower-impact cement replacements such as PFA will be used in the concrete. The PFS building is designed with a double skin glass façade, and may be able to utilise a lighter form of construction, such as a steel frame with a hollow-core concrete first-floor slab and timber slabs for the upper floors and roof.

The largely brick façades on the buildings on the Main Site benefit from a design life in excess of 60 years, and are low maintenance. In the case of other materials, due regard will be given to maximising the use of building elements which gain the higher ratings in the BRE Green Guide to Specification; using materials with recycled content; and using local suppliers and materials from sustainable sources with third party certification.

The Applicant has an established policy of using only timber obtained from forests covered by certification schemes that provide for independent verification of sustainable forestry practices and have Chain of Custody certification arrangements overseen by UKAS accredited certification bodies.

The Design Team has consulted with LBC and the design includes separate dedicated residential bin stores and bulk waste stores for the apartments on the ground floor of each building. The bin capacities satisfy the LBC requirements, providing at least 150 Litres per dwelling for 1-bed units, and an additional 50 litres of capacity per dwelling for each additional bedroom. The split between the bin capacities for residual waste and comingled dry recycling will be agreed with LBC. Use will be monitored, and the split revised as necessary. Space is also being provided in the bin stores for the specialist bins needed for the LBC food waste collection service. Separate bins stores are also provided for the full range of non-residential units.

All the bin stores have been designed to be accessible in accordance with *BS8300: 2009 Design of buildings and their approaches to meet the needs of disabled people: Code of practice.* Full details are provided in the Design and Access Statement being submitted in support of the application.

In addition, separate storage for dry recyclables and food waste will be provided in the kitchen of every dwelling, and detailed information will be provided on the LBC recycling service to encourage residents to participate in the recycling collection scheme.

4.2.8 Nature conservation and biodiversity

MAYOR'S PRIORITIES

Nature conservation and biodiversity (5.3, 7.19)

There is no net loss in the quality and quantity of biodiversity.

Developers make a contribution to biodiversity on their development site.

Design response

The whole of the site, which has a total area of approximately 3.4 Ha, has been previously developed for industrial and transport hub use, and contains no natural habitat, and the extensive nature of the works means that it will not be possible to retain the majority of the semi-mature ornamental trees that were planted when the current car park was laid out. However, the Arboricultural Survey carried out revealed that these trees provide only a very limited degree of biodiversity, with most being the non-native London Plane *(Platanus x acerifolia)* together with a number of immature native Elm *(Ulmus sp.)* and Rowan *(Sorbus aucuparia)* trees that were found to be of poor quality.

The new landscaping scheme for the site has been designed to achieve the maximum possible ecological benefit, and incorporates bio-diverse roofs, and new grassland, and shrub, tree, hedge, and ground flora planting. It also takes account of, and seeks to link with the green corridors that have developed along the railway lines to the north and southwest of the site.

Full details of the very limited existing site ecology are provided in the Arboricultural Survey and Impact Assessment, and the details of the substantial range of new landscaping works, are provided in Chapter 7 of the Design and Access Statement. These proposals will result in a significant enhancement to the quality and quantity of the biodiversity on the site.

4.3 Climate change adaptation

4.3.1 Introduction

This section outlines how the proposals incorporate measures that will enable the new dwellings to adapt to predicted future changes in the climate, and to help ensure that London remains an inviting environment in which to invest, work and live.

4.3.2 Tackling increased temperature and drought

MAYOR'S PRIORITIES

Overheating (5.3, 5.9)

Developers should include measures, in the design of their schemes, in line with the cooling hierarchy set out in London Plan policy 5.9 to prevent overheating over the scheme's lifetime.

Heat and drought resistant planting (5.3, 5.15)

The design of developments should prioritise landscape planting that is drought resistant and has a low water demand for supplementary watering.

Resilient foundations (5.3, 5.76)

Developers should consider any long-term potential for extreme weather events to affect a building's foundations and to ensure they are robust.

Design response

The development in general, and the dwellings in particular, include a range of measures that reflect the cooling hierarchy set out in London Plan Policy 5.9.

With respect to summer overheating:

- Window sizes have been optimised, and none of the apartments have an overheating risk greater than “slight” when assessed in accordance with SAP 2012 Appendix P.
- Windows are generally recessed up to 200mm to provide shading, and significant shading is provided by balconies;
- Low energy lighting and low-loss hot water cylinders will be installed in all dwellings to reduce undesirable internal gains;
- Most apartment blocks will have bio-diverse roofs to create a positive impact on biodiversity and reduce the contribution from the buildings to the urban heat island effect;
- Some buildings will have areas of high-albedo metal standing seam pitched roofs which will serve to reflect unwanted solar heat in the summer;
- A significant area of the roof of most of the blocks will be occupied by PV panel arrays, but it is envisaged that with suitable mounting arrangements they can be mounted above the bio-diverse roof surface and create additional habitat diversity due to shading;
- The vegetated surface of the roofs will absorb less radiant heat from the sun and will provide some limited additional cooling as heat is removed in conjunction with the transpiration of moisture from the plants; and
- All of the car parking is located in basements allowing the total area of unvegetated surfaces across the development (buildings with conventional roofs, roads, paths, car parks and other hardstandings) to be reduced by 14% compared to the current site, thus further reducing the contribution to the urban heat island effect.

Further detailed information including façade glazing ratios and a full set of Appendix P results for each dwelling type is provided in the Energy Statement, submitted as Appendix A to this document. In addition, dynamic simulation modelling has been carried out for the whole of Block F. This block was selected as it contains a variety of different apartment type and sizes, does not benefit from solar shading from other buildings within the scheme. The details of the modelling are contained in a separate report which is being submitted as Appendix C to this document. The results show that all the dwellings will comply with the recommendations in CIBSE TM52 without reliance on comfort cooling, and that cooling is not therefore necessary, although it will be provided to some units for commercial reasons.

There is a need to carefully balance the use of low water planting with the need to ensure that the planting has local biodiversity and amenity value. To this end, while the main ground-level and podium planting may require some supplementary watering in dry weather, the deep-substrate bio-diverse roofs will be seeded with species that will not require routine supplementary watering.

All apartment buildings will have deep-piled foundations which will eliminate any potential for the foundations to be affected by extreme weather events.

4.3.3 Increasing green cover

MAYOR'S PRIORITIES

Urban greening (2.18, 5.3, 5.10, 5.11)

Developers should integrate green infrastructure into development schemes, including by creating links with wider green infrastructure network.

Trees (5.3, 5.10, 7.21)

Developments should contribute to the Mayor's target to increase tree cover across London by 5% by 2025.

Any loss of a trees resulting from development should be replaced with an appropriate tree or group of trees for the location, with the aim of providing the same canopy cover as that provided by the original tree(s).

Design response

The available areas for developing a new site ecology are limited due to the intensive development scheme for the site, and the need for most of it to be occupied by buildings and hard surfaces. However, despite the increased utilisation, it has been possible to increase the soft landscaping proportion of the total site area from 9% to 14%, and a further 9% is provided as semi-pervious.

The underlying objective for the site ecology has been to create a landscape that increases the biodiversity and wildlife that the site can support. A particular feature of the proposal is that the imported soil, which, to a large part, will be located over an undercroft, allows pockets of acid wildflower grassland to be created, reflecting the natural signature of the Hampstead Ridge of which the site is part.

The proposed planting scheme will prioritise the selection of suitable native and wildlife-friendly species, and will include mature specimen trees, hedges and mixed shrub and ground-cover species as well as the wildflower grassland. The plant selections will be carefully designed to provide a diversity of species through each of the layers of planting, that will, over time, develop into a resilient landscape, and provide sustainable habitats for a range of insects, birds, and small mammals. This will be complemented by the construction of specific habitat elements for invertebrates, and bird and bat boxes will be incorporated into the landscape and structures at courtyard and roof level.

Community gardens featuring fruiting orchard trees and raised grow gardens for crops are proposed for Interchange Square, and the possibility of incorporating bee hives for on-site honey production will be explored. Some of the resident's courtyards and roof gardens will have "allotments" for the use of individual households.

Extensive bio-diverse roofs are proposed for all the buildings on the Main Site where the use of in-situ concrete frame construction allows the buildings to support deep-substrate roofs. The PV panel arrays proposed for many of these roofs will be mounted above the bio-diverse roofs, and there is evidence that this is mutually beneficial as the panels create areas of shade, and hence a greater variety of habitat, and the roof surface reflects far less solar heat, which reduces the panel temperatures and so increases the output of the panels. Where roofs are provided as amenity areas, planting will be provided in raised planter, and again species will be selected for their biodiversity value. If a lighter weight steel and timber structure is used for the PFS building it will have a shallow substrate sedum mat roof, or similar.

4.3.4 Flooding

MAYOR'S PRIORITIES

Surface water flooding and sustainable drainage (5.3, 5.12, 5.13, 5.14)

Developers should maximise all opportunities to achieve greenfield runoff rates in their developments.

When designing their schemes, developers should follow the drainage hierarchy set out in London Plan policy 5.13.

Developers should design Sustainable Drainage Systems (SuDS) into their schemes that incorporate attenuation for surface water runoff as well as habitat, water quality and amenity benefits.

Flood resilience and resistance of buildings in flood risk areas (5.3, 5.12, 5.13)

Development in areas at risk from any form of flooding should include flood resistance and resilience measures in line with industry best practice.

Flood risk management (5.3, 5.12)

Developments are designed to be flexible and capable of being adapted to and mitigating the potential increase in flood risk as a result of climate change.

Design response

The assessment of flood risk carried out for the purpose of this planning application has confirmed that the whole of the site is in a Zone 1 flood risk zone. The risk of groundwater and sewer flooding is also considered to be low. Full details are provided in the Flood Risk Assessment and Drainage Strategy that is being submitted in support of the application.

The greater part of both sites is occupied by buildings and hardstandings, and currently just 9% of the total area of the combined Main and PFS site is soft landscaping. The proposed development will increase the area of soft landscaping to approximately 14% notwithstanding the greatly increased intensity of use. This has been achieved primarily by locating all the car parking in basements beneath the buildings. In addition, semi-pervious surfaces, including roof gardens, amenity spaces, courtyards and substantial areas of bio-diverse roof are proposed across the site, and these areas amount to a further 9% of the site area, raising the total green cover to 23% of the site.

The proposed surface water drainage strategy will implement sustainable urban drainage systems (SuDS) to attenuate and reduce the surface water run-off. The most suitable type of SuDS for the proposed development have been found to be underground attenuation tanks. Such tanks store the run-off from major storm events and discharge it at controlled rates, and at a level that avoids any adverse downstream effects. The tanks will be complemented by the deep-substrate bio-diverse roofs that will be installed on the majority of the buildings that will also serve to retain and delay the peak run-off flow rates during severe storm events. While generally the buildings use concrete frame construction, and can therefore carry the weight of a deep-substrate roof, the PFS building may use steel columns and cross-laminated timber slabs. If necessary therefore, the roof to this building will instead be finished with a shallow substrate sedum mat, or similar, which while less effective, and not therefore included in any

surface water discharge calculations, will still contribute some benefits. Of the other possible SuDS measures, infiltration is not feasible due to the underlying clay geology and discharge directly to a natural water course is not possible as there are none locally.

The London Plan 2016 policy requirement is that new developments should seek to reduce the surface run-off to the notional greenfield rate. This was explored but was found to be impracticable, since to do so would substantially restrict the degree of development that was possible on the site. In particular, since infiltration is not possible, the only option is attenuation, and the proposed undercroft on the Main Site, and the fuel tanks, pipework, and other service ducts on the PFS Site all limit the available locations for, and sizes of, possible attenuation tanks.

The existing run-off rate was determined by calculations based on the areas of the various surface types and estimated to be 387.7 L/s. The proposed attenuation tanks will have a capacity of 818 m^3. The outflow from the storage will be routed via controlled discharge outfalls to the Thames Water combined sewer that crosses the site and the proposed total surface water discharge rate is 193.8 L/s. This approach has been agreed in principle with Thames Water, and represents a 50% reduction compared to the existing surface water discharge rate from the site.

4.4 Pollution management

4.4.1 Introduction

The density of activity across London can lead to various forms of disturbance to nearby occupiers and can result in legally recognised levels of pollution. These forms of pollution include air, water, noise and light. The pollution can occur temporarily during the construction of the new development and can also occur as a result of its operation once complete. This section outlines how the proposals seek to minimise the risk and impact of all forms of pollution.

4.4.2 Land contamination

MAYOR'S PRIORITIES

Land contamination (3.2, 5.3, 5.21)

Developers should set out how existing land contamination will be addressed prior to the commencement of their development

Design response

Prior to the commencement of site works, and as they progress, appropriate intrusive investigations will be carried out to determine whether there is any contamination on the site, although from the initial studies, elevated levels of contaminants are not expected. If any are found, appropriate decontamination and mitigation measures will be implemented. Further details are included in the Environmental Statement, Volume 3A, Appendix 2.1.

4.4.3 Air pollution

MAYOR'S PRIORITIES

Air quality (3.2, 5.3, 7.14)

Developers are to design their schemes so that they are at least 'air quality neutral'.

Developments should be designed to minimise the generation of air pollution.

Developments should be designed to minimise and mitigate against increased exposure to poor air quality.

Developers should select plant that meets the standards for emissions from combined heat and power and biomass plants set out in Appendix 7.

Developers and contractors should follow the guidance set out in the emerging The Control of Dust and Emissions during Construction and Demolition SPG when constructing their development.

Design response

The development proposals have been shown to be better than "Air Quality Neutral". Full details are provided in the AQNA Assessment, submitted as Appendix D to this document.

The buildings on the Main Site will be heated by means of a connection to a new CHP-based community heating system that has combustion plant located in an Energy Centre in the undercroft beneath the taller 14-storey element of the Block A. The CHP unit will be fitted with a catalytic converter and the specification for emissions of NOx will be 50 mg/Nm^3. The gas boilers will be types with pre-mix burners

that achieve NOx emissions that are less than 40 mg/kWh. The location of the Energy Centre will allow the boiler and CHP unit flues to be taken up an internal riser to discharge above the roof level, at a height that is well above the lower surrounding buildings.

The impact of the installation of the proposed communal heating plant together with the effect of any increased emissions from road vehicles as a result of the development has been assessed in the AQIA that has been prepared for the development. The results from the assessment indicate that the proposed development will have a negligible impact on local air quality taking account of all factors. Full details of the results are provided in the AQIA which is being submitted in support of the application.

The Applicant, who will act as the main contractor, and who will therefore be directly responsible for site operations, recognises that the public impression of site activities has a direct impact on the corporate image of a construction business, and that this has far reaching consequences. Accordingly the Applicant has well established policies and procedures dealing with the good management of site operations. They will prepare and implement a Construction Environmental Management Plan in line with the Mayor's best practice guidance to minimise the local environmental impact during the construction phase. The plan will include specific policies and procedures to prevent dust nuisance and surface and ground water contamination, as well a range of other measures to ensure that site activities do not inconvenience neighbouring properties.

Implementation of these policies will be supported by registering the development with the Considerate Constructors Scheme (CCS) which requires sites to address issues under five themes: appearance; community; environment; safety; and workforce. The site will be subject to regular external CCS audits and the results forwarded to senior management for action as necessary. The Applicant regularly achieves very high audit scores, and in a recent report for the Aldgate Place site in central London, dated 27th April 2016, the summary states: *"Overall this was an excellent site with a focussed team. This was a nice visit with a warm welcome and I look forward to my return visit in a few months' time".* There is every reason to expect that this site will be operated in the same exemplary way.

4.4.4 Noise

MAYOR'S PRIORITIES

Noise (3.2, 5.3, 7.6, 7.15)

Noise should be reduced at source, and then designed out of a scheme to reduce the need for mitigation measures.

Design response

The ambient noise climate across the site is dominated by road traffic from main roads close to the site, and the railway lines that border the site to the north and south-west. The size of the site means that in addition, local noise sources such as the intensive commercial and entertainment venue activities in the adjoining Stables Market and around Camden Lock affect the noise levels in specific parts of the site. A Noise Impact Assessment (NIA) has been carried out to determine the likely impact of this noise on the new dwellings and appropriate technical measures will be implemented to ensure that it is acceptable.

Fixed noises sources within the new development will be limited to the following plant:

- CHP unit and other plant within the Energy Centre;
- Ventilation plant for the supermarket;
- Ventilation fans for the undercroft and basement car parks;
- Roof-top ASHP chiller and ventilation plant;
- Roof-top emergency generator plant.

The cumulative noise emanating from this and other plant in the new development will comply with the LBC planning standards, as set out in in Camden *Development Policy DP28,* and in particular, appropriate technical measures will be implemented to ensure that any noise generated is at least 5 dB(A) below the background level as measured from any point 1 m from the façade of the nearest sensitive receptor.

The construction phase noise will be managed in accordance with best practice, and particularly the requirements of the Considerate Constructors Scheme code of considerate practice which includes a specific section that requires that the Developer addresses this proactively by selecting the quietest plant, ensuring that it is sited away from neighbouring properties if possible, that it is only used when necessary, that neighbours are advised of when it will be used, and that they are provided with contact details for the site manager so that contact can easily be made if they have concerns.

The internal dwelling-to-dwelling acoustic performance will be designed to exceed the requirements of Part E: 2003 of the Building Regulations by typically 3dB for both airborne and impact noise.

4.4.5 Light pollution

MAYOR'S PRIORITIES

Light pollution (5.2, 5.3, 6.7)

Developments and lighting schemes should be designed to minimise light pollution.

Design response

External lighting will minimised as far as possible consistent with satisfying requirements for safety and security. Light pollution will be minimised by designing the external lighting in accordance with the Institute of Lighting Professionals guidance including *Guidance notes for the reduction of obtrusive light, GN01 (2011).*

4.4.6 Water pollution

MAYOR'S PRIORITIES

Surface water run-off (5.3, 5.13, 5.14)

In their aim to achieve a greenfield runoff rate developers should incorporate sustainable urban drainage systems (SuDS) into their schemes which also provide benefits for water quality.

Encourage those working on demolition and construction sites to prevent pollution by incorporating prevention measures and following best practice.

Wastewater treatment (5.3, 5.14)

Residential developments discharging domestic sewage should connect to the public foul sewer or combined sewer network where it is reasonable to do so

Design response

The London Plan 2016 policy requirement is that new developments should seek to reduce the surface run-off to the notional greenfield rate. This was explored but was found to be impracticable, since to do so would substantially restrict the degree of development that was possible on the site. In particular,

since infiltration is not possible, the only option is attenuation, and the proposed basement on the Main Site, and the fuel tanks, pipework, and other service ducts on the PFS Site all limit the available locations for, and sizes of, possible attenuation tanks.

The majority of each part of the site is currently occupied by impermeable buildings and hardstandings, and just 9% of the total for the combined Main and PFS Site is soft landscaping. The proposed development will increase the area of soft landscaping to approximately 14% of the total site area, notwithstanding the greatly increased intensity of use. This has been achieved to a large degree by locating all the car parking in basements beneath the buildings. In addition, semi-pervious surfaces, including roof gardens, amenity spaces, courtyards and bio-diverse roofs are proposed across the site, and these areas amount to a further 7% of the site area.

The existing run-off rate was determined by calculation based on the areas of the various surface types and estimated to be 387.7 L/s. The proposed attenuation tanks will have a capacity of 818 m^3. The outflow from the storage will be routed via controlled discharge outfalls to the Thames Water combined sewer that crosses the site and the proposed total surface water discharge rate is 193.8 L/s. This approach has been agreed in principle with Thames Water, and represents a 50% reduction compared to the existing surface water discharge rate from the site.

The provision of the deep-substrate bio-diverse roofs will serve to retain, bind and treat contaminants that contact the surface either as dust, or suspended or dissolved in rainwater. A London Ecology Unit publication *Building Green – a guide to using plants on roof, walls and pavements (1993, revised GLA 2004)* states that 95% of heavy metals are removed from run-off by green roofs and nitrogen levels can also be reduced. Other studies demonstrated the removal of 75% of solids.

The Applicant, will prepare and implement a Construction Environmental Management Plan in line with the Mayor's best practice guidance. The plan will include specific policies and procedures to prevent surface and ground water contamination.

The development will be connected to the local foul sewer network. The drainage system will be compliant with Part H: 2002 of the Building Regulations, and follow the Environment Agency's Pollution Prevention Guidelines PPG3, with provision, if appropriate, of oil separators on the drainage from high risk areas such as the PFS forecourt and the car parks. Full details of the proposed surface and foul water systems are provided in the Flood Risk Assessment and Drainage Strategy that is being submitted in support of the application.

5. Conclusions

The details of the proposed development as set out in the proceeding sections, and in the technical reports on which this document is based, show that the development proposal meets the applicable planning policies that relate to resource management, climate change adaptation and pollution management. It will therefore result in a scheme that is compliant with the broad range of policies that seek to promote sustainable development in Camden, and across London generally.

In developing these proposals, the Design Team has taken careful account of the nature of the site and its inner-London urban location, albeit on a site that has been used for industrial and transport hub purposes for nearly 180 years. The proposal will return the site to intensive use, creating a vibrant new mix of uses and a harmonious range of distinctive buildings that reflect and respond to the surroundings and take full advantage of the existing (albeit artificial) landform.

As well as building on the past, the proposals look forward, utilising the latest energy conservation and renewable energy technologies. The heating network will use heat from a CHP-based communal heating system, and the combustion plant has been specified to have the lowest possible emissions of atmospheric pollutants, ensuring that there will be a negligible impact on local air quality. Water use will be minimised in accordance with the latest national policy. The risk from future severe rainfall events has been carefully addressed, and the scheme incorporates an extensive system of surface water attenuation features that will ensure that the total rate of discharge of surface water can be reduced significantly compared to the current level. Finally, the proposals for ecological enhancement and landscaping incorporate new grassland, shrub, hedge, and ground flora planting, and many new trees, and, with the new bio-diverse roofs, will result in an increase in total green cover from 9% to 23%.

The development proposals therefore fully meet the requirements of The London Plan 2016 for *Sustainable Development*, particularly as set out in in the GLA London Plan Supplementary Planning Guidance document: *Sustainable Design and Construction SPG (GLA) (April 2014)*. The proposals also comply with the equivalent local strategic policies in the London Borough of Camden *Core Strategy 2010 – 2025 (November 2010)*, and specifically, *Policy CS13: Tackling climate change through promoting higher environmental standards*, and the supporting local planning guidance.

Compliance with these policies demonstrates that the proposals constitute *Sustainable Development* as defined in the NPPF, and this must be given due weight when the planning application is considered.

Appendix A

Energy Statement

The Energy Statement has been prepared as a separately-bound report.

Appendix B

BREEAM Pre-assessment

The BREEAM Pre-assessment has been prepared as a separately-bound report.

Appendix C

Thermal Comfort Assessment

The BREEAM Pre-assessment has been prepared as a separately-bound report.

Appendix D

Air Quality Neutral Assessment (Building Emissions)

Contents

1. Introduction

This Air Quality Neutral Assessment of the Building Emissions has been prepared for the joint Applicants, Safeway Stores Limited and BDW Trading Limited, by BBS Environmental, a construction consultancy specialising in sustainability, energy conservation and the application of renewable energy technologies. It has been prepared to accompany a detailed planning application for the redevelopment of a site currently occupied by a Morrison's supermarket and a petrol filling station, located just off Chalk Farm Road in the London Borough of Camden.

The proposals for the site comprise the following:

Demolition of existing buildings (Class A1 foodstore and Sui Generis petrol filling station) and associated highways and site works including removal of existing surface level car parking and retaining walls along with road junction alterations.

Redevelopment of petrol filling station site to include the erection of a new building of up to six storeys and up to 11,243 sq m GEA floorspace to accommodate a petrol filling station (Sui Generis), flexible Class A1, A3 and A4 floorspace, Class B1 floorspace and a winter garden; associated cycle parking; public green space; public toilets and other associated works and highways works. For a temporary period of up to thirty months part of the ground and all of the 1st floor of the building will be used for a Class A1 foodstore with associated car parking.

Redevelopment of the main supermarket site to include the erection of buildings (Blocks A to F, including Blocks E1 and E2) of up to 14 storeys accommodating up to 573 homes and up to 60,568 sq m GEA of residential floorspace together with up to 28,333 sq m GEA non-residential floorspace within Class A1 (foodstore), flexible Class A1 and A3, Class B1a and B1c, Class D2 community centre, Sui Generis use at roof level of "Block B" for food and plant growing and production facility (including small scale brewing and distilling) with associated ancillary office, storage, education, training, café and restaurant activities; together with associated new streets and squares; hard and soft landscaping and play space; lifts; public cycle parking and cycle hire facility; and other associated works, including highways works.

The requirement for an Air Quality Neutral Assessment arises from *Policy 7.14 Improving Air Quality* of the London Plan 2016[(1)] and the further detailed guidance contained in the *Sustainable Design and Construction SPG (GLA) (April 2014)* has be utilised in the preparation of this assessment. This is an additional assessment to the Air Quality Impact Assessment that is also being submitted in support of the application.

The proposed development will be heated by means of a new Energy Centre that is located in the basement of Block E1 on the western side of the site. The plant specifications used in this assessment are those of the proposed new plant.

This assessment shows that due to the thermal efficiency of the buildings and the emissions specifications of the proposed plant, in terms of Building Emissions, the proposed development will be substantially better than "Air Quality Neutral" with NO_x emissions of 141 kgNO_x/annum compared to a benchmarked figure of 1,886 kgNO_x/annum.

Note 1: *The Spatial Development Strategy for London, consolidated with alterations since 2011*, GLA (March 2016)

2. Planning policy context

2.1 Regional air quality policies

The regional policy, The London Plan 2016, contains in *Policy 7.14 Improving Air Quality* clause "c", a requirement that new developments should be "at least 'air quality neutral' and not lead to further deterioration of existing poor air quality".

The technical requirements for an "Air Quality Neutral Assessment" are defined in the Sustainable Design and Construction SPG (GLA) (April 2014) which also set limits for the emissions of NO_x and particulates from heating plant.

This requirement is in addition to a long-standing policy requirement to undertake an Air Quality Impact Assessment to assess the effect of a proposed major development where that development has the potential to adversely local air quality

2.2 Local air quality policies

The local spatial planning document for the London Borough of Camden is the *Camden Core Strategy 2010 – 2025 (November 2010)*, and specifically, *Policy CS13: Tackling climate change through promoting higher environmental standards.* The strategy is supported by a range of detailed development policies, and *Development Policy DP32 Air Quality and Camden's Clear Zone* is particularly relevant. Further local guidance is provided in the supplementary planning document *CPG3 Sustainability (July 2015).* The emerging local policy is *Policy CC4 Air Quality* in the submission draft of the *Camden Local Plan (2016),* and this contains a broadly similar range of requirements.

Note: This Air Quality Neutral Assessment covers only the Building Emissions. It does not cover Transport Emissions, but further information on emissions from this source may be found in the Transport and Air Quality Impact Assessments that accompany the application.

3. Calculation methodology

This Air Quality Neutral Assessment has been completed using a methodology developed for the GLA and detailed in a report by Air Quality Consultants Ltd(2).

The methodology is simple and requires two sets of calculations:

- The first is a "benchmark" figure for the development. This is figure for the total *typical* emissions of the pollutants of concern (NO_x and PM_{10}) for a development of the type concerned. It is calculated by reference to the floor areas of the various land use classes within the development and a published table of benchmark emissions.
- The second calculation determines the actual *local* emissions that the development will produce and is determined from the heat demand information pertaining to the development (which is available from the Energy Demand Assessment) and the heating plant emissions specifications for the two pollutants.

If the actual predicted total emissions are less than the benchmark emissions then the development is considered to be "Air Quality Neutral". If this is not the case then additional on-site or off-site mitigation may be sought by the local planning authority.

When considering the methodology the following should be noted:

- The assessment method recognises that every type of land use generates a certain level of pollution, and that a new development will be "air quality neutral" if the level of pollution it produces is no worse than the typical level produced for the type of use concerned.
- New developments that create floor-space for activities that are more emissions-intensive will produce additional emissions but where less energy-efficient buildings are replaced a like-for-like reduction in emissions should be achieved. These reductions may compensate for the additional development.
- The assessment deals only with *local* pollution so no emissions are associated with the use of grid electricity which even when produced using fossil fuels, generally results in air pollution at a distant site, and therefore has no discernible local impact.

Finally it should be noted that this assessment is dealing air pollution and not carbon dioxide.

Note 2: *Air Quality Neutral Planning Support: GLA 80371* (April 2014).

4. Results

4.1 Benchmarked emissions

The figures for the benchmark emissions are published in the Sustainable Design and Construction SPG (GLA) (April 2014) Appendix 5 for a range of land use classes including residential. They are reproduced in the table below. In accordance with the guidance[3], since the only fuel used on the site is natural gas the PM_{10} emissions will be negligible, and only NO_x emissions need be considered.

The areas used are based on the Gross Internal Areas (GIAs) as determined by the Architect and included in a schedule in Appendix 1.

Table 1: Benchmarked emissions

Land Use	GFA(m^2)	Building Emissions Benchmarks ($gNOx/m^2/annum$)[2]	Benchmarked Emissions (kgNOx/annum)
A1	6,747	22.6	152
A3-A5	801	75.2	60
A2/B1	5,532	30.8	170
B2-B7	0	36.6	0
B8	0	23.6	0
C1	0	70.9	0
C2	0	68.5	0
C3	51,418	26.2	1,347
D1(a)	0	43.0	0
D1(b)	0	75.0	0
D1(c-h)	0	31.0	0
D2(a-d)	0	90.3	0
D2(e)	552	284.0	157
Total Benchmarked Building Emissions			**1,886 kgNOx/annum**

Note 3: *Air Quality Neutral Planning Support: GLA 80371* (April 2014), paragraph 4.3.

4.2 Plant specifications

The figures for the building emissions can only be determined by reference to the heating plant specification. The majority of the development is to be connected to a new Energy Centre located in an undercroft on the Main Site. Details of the proposed plant are as follows:

Gas boilers (typical modular boiler):	40 mg NOx/kWh
CHP unit (Ener-g E150):	50 mg NOx/Nm^3 (at 5% excess O_2)

The Sustainable Design and Construction SPG (GLA) (April 2014) Section 4.3 sets a NO_x emission limit for new gas boilers of 40 mg/kWh: all proposed boiler types meet this limit.

The Sustainable Design and Construction SPG (GLA) (April 2014) Appendix 7 sets out emissions limits for CHP units. The limit depends on the background annual mean NO_2 level at the site. There is a tiered approach with two bands and the target depends on the local air quality. Sites where the background level is less than 5% below the national objective for the pollutant in question are in Band A, and have a NOx emissions limit of 250 mg/Nm^3, and sites that are above this level are in Band B and have an emissions limit of 95 mg/Nm^3. However, in this case the selected CHP unit has the lowest possible NOx emissions of only 50 mg/Nm^3 and so it meets the more onerous performance limit.

Therefore, all proposed plant is fully compliant with the policy limits for plant NOx emissions.

4.3 Building emissions

The figures for the building emissions have been determined by reference to the figures for annual energy use and design heat asset split taken from the Energy Statement[(4)] prepared for the purpose of the planning application, and from the typical specifications for policy-compliant heating plant as noted above. At this stage, the boilers have not been selected, although a typical unit would be the Wessex ModuMax Mk3 modular boiler manufactured Hamworthy Heating. The various models available all have NOx emissions rates that are below 40 NOx mg/kWh, and similar boilers are available from other manufacturers. But because the boiler has not been selected the maximum policy-compliant emissions rate of 40 mg NOx/kWh has been used in all the subsequent calculations.

Note 4: EST48232 Energy Statement Camden Goods Yard (BBS) (June 2016)

Table 2: Energy demand and plant specifications

Total annual heat demand:	**1,950,176 kWh/annum**
Annual boiler heat:	745,838 kWh/annum
Boiler model:	Not yet selected
Boiler NOx emissions rate:	40 mg/kWh
Annual CHP heat:	1,204,339 kWh/annum
CHP model:	Ener-g E150
CHP NOx emissions rate:	50 mg/Nm^3 (at 5% excess O_2)
CHP NOx emissions rate:	56 mg/kWh(5)
The CHP NOx emissions rate is for the total power output i.e. electricity and heat. To obtain the heat emissions rate it must be divided by the ratio of the heat to the total power. The parameters for the proposed CHP unit are:	
Rated heat output:	234 kW
Rated electrical output:	150 kW
CHP heat NOx emissions rate:	56 / (337 / (337 + 210)) = 92 mg/kWh

Table 3: Annual building emissions

Total annual heat demand:	**1,950,176 kWh/annum**
Annual communal boiler heat:	745,838 kWh/annum
Boiler NOx emissions:	29.8 kg
Annual CHP heat:	1,204,339 kWh/annum
CHP heat NOx emissions:	110.8 kg
Total annual NOx emissions:	**141 kgNOx/annum**

Note 5: Conversion factors and adjustment for excess oxygen taken from the *CSH Technical Guide (November 2010)*.

5. Conclusions

The foregoing results show that the Building NO_x Emissions for this development are predicted to be 141 kgNO_x/annum compared to benchmarked emissions of 1,886 kgNO_x/annum.

Since the only fuel used is natural gas, the possibility of particulate emissions from the heating plant does not have to be considered so no targets or results have been determined for PM_{10}.

As the Building Emissions of NOx are lower than the benchmark values the development can be considered to be “Air Quality Neutral” in respect of emissions from this source and no further mitigation is necessary and the development is fully compliant with this aspect of The London Plan 2016 *Policy 7.14 Improving Air Quality,* and the complementary local Camden LDF *Core Strategy Policy CS13: Tackling climate change through promoting higher environmental standards.*

Appendices

Appendix 1 – Schedule of areas

Schedule of conditioned areas for the development.

Use[6]	**GFA (m^2)**
Class A1 retail	5,715
Class A1-A4 flexible (assessed as A1)	672
Class B1(a) offices	4,749
Class B1(c) industrial suitable for a residential area	783
Residential C3	51,418
Leisure D2(e)	552
Sui Generis (assessed as A1)[7]	360

Further details of the areas are provided in the Design and Access Statement.

Note 6: GFA areas and use classes have been determined from the Architect's GIA schedules. However only conditioned areas are included, and the use classes allocated are based on function rather than actual land planning use class. An example is the resident's gym, which is allocated to D2(e) whereas the other communal space is allocated to B1(a). Non-conditioned spaces are not included as there will be no heating-related emissions. Therefore, the total areas are significantly lower than the areas listed in the schedules.

Note 7: The GFA of the Sui Generis space comprises 360 m^2 of PFS kiosk, plus PFS plant space, a winter garden, and the space on the roof of Block B proposed for use by a plant growing and production facility. Of these spaces, only the PFS kiosk is included, and in the calculation allocated Class A1 (retail) emissions as this is the lowest figure, and appropriate for the actual type of use. The other areas within the Sui Generis use class have been omitted, so do not contribute to the benchmarked emissions (permitted emissions) figure.

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