CENTRE POINT

ENERGY STATEMENT

DOCUMENT 106610/LA/120207 - PLANNING APPLICATION ISSUE

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GRONTMIJ

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Energy Statement
106610/LA/120207
Revision 08

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Contents

1. Executive Summary

The redevelopment scheme for Centre Point has recently evolved such that additional land has been brought into the scheme, with additional new-build residential apartments being proposed. These will be situated to the south end of the site, on land that is currently occupied by a public house.

This statement has been prepared in response to these new proposals.

There are two options presented in this Statement, which reflect the two proposals outlined for the new-build residential units. These are referred to throughout this report as Option A and Option B (see Section 3 for further details).

Option A includes a proposed affordable housing scheme which is made up of 13No. apartment units. **Option B** includes a proposed affordable housing scheme which is made up of 16No. apartment units. In both options, the remainder of the development (incorporating Centre Point Tower, Centre Point House and Centre Point Link) remains the same.

The energy strategy for both options has been developed in line with the guidelines set out in Part L 2010 of the Building Regulations and in the London Plan. **Lean**, **Clean** and **Green** measures have been adopted, with the resulting development achieving carbon emissions reductions far in excess of the current Building Regulations, and measuring favourably in relation to the London Plan.

Regarding BREEAM and Code for Sustainable Homes:

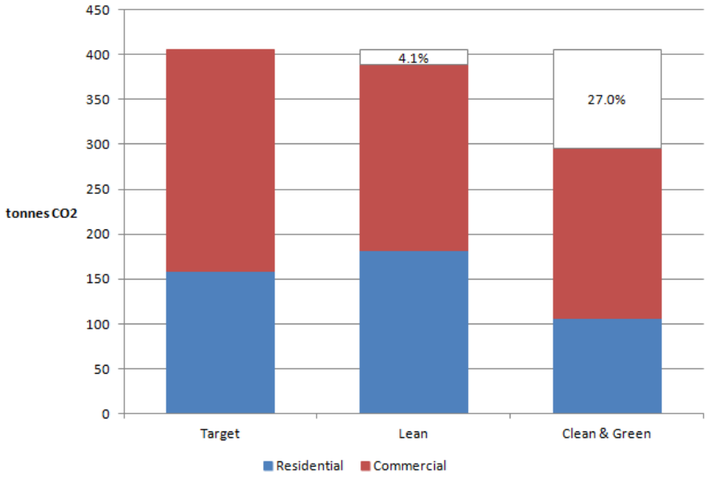
- Centre Point Tower residential will target '**Excellent**' rating when assessed against BREEAM Refurbishment 2012 (Domestic Buildings).
- Centre Point retail and leisure units will target '**Very Good**' rating when assessed against BREEAM Refurbishment 2012 (Non-Domestic Buildings)
- New-build residential units will target '**Level 4**' ratings when assessed under Code for Sustainable Homes

Relative to Part L of the Building Regulations 2010, the two options can be summarised by the two graphs opposite.

When measured against the requirements of the London Plan, the development can be summarised by the tables on the following page, as presented in pages 5 & 6 of the *GLA Guidance on Preparing Energy Assessments, Sept 2011*.

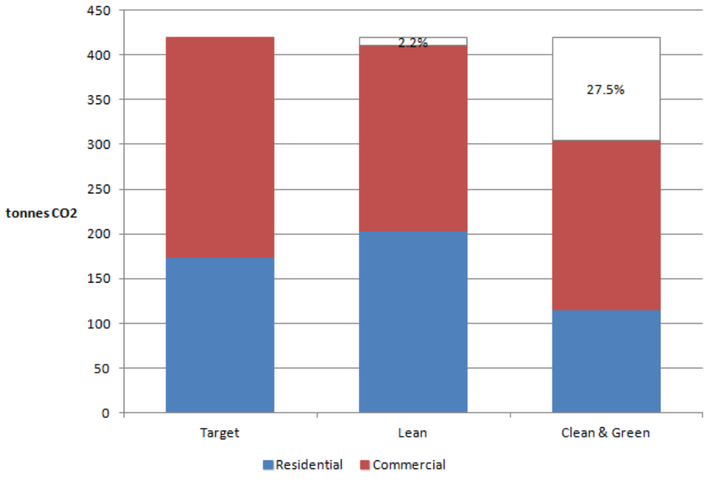
1.1 Part L 2010 – Option A

Relative to Part L of the Building Regulations 2010, regulated emissions are calculated to be 27.0% lower than the target emissions:



1.2 Part L 2010 – Option B

Relative to Part L of the Building Regulations 2010, regulated emissions are calculated to be 27.5% lower than the target emissions:



1.3 London Plan – Option A

GLA Table 1: Carbon dioxide emissions after each stage of the energy hierarchy

	Carbon Dioxide Emissions(tonnes CO_2 per annum)	
	Regulated	Unregulated
Building Regulations 2010 Part L compliant development	405.3	513.1
After energy demand reduction	388.8	513.1
After CHP	295.9	513.1
After renewable energy	295.9	513.1

GLA Table 2: Regulated carbon dioxide savings from each stage of the energy hierarchy

	Regulated Carbon Dioxide Savings	
	Tonnes CO_2 per annum	%
Savings from energy demand reduction	16.5	4.1%
Savings from CHP	92.9	23.9
Total	109.4	27.0%

1.4 London Plan – Option B

GLA Table 1: Carbon dioxide emissions after each stage of the energy hierarchy

	Carbon Dioxide Emissions(tonnes CO_2 per annum)	
	Regulated	Unregulated
Building Regulations 2010 Part L compliant development	419.9	520.8
After energy demand reduction	410.7	520.8
After CHP	304.4	520.8
After renewable energy	304.4	520.8

GLA Table 2: Regulated carbon dioxide savings from each stage of the energy hierarchy

	Regulated Carbon Dioxide Savings	
	Tonnes CO_2 per annum	%
Savings from energy demand reduction	9.2	2.2%
Savings from CHP	106.3	25.9%
Total	115.5	27.5%

2. Introduction

The following report outlines the energy strategy for the proposals at Centre Point. The site was originally constructed in the 1960's as a mixed use complex, comprising of offices in Centre Point Tower (CPT), retail & office in the Centre Point Link (CPL) and residential, retail & office in Centre Point House (CPH).

The proposal is to create a new mixed use development in which CPT will receive refurbished residential accommodation, while retail and leisure units will be located in CPL and the lower levels of CPH and CPT.

A small public house at the south end of the site has recently been drawn into the scheme. The proposals here include for constructing new-build affordable housing units on the site, with a retail outlet at ground level. This element of the scheme will be referred to throughout this document as 'The Pub Site'.

It is noted that the existing building structure in CPT, CPH and CPL is thermally inefficient and has significant cold bridging issues. These are primarily caused by the external facade being directly connected to the structural floor slabs without a thermal break. This has impacted on the extent to which the facade performance can be improved and has reduced the level of carbon savings that can be achieved.

2.1 Purpose of the Report

Reducing carbon dioxide emissions into the atmosphere to reduce the impact on climate change is one of the major objectives of sustainable development.

This report considers a number of measures by which this can be achieved for the Centre Point proposals and recommends those which are most appropriate in terms of environmental, technical and economic feasibility, as well as outlining the proposed energy strategy. It demonstrates that existing developments such as this can be adapted and improved to meet the standards of new buildings, in which people can live and work reducing dramatically the amount of fossil fuels consumed and reduce the release of unsustainable quantities of carbon dioxide into the atmosphere.

This is a technical report. Whilst the development is an existing site it follows the guidelines set out in the document "Integrating renewable Energy into New Developments: Toolkit for planners, developers and consultants" as produced by London Renewables.

This document deals with passive and active energy efficiency, as well as a centralised energy centre complying with local planning policy, including the Mayor of London's Energy Strategy and Camden Planning guidance.

Note that it has not been found feasible to incorporate 'Green' technologies into the development, due to site and/or technical constraints. These include the listed status of the building and limited space to provide these features which would adversely affect the external appearance of the building.

Two of the major requirements of the 2011 London Plan are that the 'Green' building exceeds the 2010 Part L regulations by a minimum of 25%, and that, where feasible, renewable technologies contribute to at least 20% of the overall reduction in carbon dioxide emissions.

2.2 Building Regulations

The relevant national regulations (The Building Regulations Part L, Conservation of Fuel & Power) are also referenced. The current, 2010, edition is part of a rolling programme intended to reduce carbon dioxide emissions from buildings through a combination of energy efficiency measures and on-site renewable energy.

The analysis undertaken to establish compliance with Building Regulations has been conducted in accordance with the guidance set out in the London Plan, namely the Energy Hierarchy, Lean, Clean, Green (see overleaf).

2.3 Planning Policies

The planning policies relating to the Centre Point Development's Energy Statement are as follows:

2.3.1 National Planning Policy

The National Planning Policy Framework, issued in March 2012, sets out the Government's planning policies for England and how these are expected to be applied. The key policies highlighted in this document which relate to energy and climate change include:

Local Planning Authorities should ensure that development plans address the potential impacts of climate change through policies which reduce energy use and improve energy efficiency in existing buildings, reduce greenhouse gas emissions and promote the development of renewable energy sources in a way that is consistent with the Government's Zero Carbon Buildings Policy.

Local Planning Authorities should expect new developments to fully investigate the feasibility of using decentralised energy supplies and to take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.

Local Planning Authorities should have a positive strategy to promote energy generated from renewable and low carbon sources, whilst ensuring that adverse impacts (including landscape and visual impacts) are addressed satisfactorily. Economic and social impacts should also be considered, particularly in identification of suitable areas for renewable or low carbon energy sources and the support of community-led initiatives.

2.3.2 Regional Planning Policy

The Mayor of London published the current revision of the 'London Plan' in July 2011. This is the Spatial Development Strategy for Greater London. The Development Plans of all London Boroughs must be in general conformity with the provisions of the London Plan.

To support borough planners, the Mayor has also published a guidance document via London Renewables: "Integrating Renewable Energy into New Developments: A Toolkit for Planners, Developers and Consultants" (Sep 2004) and the Supplementary Planning Guidance "Sustainable Design and Construction" (May 2006).

The London Plan includes policies both for reducing energy consumption within buildings and, significantly, promoting the use of decentralised electricity generation and renewable energy. These policies cover the role of boroughs in supporting the Mayor's Energy Strategy and the requirements of planning applications.

The London Plan recognises that energy efficiency should come before energy supply considerations and has suggested a simple strategy known as the Mayor's Energy Hierarchy. This system follows good practice in the design of low carbon buildings and comprises three distinct stages in order of application:

- Use Less Energy (Be Lean)
- Supply Energy Efficiently (Be Clean)
- Use Renewable Energy (Be Green)

This strategy puts energy efficiency/conservation measures first in reducing emissions, 'Be Lean'. Following this, consideration must be given to supplying the resultant reduced energy demand as efficiently as possible, including the use of site wide networks, combined heat and power (CHP) and tri-generation (CCHP), 'Be Clean'. Finally, sources of renewable energy should be examined, 'Be Green'.

The mayor will expect all major developments to demonstrate that the proposed heating and cooling systems have been selected in accordance with the following order of preference:

- Connection to an existing district heating or cooling networks
- Site-wide heating networks
- Gas-fired C/CHP (or fuel cell)
- Gas-fired C/CHP (or fuel cell) plus heat or coolth export beyond the development
- Site wide cooling network

The possibility of connecting to an existing district heating network has been considered. There are currently no existing or proposed district heating networks in the vicinity of the site (see Section 6). These options do not appear viable and hence a site wide air sourced water cooled heat pump network is being considered. Provision will be made within the heating and condenser networks for future connections to district heating networks and/or adjacent developments.

The current London Plan includes a notional target for on-site renewable energy, unless it can be demonstrated that such provision is not feasible. This target is for renewable energy to achieve a 20% reduction in carbon dioxide emissions after any energy efficiency measures and (non-renewable) C/CHP schemes have been applied.

The Plan also states that provision must be made in some form for the future Hydrogen Economy.

The table below outlines the key policies in the 2011 London Plan which this report addresses and the impact on the Centre Point proposals. It also summarises how the development will address these policies.

Ref	Policy Outline	Proposed Scheme
5.1	Climate Change Mitigation	Refer to responses to policies 5.2, 4A.6 and 4A.7.
5.2	Minimising Carbon Dioxide Emissions.	The proposals will, wherever possible, go beyond the requirements for Building Regulations and the targets outlined in Policy 5.2 of the London Plan 2011 in reducing CO_2 emissions, wherever technically and economically feasible. Annual emissions for the development are expected to be approximately 26.9% below a baseline of 2010 building regulations compliant buildings including non-regulated energy uses. This document sets out the assessment as described in policy 5.2 and the recent GLA energy team guidance on Planning Energy Assessments. Calculations are based on the use of accredited Part L software. A baseline CO_2 emission has been determined representing the Target Emission Rate (TER) The Building Emission Rate of the proposed buildings will be less than the TER as defined by Part L 2010. This will be achieved by passive design of the buildings and the incorporation of energy efficient plant & systems.
5.3	Sustainable Design and Construction	For the residential areas the design has been carried out against CfSH Level 4 criteria, however given that the development is existing, Ecohomes accreditation is applicable. Initial assessments suggest a 'Very Good' rating is achievable. Many aspects of this policy will be dealt with via the BREEAM and Code for Sustainable Homes assessments. Other responses within this table also apply to this policy. BREEAM and CfSH assessments can be found in the Appendices.
5.4	Retrofitting	The development is an existing site and all buildings will be retained and will be connected to the central energy centre. Wherever possible all areas will be upgraded as far as practicable within the constraints of the building's listing.
5.5	Decentralised Energy Networks	Centralised energy plant will serve the entire development. This will include heating & cooling by a site wide air sourced water loop which feeds heat pumps throughout the site. A site wide domestic hot water network fed by gas fired CHP will serve the development.
5.6	Decentralised Energy: Networks in development proposals.	There is no existing or planned district heating schemes in the vicinity of the site. An onsite air sourced heat pump network backed up by CHP and a CHP led domestic hot water network will serve the entire development. This central energy system will incorporate connections ready to connect to future district heating schemes. The possibility of incorporating the Centre Point energy system with a new development to the south will be investigated Passive measures & façade optimisation will be used to minimise the requirement for heating & cooling.
5.7	Renewable Energy	Various other renewable technologies have been examined but the structural and technical constraints of the existing buildings do not make adoption of renewable technologies appropriate. For example, the planned limited structural foundation works do not permit the adoption of ground sourced technologies.
5.8	Innovative Energy Technologies	The building energy systems will be designed such that the CHP unit can be replaced with a fuel cell once these become economically and technically viable for the development.
5.9	Overheating and Cooling	General building design, such as optimisation of the façade and openable windows will minimise the effect of solar gains to the buildings and subsequently the requirement for space cooling.

2.3.3 Local Planning Policy

Camden Council's Local Development Framework namely the Core Strategy and Development Policies document was adopted in November 2010 Policy DP22 – Promoting Sustainable Design and Construction is relevant to this report. The policy requires Code for Sustainable Homes (CFSH) Level 4 for residential, BREEAM (Domestic Refurbishment) 'Very Good' targeting 'Excellent' for residential refurbishment and BREEAM 'Very Good' targeting 'Excellent' for non-domestic.

The policy also asks that buildings are designed to avoid overheating and the use of air-conditioning to be avoided where possible.

The policy also requires that green roofs, brown roofs, or green walls are incorporated in all buildings.

Generally, the policies detailed in the London Plan 2011 are equivalent to or more onerous in terms of energy use and carbon emissions than local planning policy. Compliance with the London Plan will ensure compliance with Camden Council policies.

2.4 BREEAM / Code for Sustainable Homes

The Building Research Establishment Environmental Assessment Method, known as BREEAM, describes the environmental performance standard against which buildings in the UK can be assessed, rated and certified.

The BREEAM Scheme Document and the information detailed therein has been designed to be used by trained, qualified and licensed BREEAM Assessors in accordance with the procedural and operational requirements of BREEAM under the terms and conditions of a relevant BREEAM licence.

The BREEAM Technical Guidance has been drafted by the BREEAM Centre at the Building Research Establishment (BRE).

The BRE also develops the Code for Sustainable Homes. This is in effect a BREEAM assessment to be used for new-build residential developments. Like BREEAM, the Code for Sustainable Homes has been designed to be used by trained, qualified and licensed Assessors in accordance with the procedural and operational requirements of the Code under the terms and conditions of a relevant Code for Sustainable Homes licence.

The development at Centre Point will be assessed under the following schemes:

CPT residential:	BREEAM Refurbishment 2012 (Domestic Buildings)
	Target '**Excellent**'
CP retail/leisure:	BREEAM Refurbishment 2012 (Non-Domestic Buildings)
	Target '**Very Good**'
IFox residential:	Code for Sustainable Homes
	Target '**Level 4**'

See Appendix A-C for pre-assessments for each of these schemes.

3. Development Options

The recent inclusion of designs for redeveloping the existing public house warrants a reassessment of the Energy Strategy. This report aims to address this.

There are currently two options being forwarded for consideration. These relate to the massing and design for the affordable housing units and the ground level retail unit planned for the Pub site.

Each option has been assessed separately and each will be discussed in this Statement.

Option A	Residential GEA (m^2)	Retail GEA (m^2)	Total GEA (m^2)
Total Proposed GEA (m2)	33,861	8155	**42,015**

Option B	Residential GEA (m^2)	Retail GEA (m^2)	Total GEA (m^2)
Total Proposed GEA (m2)	33,968	8156	**42,124**

4. Baseline Building Emissions

Part L, 2010, of the Buildings Regulations use a 2010 compliant "Notional" building against which target reductions in carbon emissions must be achieved.

The 2010 Approved Documents Part L and supporting second or third tier documents set out in detail how a 2010 notional building should be modelled to produce a base energy demand and the resultant carbon dioxide emissions assessment.

The current London Plan assesses a development or building's carbon dioxide emissions against the Part L 2010 compliant building. This figure is calculated using Part L accredited software. The energy use assessment for Part L of the Building Regulations does not include all forms of energy use only 'Regulated' energy use is assessed. The London Plan however requires that 'unregulated' energy use such as appliances and cooking are also considered.

The 'unregulated' energy use is calculated by reference to published material or by calculation.

- For residential areas, an allowance for cooking & appliances has been added based on the information outlined in the SAP worksheet 9.90.
- For the functional non-domestic areas, an allowance for small power has been added based on output from the Part L model for the building (i.e. the NCM).
- For plant rooms, an estimate has been made of the lighting & small power energy demand.

The treated areas of the building have been modelled using the National Calculations Method (NCM). This is incorporated in SAP and a dynamic thermal simulation tool (TAS by EDSL Ltd) accredited for carrying out carbon emissions calculations. The results have been used to estimate energy consumption and carbon dioxide emissions. This summation is known as the 'Baseline' emissions rate. All carbon reduction measures are assessed against this.

Allowances for energy consumption not included under Part L have been made by reference to published material or by calculation. These include small power (energy use for electrical appliances).

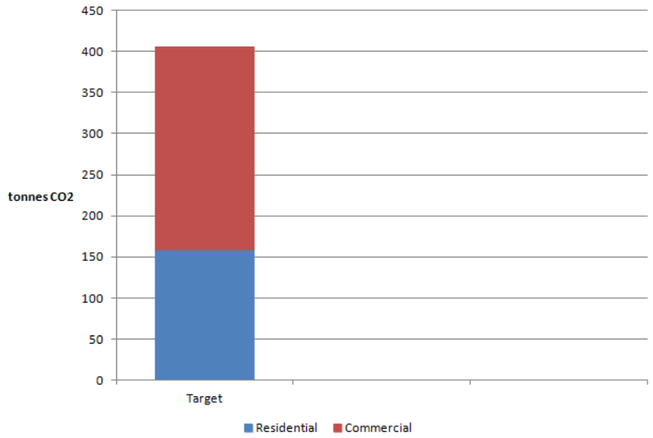
Regulated energy use and the associated carbon dioxide emissions have been calculated using TAS version 9.2.1.3 and SAP 2010.

Unregulated energy use and the associated carbon dioxide emissions for the non domestic buildings has been calculated using the TAS UK Building Regulations Studio, CIBSE publications for guidance, as well as evidence established through previous development work.

The charts opposite indicate the performance of the development relative to Part L of the Building Regulations 2010.

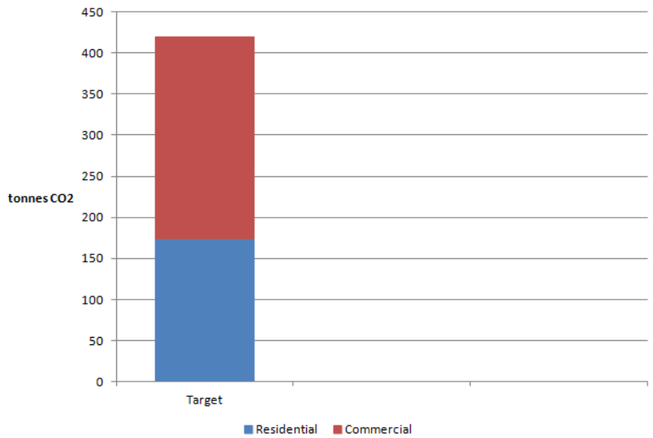
4.1 Option A

Site-wide regulated emissions target for Option A are 405.3 tonnes.



4.2 Option B

Site-wide regulated emissions target for Option B are 419.9 tonnes.



5. Be Lean - Reducing Energy Demand

Energy efficient servicing strategies and equipment have been used throughout the development to ***reduce energy demand***. Features employed include:

5.1 Passive Design Features

5.1.1 Building Envelope Thermal Properties

The façade design has been developed to meet or exceed the Building Regulations limiting performance criteria. Thermal bridging between the external fabric of the building and the structural floor slabs has been reduced by the additional thermal insulation applied but cannot be eliminated. This has impacted on the extent of carbon saving that is achievable.

For the new-build residential at IFox, the building envelope design is more flexible. The design here will be driven by the same principles however as those that have been adopted for the residential units in CPT, namely to minimise heat loss in winter and heat gains in summer.

5.1.2 Facade Optimisation

The design of the facade has a significant impact on the energy demand of a building in terms of heating, cooling and artificial lighting. As a listed building, there are limitations and restrictions on the extent of changes that can be made to Centre Point. A low solar transmittance of the glazing system, whilst reducing the demand for cooling energy, will also increase heating demand and artificial lighting energy consumption because it reduces daylight levels within the perimeter areas. A glazing of poor thermal and solar performance will reduce energy demand for artificial lighting but increase demand for heating and cooling. Hence a fine balance has been struck.

Note that the benefit of increased daylight falls off rapidly once daylight factors exceed about 5%. The proportion of glazing also has a major impact on views out which is known to affect the well-being of occupants.

An analysis of the likely solar exposure into each occupied area has been undertaken and the results used to determine the balance of solidity, shading and glazing solar performance (g-value) required to limit solar gains in the summer to acceptable levels. As a result, the Centre Point development glazing performance is maximised for each orientation - to control solar gains on the façades that would otherwise be susceptible to summer overheating (South, East and West), and to maximise solar exposure on the façade that will lose the most heat in the winter (north).

The façade optimisation reduces the energy required for heating in the winter, as well as avoiding an unacceptable risk of summertime overheating.

The facade design is more flexible for the new-build residential units on the IFox site. The design however will be again driven by the same principles as those adopted for CPT residential units.

5.2 Active Design Features: Unregulated Energy Use

5.2.1 Low Energy White Goods

White goods are now provided with a certified energy label. These are rated A+, A, B and C with C being the least efficient.

It is intended that all white goods provided will be rated at the highest energy rating available. This will result in an emissions saving of circa 2.5% from previous building regulations.

5.2.2 Low Energy Culture

Providing building users and operators with practical guidance on the importance and methods of energy efficiency can lead to effective, low cost reductions in energy usage and carbon emissions. Savings can be expected in, for example:

- Operating Comfort Cooling Systems Efficiently in Mixed Mode
- Lighting Energy: A Culture of 'Turn-It-Off'
- Small Power: Including Avoiding Monitors and PCs, etc., in Stand-By Mode
- Heating Energy: For Example Reducing Thermostat Settings

The amount of energy that can be saved will be dependent upon the motivation of the occupants and the effectiveness of the awareness programmes. Such programmes cannot be a one-off event and must make progress in energy efficiency transparent. It is recommended that targets are set and that recognition is given to users and operators who achieve these targets.

Training of operators and facility managers is particularly important to provide them with the skills and knowledge to implement change and continue to improve an energy management programme. Whilst this will be encouraged it is not possible to quantify the savings achieved.

5.3 Active Design Features: Regulated Energy Use

5.3.1 Low Energy Lighting

LED luminaries will be used predominantly, with high frequency ballasts and high efficacy lamps and luminaries also utilised where required. Lighting controls can further reduce energy consumption. Lighting controls such as daylight control, presence sensors, etc., will be used, where appropriate.

5.3.2 Air Handling Heat Recovery

Appropriately designed heat recovery on mechanical ventilation can provide significant energy savings. All ventilation systems will include heat recovery where technically feasible. It is currently proposed all air handling units (AHUs), will contain plate heat

exchangers, where conditions allow. Whole house ventilation units will incorporate heat recovery.

5.3.3 Power Factor Correction

The Building Regulations Approved Document L2A identifies that the provision of power factor correction to the building electrical supply can provide significant savings in electrical consumption. A saving in electrical energy consumption of 1.5% is awarded for power factor correction to 0.9 and a saving of 2.5% awarded for power factor correction to 0.95 power factor. Centre Point intends to have a power factor correction of 0.95.

5.3.4 Automatic Monitoring and Targeting

The Building Regulations Approved Document L2 identifies that the provision of automatic monitoring and targeting on new equipment with alarms for out of range values, can provide significant savings in energy consumption of the building services systems. A saving in energy consumption of 5% is awarded for complete installations that measure, record, transmit, analyse, report and communicate meaningful energy management information to enable the operator and occupier to manage the energy it uses.

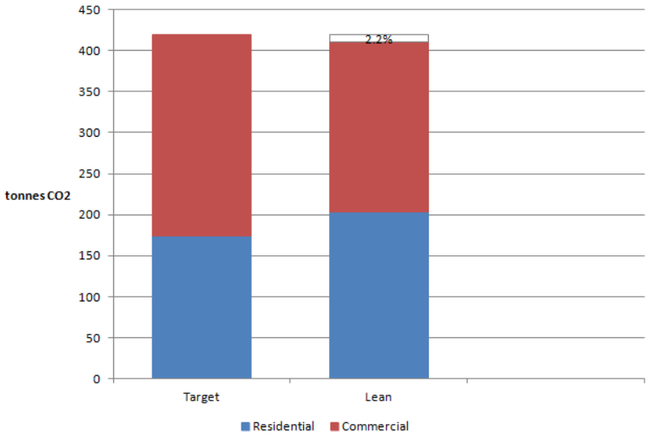
5.4 Lean Carbon Dioxide Emissions

5.4.1 Option A

Site-wide regulated emissions are reduced by 4.1% due to **Lean** measures.

5.4.2 Option B

Site-wide regulated emissions are reduced by 2.2% due to **Lean** measures.



6. Be Clean - Supplying Energy Efficiently

After minimising the energy demand, the development's energy performance is further improved by ensuring the energy required is generated as efficiently as possible. The London Plan Policy 5.6 details how this can be done and defines the hierarchy by which the energy systems should be selected:

- Connection to existing low carbon heat distribution networks
- Provide a site wide energy system
- Adopt a C/CHP unit
- Export energy from a site wide C/CHP

6.1 District Heating/Cooling Networks

The feasibility of connecting the development to a district heating network has been assessed, making reference to the London Heat Map. The following image is an extract of the London Heat Map for the area surrounding Centre Point, this indicates that there are no existing or proposed networks in this area.

Discussions have been held with Consolidated Developments Ltd who are in the process of developing a planning application for a mixed use development to the south of the Centre Point site. The discussions centred on the potential for optimising the use of energy by linking the two sites. Joint discussions were also held with the Carbon Trust and Mitie that were facilitated by Camden Council. It was agreed that the viability of a combined energy centre for the two sites will not be practical in programme terms, will not deliver further carbon savings and is not financially viable. The potential for the transfer and use of waste heat between the two sites is being progressed.

Irrespective of the study outcome, capped connections and space for heat exchanger interfaces will be provided to allow future connection to a local heat network if this materialises in the future.

6.2 Site-Wide Heating/Cooling Networks

A site wide air cooled condenser loop system will be utilised across the development. This will be connected to heat pumps (providing heating and cooling). Heat recovery will be utilised across the system wherever possible, such that waste heat from the retail units being cooled can be used in the residential areas when there is a heating demand.

The development has been designed to minimise the requirement for cooling and to avoid overheating, by the measures detailed in Section 5. The façade includes optimised glazing performance based on orientation. The opportunity to open windows to provide natural ventilation is afforded to the residential units as an alternative to mechanical cooling.

The major centralised plant will be located at basement level, with ambient energy rejection plant located at roof level.

An energy schematic, indicating the extent of the communal heat sink and heating network is shown in Appendix D of this report.

6.3 Adoption of a C/CHP System

The use of absorption cooling has been reviewed in conjunction with the CHP waste heat. Due to the low cooling loads and intermittent nature of the demand this option has been discounted.

The site wide space cooling and heating demand will be met by the heat pump systems served by a common condenser circuit. A gas fired CHP will meet the domestic hot water demand and top up heat to the condenser circuit in cold extremes. This unit will provide heat whilst generating electricity. The system shall primarily meet the base landlord's electricity demand.

A detailed study has been undertaken to establish the optimal size and operating regime of the CHP plant (see Appendix E). This study has ensured the unit size of the CHP has been optimised to maximise efficiency in line with Building Regulations requirements and CHP QA standards. The electrical energy produced will be used in landlord and common parts of the development.

Discussions are being held with UK Power Networks (UKPN) to establish the feasibility of exporting excess electricity from CHP to the grid. We await confirmation that the expected permission will be granted.

6.4 Fuel Cell to Drive C/CHP

An alternative option is available for replacing the CHP unit with a fuel cell.

The use of fuel cell technology has been investigated for other similar developments within this office. Whilst it has the potential to offer near zero NOx emissions, the fuel cell is comparable to gas fired CHP systems in terms of greenhouse gas (GHG) emissions. Its capital expense however means it is approximately 4 times more expensive to install, meaning the carbon savings benefit per unit capital cost makes this technology prohibitive in the current market.

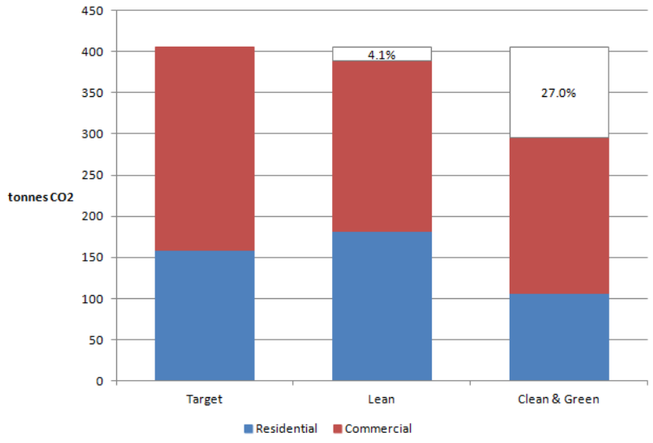
Furthermore, at full load the fuel cell produces both high grade waste heat (approximately 300oC) and low grade waste heat. Under the current strategy, the high grade heat is delivered at too high a temperature to be used efficiently within the development.

For reasons noted above, fuel cell technology is not the preferred strategy for this scheme.

6.5 Clean Carbon Dioxide Emissions

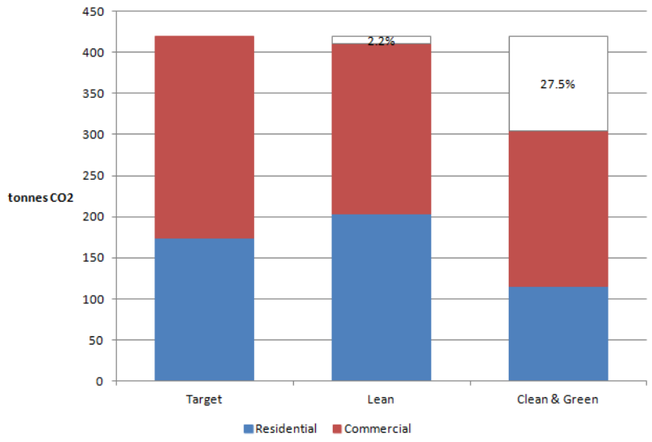
6.5.1 Option A

Site-wide regulated emissions are reduced by a further 22.9% due to CHP, taking aggregate reduction in emissions due to **Lean** and **Clean** measures to 27.0%.



6.5.2 Option B

Site-wide regulated emissions are reduced by a further 25.3% due to CHP, taking aggregate reduction in emissions due to **Lean** and **Clean** measures to 27.5%.



7. **Be Green - Renewable Energy**

The current version of the London Plan contains a presumption that development will seek to reduce carbon dioxide emissions through the use of on-site renewable energy generation wherever feasible. This reduction is measured against the energy efficient 'Lean' and 'Clean' design emissions.

The plan also recommends the following renewable energy technologies are likely to be the most effective in London developments, in terms of environmental, technical and economic feasibility:

- Biomass heating / cooling / electricity
- Renewable energy from waste
- Photovoltaic panels
- Solar hot water heating
- Wind turbines
- Ground source/ aquifer heat pumps
- Air source heat pumps

Each of these has been assessed. The results are shown within the following pages.

The London Plan also encourages the use of innovative energy technologies such as hydrogen fuel cell vehicles or anaerobic digestion. This includes the introduction of hydrogen supply and distribution infrastructure. These concepts have been discussed within this section of the report.

7.1 Renewable Technologies

7.1.1 Biomass / Biodiesel Heating / Cooling / Electricity

A common and sustainable form of biomass is wood in the form of small chips or pellets. These are produced as a waste product in the forestry industry. The fuel is burnt in specially designed boilers with high efficiency filters on the exhaust to reduce particulate emissions.

Although carbon dioxide is emitted in the exhaust gas, this originated from the atmosphere and was stored within the trees by photosynthesis. As such, there is no net increase in atmospheric carbon emissions and it is considered a 'carbon neutral' fuel. However, some fossil fuel will be expended in producing and transporting biomass which is why there are some associated carbon emissions. The current building regulations specify an emission rate one-seventh that of natural gas.

The key issues with biomass are fuel handling and storage, fuel availability, emissions and ash disposal.

Where biomass boilers are installed, they need to operate under steady load conditions. Usually, therefore, gas fired boilers provide top up at times of peak load.

However due to the size of the installation and the frequency of fuel deliveries required biomass / bio-gas installations are impractical for this site.

Air quality is also seen to be an issue in London. Extensive filtration and catalytic conversion is require to reduce particulate matter (PM), nitrogen oxide (NOx) and the potential nitrous oxide (N2O) emissions from biomass installations, together with high level dispersion to meet the London air quality requirements. These restrictions mean that biomass / bio-gas heating and/or cooling is inappropriate for this development.

7.1.2 Renewable Energy from Waste

Generating energy from waste would not be appropriate for this development due to the relatively low levels of combustible waste generated on site.

7.1.3 Photovoltaics

The load carrying capacity of the flat roof areas is not adequate to take the load of PV panels. The tower roof space is taken up with heat rejection from the condenser water loop. There are also concerns about the visual impact that PV panels will have on the buildings appearance and the obvious listed building issues. The use of PV is therefore not recommended.

7.1.4 Solar Hot Water Heating

The option of providing solar hot water to the development has been considered. In addition to the difficulty in identifying suitable locations for panels within the development, it is recognised that they compete for thermal loads with CHP, making

their inclusion incompatible with the proposed strategy and as such this is not appropriate for this site.

7.1.5 Wind Turbines

Wind turbines produce electricity directly from the energy in wind. This is then fed into the buildings electrical system via control gear.

Two types of wind turbine are available, horizontal axis and fixed axis. The former tend to be noisy and produce vibration. The latter are quieter in operation and more suited to installation on buildings but are generally less efficient and more expensive.

Recent measurements of a wind turbine on a London building has confirmed reports that wind turbulence around buildings greatly reduces energy output – typically half that suggested by manufacturers' literature. There are also concerns relating to the visual impact of such devices on the building appearance which together with restrictions on building height means wind turbines are not recommended for this project.

7.1.6 Ground Source Heat Pumps

A heat pump utilises the heat stored within the earth (consistently around 12°C) below the building to provide low grade hot water for use as heating. As the development is an existing site and there are no major construction works to the foundations, there is no scope for incorporating a closed loop ground source heat pump system.

Therefore this technology has been discounted from this development.

8. Sustainability Statement

8.1 Option A

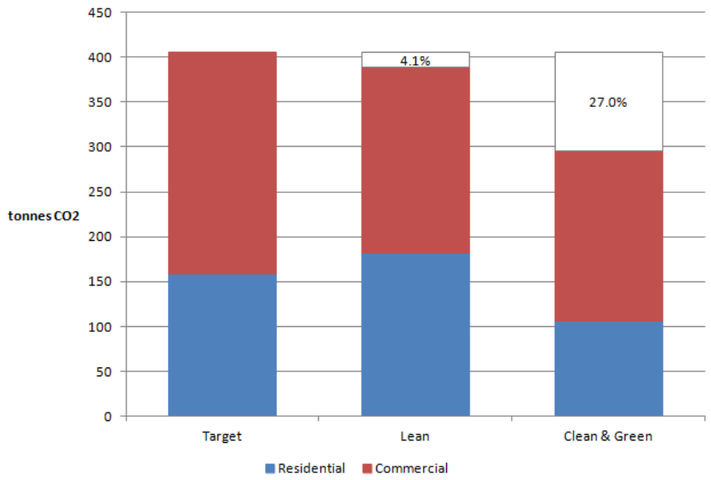
This Energy Statement has been prepared in response to the new proposals for Planning consent regarding the redevelopment of Centre Point, in particular the inclusion of new construction of affordable housing on the site of the existing pub.

The energy strategy for ***Option A*** has been developed in line with the guidelines set out in Part L 2010 of the Building Regulations and in the London Plan. **Lean**, **Clean** and **Green** measures have been adopted, with the resulting development achieving carbon emissions reductions far in excess of the current Building Regulations, and measuring favourably in relation to the London Plan.

Regarding BREEAM and Code for Sustainable Homes:

- CPT residential will target '**Excellent**' rating when assessed against BREEAM Refurbishment 2012 (Domestic Buildings)
- CP retail and leisure units will target **'Very Good'** rating when assessed against BREEAM Refurbishment 2012 (Non-Domestic Buildings)
- The new affordable housing scheme on the Pub site will target **'Level 4'** rating when assessed under Code for Sustainable Homes

Relative to Part L of the Building Regulations 2010, regulated emissions are calculated to be 27.0% lower than the target emissions:



When measured against the requirements of the London Plan, the development can be summarised by the following tables, as per presented in pages 5 & 6 of the *GLA Guidance on Preparing Energy Assessments, Sept 2011*:

GLA Table 1: Carbon dioxide emissions after each stage of the energy hierarchy

	Carbon Dioxide Emissions(tonnes CO_2 per annum)	
	Regulated	**Unregulated**
Building Regulations 2010 Part L compliant development	405.3	513.1
After energy demand reduction	388.8	513.1
After CHP	295.9	513.1
After renewable energy	295.9	513.1

GLA Table 2: Regulated carbon dioxide savings from each stage of the energy hierarchy

	Regulated Carbon Dioxide Savings	
	Tonnes CO_2 per annum	**%**
Savings from energy demand reduction	16.5	4.1%
Savings from CHP	92.9	23.9%
Total	109.4	27.0%

8.2 Option B

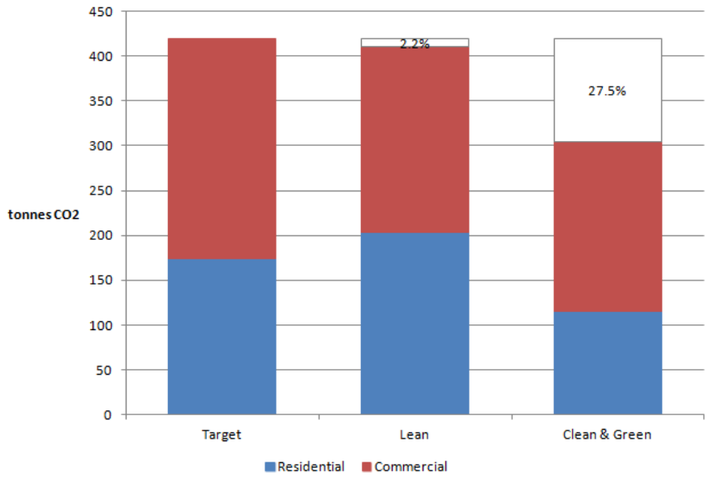
This Energy Statement has been prepared in response to the new proposals for Planning consent regarding the redevelopment of Centre Point, in particular the inclusion of new construction of affordable housing on the site of the existing pub.

The energy strategy for ***Option B*** has been developed in line with the guidelines set out in Part L 2010 of the Building Regulations and in the London Plan. **Lean**, **Clean** and **Green** measures have been adopted, with the resulting development achieving carbon emissions reductions far in excess of the current Building Regulations, and measuring favourably in relation to the London Plan.

Regarding BREEAM and Code for Sustainable Homes:

- CPT residential will target '**Excellent**' rating when assessed against BREEAM Refurbishment 2012 (Domestic Buildings)
- CP retail and leisure units will target '**Very Good**' rating when assessed against BREEAM Refurbishment 2012 (Non-Domestic Buildings)
- The new affordable housing scheme on the Pub site will target **'Level 4'** rating when assessed under Code for Sustainable Homes

Relative to Part L of the Building Regulations 2010, regulated emissions are calculated to be 27.5% lower than the target emissions:



When measured against the requirements of the London Plan, the development can be summarised by the following tables, as per presented in pages 5 & 6 of the *GLA Guidance on Preparing Energy Assessments, Sept 2011*:

GLA Table 1: Carbon dioxide emissions after each stage of the energy hierarchy

	Carbon Dioxide Emissions(tonnes CO_2 per annum)	
	Regulated	**Unregulated**
Building Regulations 2010 Part L compliant development	419.9	520.8
After energy demand reduction	410.7	520.8
After CHP	304.4	520.8
After renewable energy	304.4	520.8

GLA Table 2: Regulated carbon dioxide savings from each stage of the energy hierarchy

	Regulated Carbon Dioxide Savings	
	Tonnes CO_2 per annum	**%**
Savings from energy demand reduction	9.2	2.2%
Savings from CHP	106.3	25.9%
Total	115.5	27.5%

Appendices

Appendix A - Code for Sustainable Homes (Domestic New Build)

106610/LA/120207 Issue 08

breglobal

Results

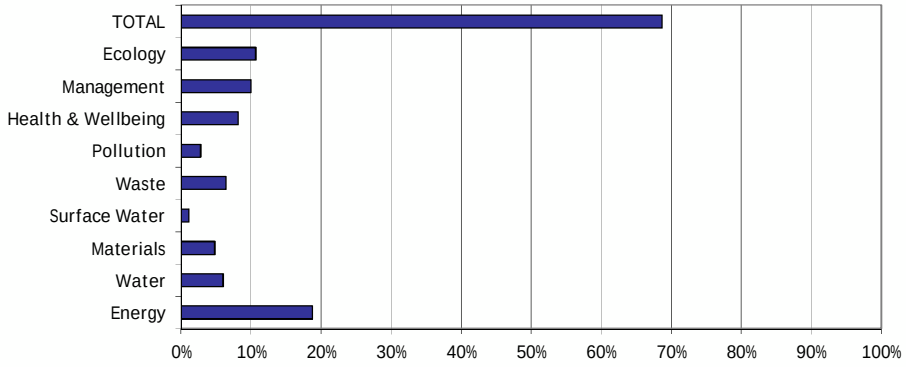
Development Name:	Centre Point
Dwelling Description:	Both Options
Name of Company:	Grontmij
Code Assessor's Name:	David Partington
Company Address:	
Notes/Comments:	The pre-assessment score combines credits that are mandatory as well as "tradable" credits that are typically achieved with little effort. All apartments will require a Code level 4 certificate. Some apartments may achieve credits currently not targeted but have not been applied as a worse case scenario.

PREDICTED RATING - CODE LEVEL: 4

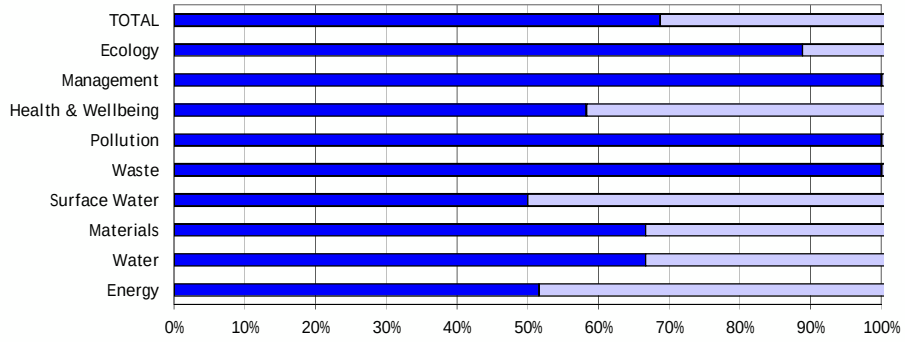
Mandatory Requirements: All Levels

% Points:	68.70%	- Code Level: 4
Breakdown:	Energy	- Code Level: 4
	Water	- Code Level: 4

Graph 1: Predicted contribution of individual sections to the total score and percentage of total achievable score



Graph 2: Predicted percentage of credits achievable: Total and by Category



NOTE: The rating obtained by using this Pre Assessment Estimator is for guidance only. Predicted ratings may differ from those obtained through a formal assessment, which must be carried out by a licensed Code assessor.

CATEGORY 1 ENERGY	Overall Level: 4	Overall Score	68.70	Assumptions Made	Evidence Required (The below cells can be formatted by assessors if required.)
% of Section Credits Predicted: 51.61		Credits	Level		
Contribution to Overall % Score: 18.78 points		16.0 of 31 Credits	Level 4		
Ene 1 Dwelling Emission Rate	Credits are awarded based on the percentage improvement of the Dwelling Emission Rate (DER) over the Target Emission Rate (TER) as calculated using SAP 2009. Minimum standards for each Code level apply. The Code energy calculator can be used to calculate a predicted score. Enter the predicted score What is the predicted number of credits? 3.0 OR Are zero net CO_2 emissions achieved? ☐	3.0 of 10 Credits	Level 4	Achievement of 25% reduction below Part L1A:2010 building regs is mandatory. Development incorporates central CHP system.	
Ene 2 Fabric Energy Efficiency	Credits are awarded based on the Fabric Energy Efficiency (kWh/m^2/yr) of the dwelling. Minimum standards apply at Code levels 5 and 6. The Code energy calculator can be used to calculate a predicted score. Enter the predicted score Apartments, Mid-terrace ◉ OR End terrace, Semi and Detached ○ OR Staggered Mid terrace ○ What is the predicted number of credits? 3.0	3.0 of 9 Credits	-	Apartment u-values would need to be significantly better than Part L 2010 limiting values. Credits assumed.	
Ene 3 Energy Display Devices	Credits are awarded where a correctly specified Energy Display Device is installed monitoring electricity and/or primary heating fuel consumption. Select whether the EDD monitors electricity and/or fuel None Specified ○ Primary Heating only ○ OR Electricity only ○ OR Electricity and primary heating fuel ◉	2 of 2 Credits	-	Appropriate Energy Display Device/s could be installed.	

Issue		Credits	Level	Assumptions Made	Evidence Required
Ene 4 Drying Space	One credit is awarded for the provision of either internal or external secure drying space with posts and footings or fixings capable of holding 4m+ of drying line for 1-2 bed dwellings and 6m+ for dwellings with 3 bedrooms or greater. Will drying space meeting the criteria be provided? Yes ◉ OR No ○	1 of 1 Credits	-	Appropriate drying fixings could be incorporated into bathroom design for required length of drying line. Bathrooms extract ventilation to be at least 30l/s.	
Ene 5 Energy Labelled White Goods	Credits are awarded where each dwelling is provided with either information about the EU Energy Labelling Scheme, White Goods with ratings ranging from A+ to B or a combination of the previous according to the technical guide. Select the appropriate option below EU Energy labelling information only ☐ A+ rated appliances ☑ A rated washing machine and dishwasher ☑ B rated tumble dryer or washer dryer ☐ EU Energy labelling information provided ☑	2 of 2 Credits	-	All white goods need to be provided with required EU energy efficiency ratings.	
Ene 6 External Lighting	Credits are awarded based on the provision of space lighting* with dedicated energy efficient fittings and security lighting fittings with appropriate control gear.. Space Lighting None provided ○ OR Non Code compliant lighting ○ OR Code compliant lighting ◉ Security Lighting None provided ○ OR Non Code compliant lighting ○ OR Code compliant lighting and controls ◉ Dual lamp luminaires Compliant with both above criteria ☐ * Statutory safety lighting is not covered by this requirement	2 of 2 Credits	-	Space and security lighting to be Code compliant.	

Issue		Credits	Level	Assumptions Made	Evidence Required
Ene 7 Low or Zero Carbon Technologies	Credits are awarded where there is a 10% or 15% reduction in CO_2 emissions resulting from the use of low or zero carbon technologies. Select % contribution made by low or zero carbon technologies Less than 10% of demand ○ OR 10% of demand or greater ◉ OR 15% of demand or greater ○	1 of 2 Credits	-	Some apartments may achieve 2 credits	
Ene 8 Cycle Storage	Credits are awarded where adequate, safe, secure and weather proof cycle storage is provided according to the Code requirements. Fill in the development details below Number of bedrooms: 1 Number of cycles stored per dwelling* 0.5 * if you have storage for 1 cycle per two dwellings insert 0.5 in number of cycles stored per dwelling	1 of 2 Credits	-	One credit requires one space for every two 1-bed apartments, 1 space per 2 or 3-bed apartment and 2 spaces for every 4+ bed apartment. Two credits require one space for every 1-bed apartments, 2 spaces per 2 or 3-bed apartment and 4 spaces for every 4+ bed apartment.	
Ene 9 Home Office	A credit is awarded for the provision of a home office. The location, space and services provided must meet the Code requirements. Will there be provision for a Home Office? Yes ◉ OR No ○	1 of 1 Credits	-	A suitable room with a window to be provided with two double power sockets, double telephone socket (or broadband) and sufficient space for a desk & chair and book case. For 1 and 2-bed apartments could be the living room unless open plan with the kitchen, for larger apartments cannot be the living room. Room must still be able to function for its original purpose. Room requires average daylight factor of 1.5%	

CATEGORY 2 WATER	Overall Level: 4	Overall Score	68.70	Assumptions Made	Evidence Required (The below cells can be formatted by assessors if required.)
% of Section Credits Predicted: 66.66		Credits	Level		
Contribution to Overall Score: 6.00 points		4 of 6 Credits	Level 4		
Wat 1 Indoor Water Use	Credits are awarded based on the predicted average household water consumption, calculated using the Code Water Calculator Tool. Minimum standards for each code level apply. Select the predicted water use / Mandatory Requirement greater than 120 litres/ person/ day ○ OR ≤ less than 120 litres/ person/ day ○ OR ≤ less than 110 litres/ person/ day ○ OR ≤ less than 105 litres/ person/ day ◉ OR ≤ less than 90 litres/ person/ day ○ OR ≤ less than 80 litres/ person/ day ○	3 of 5 Credits	Level 3 AND Level 4	Apartments to be provided with required combination of low flow water fittings/devices and maybe grey water recycling systems. Minimum of 3 credits is a mandatory requirement.	
Wat 2 External Water Use	A credit is awarded where a compliant system is specified for collecting rainwater for external irrigation purposes. Where no outdoor space is provided the credit can be achieved by default. Select the scenario that applies No internal or communal outdoor space ○ OR Outdoor space with collection system ◉ OR Outdoor space without collection system ○	1 of 1 Credits	-	No individual or communal garden space or if only balconies are provided, the credit can be awarded by default otherwise a water butt up to 200L in volume is required.	

CATEGORY 3 MATERIALS	Overall Level: 4	Overall Score	68.70	Assumptions Made	Evidence Required (The below cells can be formatted by assessors if required.)
% of Section Credits Predicted: 66.66		Credits	Level		
Contribution to Overall Score: 4.80 points		16 of 24 Credits	All Levels		
Mat 1 Environm-ental Impact of Materials	Mandatory Requirement: At least three of the five key building elements must achieve a Green Guide 2008 Rating of A+ to D. Tradable Credits: Points are awarded on a scale based on the Green Guide Rating of the specifications. The Code Materials Calculator can be used to predict a potential score. Mandatory Requirement Will the mandatory requirement be met? ☑ Enter the predicted score What is the predicted number of credits? 10	10 of 15 Credits	All Levels	Roof, External walls, Internal walls, Upper & Ground floors and Staircase: at least 3 of these elements require a minimum Green Guide rating of D. The area of each element and its Green guide rating is required. 10 credits equate to all elements being A rated. 15 credits equate to all elements being A+ rated.	
Mat 2 Responsible Sourcing of Materials - Basic Building Elements	Credits are awarded where materials used in the basic building elements are responsibly sourced. The Code Materials Calculator can be used to predict a potential score. Enter the predicted Score What is the predicted number of credits? 4	4 of 6 Credits	-	80% of the frame, ground floor, upper floors, roof, external & internal walls, foundations/substructure and staircase would need to be sourced from suppliers with Environmental Management Systems such as ISO 14001. 100% of timber must be legally sourced.	
Mat 3 Responsible Sourcing of Materials - Finishing Elements	Credits are awarded where materials used in the finishing elements are responsibly sourced. The Code Materials Calculator can be used to predict a potential score. Enter the predicted Score What is the predicted number of credits? 2	2 of 3 Credits	-	As above but usually easier as most finishing elements are timber based. Requires input from the team.	

CATEGORY 4 SURFACE WATER RUN-OFF	Overall Level: 4	Overall Score	68.70	Assumptions Made	Evidence Required (The below cells can be formatted by assessors if required.)
% of Section Credits Predicted:	50.00%	Credits	Level		
Contribution to Overall Score:	1.10 points	2 of 4 Credits	All Levels		

Sur 1 Management of Surface Water Run-off from developments	Mandatory Requirement: Peak rate of run-off into watercourses is no greater for the developed site than it was for the pre-development site and that the additional predicted volume of rainwater discharge caused by the new development is entirely reduced as far as possible in accordance with the assessment criteria. Desiging the drainage system to be able to cope with local drainage system failure. Tradable Credits: Where SUDS are used to improve water quality of the rainwater discharged or for protecting the quality of the receiving waters. Mandatory Requirement Will the mandatory requirement be met? ☑ Select the appropriate option No SUDS ☐ No runoff into watercourses for the first 5 mm of rainfall ☐ Runoff from hard surfaces will receive an appropriate level of treatment ☐	0 of 2 Credits	All Levels	Mandatory requirement that peak run off rate & volume of run off are not increased. Typically difficult to achieve attenuation or SUDs treatment of any water collected on site. No credits assumed.	
Sur 2 Flood Risk	Credits are awarded where developments are located in areas of low flood risk or where in areas of medium or high flood risk appropriate measures are taken to prevent damage to the property and its contents in accordance with the Code criteria in the technical guide. Select the annual probability of flooding (from PPS25*) Zone 1 - Low ◉ OR Zone 2 - Medium ○ OR Zone 3 - High ○ Select the apropriate option(s) Low risk of flooding from FRA** ☑ All measures of protection are demonstrated in FRA ☐ Ground floor level and access routes are 600 mm above design flood level ☐ * Planning Policy Statement 25 - Planning and Flood Risk ** FRA - Flood Risk Assessment	2 of 2 Credits	-	Centre Point development situated in zone 1 as defined by PPS25 development.	

CATEGORY 5 WASTE	Overall Level: 4	Overall Score	68.70	Assumptions Made	Evidence Required (The below cells can be formatted by assessors if required.)
% of Section Credits Predicted:	100.00%	Credits	Level		
Contribution to Overall Score:	6.40 points	8 of 8 Credits	All Levels		

Was 1 — Storage of non-recyclable waste and recyclable household waste

Mandatory Requirement: The space provided for waste storage should be sized to hold the larger of either all external containers provided by the Local Authority or the min capacity calculated from BS 5906. Tradable Credits are awarded for adequate internal and/ or external recycling facilities.

Mandatory Requirement

Will the minimum space be provided and be accessible to disabled people?	☑

Internal Recyclable household waste storage — 0 of 2 Credits

Where there is no external recyclable waste storage and no Local Authority collection scheme	
Internal storage (capacity 60 litres)	☐

Local Authority collection Scheme — 4 of 4 Credits — All Levels

Post Collection sorting	
Internal storage (capacity 30 litres)	☑
Pre-collection sorting	
Internal storage (3 separate bins, capacity 30 litres)	☐

External Storage, no Local Authority collection scheme — 0 of 4 Credits

3 separate internal storage bins (capacity 30 litres)	☐
AND	
Houses	
External Storage(capacity 180 litres)	☐
Flats	
Private recycling operator	☐
3 or greater types of waste collected	☐

The mandatory requirement is relatively straight forward.

Type of dedicated internal recycling bin determined by the type of Local Authority collection scheme.

Need to comply with some Part M requirements.

Issue		Credits	Level	Assumptions Made	Evidence Required
Was 2 Construction Site Waste Management	A credit is awarded where a compliant SWMP is provided with targets and procedures to minimise construction waste. Credits are available where the SWMP include procedures and commitments for diverting either 50% or 85% of waste generated from landfill. SWMP details Does the SWMP include: + No SWMP ○ + SWMP with targets and procedures to minimise waste? ○ + SWMP with procedures to divert 50% of waste ○ + SWMP with procedures to divert 85% of waste ◉	3 of 3 Credits		Any construction project in England costing over £300,000 requires a SWMP. The SWMP must contain target benchmarks & procedures to minimise construction waste.	
Was 3 Composting	A credit is awarded where individual home composting facilities are provided, or where a community/ communal composting service, either run by the Local Authority or overseen by a management plan is in operation. Select the facilities available No composting facilities ○ Individual composting facilities ○ OR Communal/ community composting*? ◉ Local Authority ☑ OR Private with management plan ☐ * including if an automated waste collection system is in place	1 of 1 Credit	-	Camden run a kitchen waste collection scheme	

CATEGORY 6 POLLUTION	Overall Level: 4	Overall Score	68.70	Assumptions Made	Evidence Required (The below cells can be formatted by assessors if required.)
% of Section Credits Predicted: 100.00%		Credits	Level		
Contribution to Overall Score: 2.80 points		4 of 4 Credits	All Levels		
Pol 1 Global Warming Potential (GWP) of Insulants	A credit is awarded where <u>all</u> insulating materials only use substances (in manufacture AND installation) that have a GWP of less than 5. Select the most appropriate option All insulants have a GWP less than 5 ◉ OR Some insulants have a GWP of less than 5 ○ OR No insulants have a GWP of less than 5 ○	1 of 1 Credits	-	Almost standard.	
Pol 2 NOx Emissions	Credits are awarded on the basis of NOx emissions arising from the operation of the space and water heating system within the dwelling. Select the most appropriate option Greater than 100 mg/kWh ○ OR Less than 100 mg/kWh ○ OR Less than 70 mg/kWh ○ OR Less than 40 mg/kWh ◉ OR Class 4 boiler ○ OR Class 5 boiler ○ OR All space and hot water energy requirements are met by systems who do not produce NOx emissions ○	3 of 3 Credits	-	Will depend predominantly on the gas-fired CHP.	

CATEGORY 7 HEALTH & WELLBEING	Overall Level: 4	Overall Score	68.70	Assumptions Made	Evidence Required (The below cells can be formatted by assessors if required.)
% of Section Credits Predicted: 58.00%		Credits	Level		
Contribution to Overall Score: 8.16 points		7 of 12 Credits	No level		
Hea 1 Daylighting	Credits are awarded for ensuring key rooms in the dwelling have high daylight factors (DF) and a view of the sky. Select the compliant areas Room Kitchen: Avg DF of at least 2% ☐ Living Room*: Avg DF of at least 1.5% ☐ Dining Room*: Avg DF of at least 1.5% ☐ Study*: Avg DF of at least 1.5% ☐ 80% of working plane in all above rooms receive direct light from the sky? ☐ Any room used for Ene 9 Home Office must also achieve a min DF of 1.5%.	0 of 3 Credits	-	Will require review during detail design stage with the project team. Kitchens are often at the rear of the living room and are difficult to achieve 2% ADF. All rooms within the dwelling must achieve 80% of the view of sky. Penthouses should achieve this. No credits assumed. Calculations would be required.	
Hea 2 Sound Insulation	Credits are awarded where performance standards exceed those required in Building Regulations Part E. This can be demonstrated by carrying out pre-completion testing or through the use of Robust Details Limited. Select a type of property Detached Property ○ Attached Properties: - Separating walls and floors only exist between non habitable spaces ○ - Separating walls and floors exist between habitable spaces ◉ Select a performance standard Performance standard not sought ○ Airborne: 3db higher; Impact: 3dB lower ○ OR Airborne: 5db higher; Impact: 5dB lower ◉ OR Airborne: 8db higher; Impact: 8dB lower ○	3 of 4 Credits	-	Assume airborne sound insulation values 5dB higher than Part E. Impact sound insulation values 5dB lower than Part E	

Issue		Credits	Level	Assumptions Made	Evidence Required
Hea 3 Private Space	A credit is awarded for the provision of an outdoor space that is at least partially private. The space must allow easy access to all occupants. Will a private/ semi-private space be provided? Yes, private/semi-private space will be provided ○ OR No private/semi-private space ◉	0 of 1 Credits	-	Each apartment needs at least 1.5m2 / bedroom of private space to claim the credit. Worse case - no credits assumed.	
Hea 4 Lifetime Homes	Mandatory Requirement: Lifetime Homes is mandatory when a dwelling is to achieve Code Level 6. Tradable credits: Credits are awarded where the developer has implemented all of the principles of the Lifetime Homes scheme. Mandatory Requirement Dwelling to achieve Code Level 6? ☐ Lifetime Homes Compliance All Lifetime Homes criteria will be met ◉ OR Exemption from LTH criteria 2/3 applied ○ Credit not sought ○	4 of 4 Credits	No level	Each dwelling has to comply with all 16 design criteria within Lifetime Homes to gain the 4 credits. Assume there is a requirement to implement with affordable housing.	

CATEGORY 8 MANAGEMENT	Overall Level: 4	Overall Score	68.70	Assumptions Made	Evidence Required (The below cells can be formatted by assessors if required.)
% of Section Credits Predicted: 100.00%		Credits	Level		
Contribution to Overall Score: 10.00 points		9 of 9 Credits	All Levels		
Man 1 Home User Guide	Credits are awarded where a simple guide is provided to each dwelling covering information relevant to the 'non-technical' home occupier, in accordance with the Code requirements. Tick the topics covered by the Home User Guide Operational Issues? ☑ Site and Surroundings? ☑ Is available in alternative formats? ☑	3 of 3 Credits	-	Needs input from all of design team. Requires a procedure whereby the home owner can obtain the User Guide in a different format such as foreign language / large print / Braille etc.	
Man 2 Considerate Constructors Scheme	Credits are awarded where there is a commitment to comply with best practice site management principles using either the Considerate Constructors Scheme or an alternative locally/ nationally recognised scheme. Select the appropriate scheme and score No scheme used ○ Considerate Constructors OR Best Practice: Score between 24 and 31.5 ○ OR Best Practice+: Score between 32 and 40 ◉ Alternative Scheme* OR Mandatory + 50% optional requirements ○ OR Mandatory + 80% optional requirements ○ * In the first instance, contact a Code Service Provider if you are considering to use an alternative scheme.	2 of 2 Credits	-	CCS scheme has now changed. A minimum score of 35 out of 50 with a minimum score of 7 in each category is required to achieve 2 credits.	
Man 3 Construction Site Impacts	Credits are awarded where there is a commitment and strategy to operate site management procedures on site as following: Tick the impacts that will be addressed Monitor, report and set targets, where applicable, for: - CO_2/ energy use from site activities ☑ - CO_2/ energy use from site related transport ☐ - water consumption from site activities ☑ Adopt best practice policies in respect of: - air (dust) pollution from site activities ☑ - water (ground and surface) pollution on site ☐ 80% of site timber is reclaimed, re-used or responsibly sourced ☑	2 of 2 Credits	-	This is becoming standard. Have assumed 4 of the impacts will be monitored to achieve 2 credits. Which 4 to be decided.	

Issue		Credits	Level	Assumptions Made	Evidence Required
Man 4 Security	Credits are awarded for complying with Section 2 - Physical Security from Secured by Design - New Homes. An Architectural Liaison Officer (ALO), or alternative, needs to be appointed early in the design process and their recommendations incorporated. Secured by Design Compliance Credit not sought ○ OR Secured by Design Section 2 Compliance ◉	2 of 2 Credits	-	Assume at least section 2 of SBD will be achieved unless formal certification is required.	

CATEGORY 9 ECOLOGY	Overall Level: 4	Overall Score	68.70	Assumptions Made	Evidence Required (The below cells can be formatted by assessors if required.)
% of Section Credits Predicted: 88.00%		Credits	Level		
Contribution to Overall Score: 10.66 points		8 of 9 Credits	All Levels		
Eco 1 Ecological Value of Site	One credit is awarded for developing land of inherently low value. Select the appropriate option Credit not sought ○ OR Land has ecological value ○ OR Land has low/ insignificant ecological value* ◉ * Low ecological value is determined either a) by using Checklist Eco 1 across the whole development site; or b) where an suitably qualified ecologist is appointed and can confirm or c) produces an independent ecological report of the site, that the construction zone is of low/ insignificant value; AND the rest of the development site will remain undisturbed by the works.	1 of 1 Credits	-	Ecologist already appointed. Confirmed site is of low ecological value. May require another visit?	
Eco 2 Ecological Enhancement	A credit is awarded where there is a commitment to enhance the ecological value of the development site. Tick the appropriate boxes Will a *Suitably Qualified Ecologist* be appointed to recommend appropriate ecological features? ☑ AND Will all key recommendations be adopted? ☑ AND 30% of other recommendations be adopted? ☑	1 of 1 Credits	-	Ecologist appointed	
Eco 3 Protection of Ecological Features	A credit is awarded where there is a commitment to maintain and adequately protect features of ecological value. Type and protection of existing features Site with features of ecological value? ○ OR Site of low ecological value (as Eco 1)? ○ AND All* existing features potentially affected by site works are maintained and adequately protected? ☐ *If a suitably qualified ecologist has confirmed that a feature can be removed due to insignificant ecological value or poor health conditions, as long all the rest have been protected, then this box can be ticked.	1 of 1 Credits	-	Ecologist appointed - nothing to protect.	

Issue		Credits	Level	Assumptions Made	Evidence Required
Eco 4 Change of Ecological Value of Site	Credits are awarded where the change in ecological value has been calculated in accordance with the Code requirements and is calculated to be: Change in Ecological Value Major negative change: fewer than -9 ○ Minor negative change: between -9 and -3 ○ OR Neutral: between -3 and +3 ○ Minor enhancement: between +3 and +9 ◉ Major enhancement: greater than 9 ○	3 of 4 Credits	-	A neutral effect on site ecology achieves 2 credits. Assumed will achieve an extra point for an increase of 3 species per hectare after development.	
Eco 5 Building Footprint	Credits are awarded where the ratio of combined floor area of all dwellings on the site to their footprint is: Ratio of Net Internal Floor Area: Net Internal Ground Floor Area Credit Not Sought ○ OR Houses: 2.5:1 OR Flats: 3:1 ○ OR Houses: 3:1 OR Flats: 4:1 ◉ OR Houses & Flats Weighted (2.5:1 & 3:1) ○ OR Houses & Flats Weighted (3:1 & 4:1) ○	2 of 2 Credits		The advantage of high-rise!	

Appendices

Appendix B - BREEAM (Domestic Refurbishment)

106610/LA/120207 Issue 08

Centre Point	BREEAM Domestic Refurbishment 2012					
Category	Predicted Credits	Points after weighting	Available Credits	Issue	Title	Weighting Factor %
Energy	3		6	Improvement in Energy efficiency rating	Ene 01	43
						(1.48)
	3.5		4	Energy efficiency post refurbishment (M) (Need 2.5 for Excelle	Ene 02	
	7		7	Primary energy demand	Ene 03	
	0		1	Drying Space	Ene 06	
	0		2	Renewable Technologies	Ene 04	
	2		2	Energy Labelled White Goods	Ene 05	
	1		2	Lighting	Ene 07	
	2		2	Energy Display Device	Ene 08	
	1		2	Cycle Storage	Ene 09	
	0		1	Home Office	Ene 10	
	19.5	**28.91**	**29**	**Category 1 Totals**		
Water	2		3	Internal Water Use (M) (Need 2 for Excellent)	Wat 01	11
	0		1	External Water Use	Wat 02	(2.2)
	1		1	Water Meter	Wat 03	
	3	**6.60**	**5**	**Category 2 Totals**		
Materials	18		25	Environmental Impact of materials	Mat 01	8
	8		12	Responsible sourcing of materials: Basic Elements (M)	Mat 02	(0.178)
	5		8	Insulation	Mat 03	
	31	**5.51**	**45**	**Category 3 Totals**		
Waste	1		2	Household Waste	Was 01	3
	2		3	Refurbishment Site Waste Management	Was 02	(0.60)
	3	**1.80**	**5**	**Category 4 Totals**		
Pollution						6
	0		3	Nitrogen Oxide Emissions	Pol 01	(0.75)
	2		3	Surface Water Runoff	Pol 02	
	2		2	Flooding (M) (Need 2 for Excellent)	Pol 03	
	4	**3.00**	**8**	**Category 5 Totals**		
Health & Wellbeing	0		2	Daylighting	Hea 01	17
	3		4	Sound Insulation	Hea 02	(1.42)
	0		1	Volatile Organic Compounds	Hea 03	
	2		2	Inclusive Design	Hea 04	
	2		2	Ventilation (M) (Need 1 for Excellent)	Hea 05	
	1		1	Safety (Need 1 for Excellent)	Hea 06	
	8	**11.33**	**12**	**Category 6 Totals**		
Management	3		3	Home User Guide	Man 01	12
						(1.09)
	2		2	Responsible Construction Practices	Man 02	
	1		1	Construction Site Impacts	Man 03	
	2		2	Security	Man 04	
	1		1	Protection & Enhancement of Ecological Features	Man 05	
	2		2	Project Management	Man 06	
	11	**12.00**	**11**	**Category 7 Totals**		
Innovation			1	Responsible Construction Practices	Man 02	Innovation
			1	Protection & Enhancement of Ecological Features	Man 05	
			1	Inclusive Design	Hea 04	
			1	Surface Water Runoff	Pol 02	
	0	**0.00**	**4**	**Category 8 Totals**		
Innovation	4		**10**	Innovation	Inn 01	10
	79.5	**73.16**	**Assessment Totals**			
(M) denotes issues with n	LEVEL	Excellent				

BREEAM:
Pass - 30
Good - 45
Very Good - 55
Excellent - 70
Outstanding - 85

Appendices

Appendix C - BREEAM (Retail)

106610/LA/120207 Issue 08

Centre Point BREEAM NC 2011 (Pre-Assessment) RETAIL

Shell & Core Assessment

Result 62.31% VERY GOOD

+ Innovation Credits = 64.31% VERY GOOD

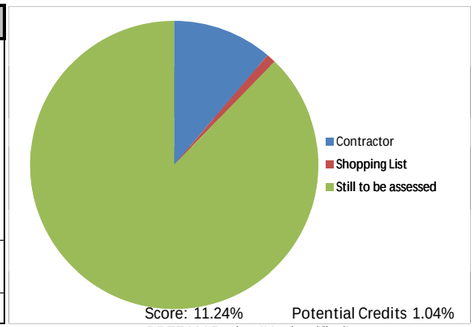
BRE deems credit compliance influenced by fit-out spec / lease agreement with the incoming tenant

Grontmij

Principal Action / Responsibility

Principal Contractor

Credit Ref	No. Credits	Title	Credit Criteria / Question	Credit/s Sought		Shopping List		Unlikely	% Each Credit Worth to Overall Score
Man 01	1	Sustainable Procurement	Principal Contractor to be appointed to undertake a thermographic survey of completed building and any defects uncovered are to be remediated	✓	1		0		0.545%
Man 02	2	Responsible Construction Practices	Will the Principal Contractor commit to achieving certification under the Considerate Constructors Scheme. And Score >32 points	✓	2		0		
Man 03	5	Construction Site Impacts	Site energy and water consumption to be metered/monitored	✓	5		0		
			Transport of construction materials and wate to/from site to be measured/monitored	✓					
			Timber to be sourced in accordance with the Government's Timber Procurement Policy	✓					
			Principal Contractor sould operate a compliance Environmental Management System	✓					
			The Principal Contractor should adopt best practice pollution prevention polices and procedures	✓					
Mat 03	3	Responsible Sourcing	Specification of responsibly sourced materials for key building elements	✓	2	✓	1		1.04%
Mat 04	1	Insulation	All building insulating materials to be responsibly sourced	✓	1		0		
Wst 01	4	Construction Waste Management	Resource efficiency via effective management and reduction of construction waste	✓	3	×	0		1.25%
				TOTALS	11.24%	1.04%			



Score: 11.24% Potential Credits 1.04%

BREEAM Rating 'Unclassified'

Pass - 30%, Good - 45%, Very Good - 55%, Excellent - 70%, Outstanding 85%

Principal Action / Responsibility

Structural Engineer

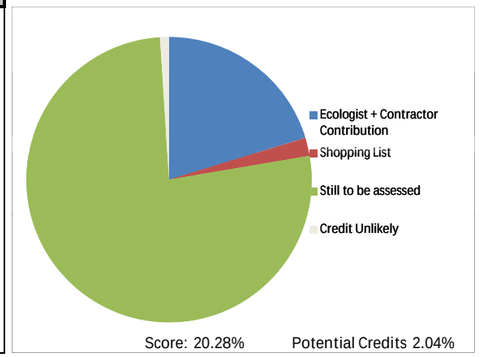
Credit Ref	No. Credits	Title	Credit Criteria / Question	Credit/s Sought		Shopping List		Unlikely	% Each Credit Worth to Overall Score
Wst 02	1	Recycled Aggregates	Specification of recycled and secondary aggregates, reducing the demand for virgin materials. >25% by weight or volume of the total high-grade aggreate specified for the development	×	1	✓	0		1.04%
				TOTALS	1.04%	0.00%			

Principal Action / Responsbility

Ecological Consultant / (Client)

Credit Ref	No. Credits	Title	Credit Criteria / Question	Credit/s Sought		Shopping List		Unlikely	% Each Credit Worth to Overall Score
LE 01	2	Site Selection	Ecologist confirms that at least 75% of the proposed development's footprint will be located on previously developed land	✓	1		0		1.00%
			Confirmation that the site was deemed significantly contaminated	×	0		0	✓	
LE 02	1	Ecological Value of the Site & Protection of Ecological Features	Ecologist confirms that the land is defined as 'Land of low ecological value'	✓	1		0		
			Ecologist & client confirm that all features of ecological value surrounding the construction zone / site boundary are suitably protected	✓					
LE 03	2	Mitigating Ecological Impact	Ecologist confirms that there has been no negative change or improvement in plant species richness due to the development	✓	2		0		
LE 04	3	Enhancing Site Ecology	Confirmation that a suitably qualified Ecologist is appointed	✓	2	✓	1		
			Confirmation from the client that the ecologist's recommendations are implemented						
			Confirmation that the ecological value of the site has increased. >6 species 3no. Credits. <6no. Species 2no. Credits						
LE 05	2	Long Term Impact on Biodiversity	Ecologist confirms that all relevant UK and EU legislation relating to protection and enhancement of ecology has been complied with during the design and construction process.	✓	2		0		
			A landscape and habitat management plan, appropriate to the site, is produced covering at least the first five years after project completion. This should be handed to the building occupants and includes: Management of any protected features on site. Management of any new, existing or enhanced habitats. A reference to the current of future site level or local Biodiversity Action Plan.	✓			0		
				TOTALS	8.00%	1.00%			

Accumulative Pie Chart



Score: 20.28% Potential Credits 2.04%

BREEAM Rating 'Unclassified'

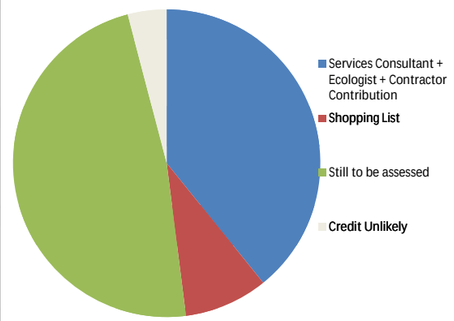
Pass - 30%, Good - 45%, Very Good - 55%, Excellent - 70%, Outstanding 85%

Principal Action / Responsbility
Services Consultant

Credit Ref	No. Credits	Title	Credit Criteria / Question	Credit/s Sought		Shopping List		Unlikely	% Each Credit Worth to Overall Score
Hea 01	2	Visual Comfort	Confirmation that daylighting, views out, internal blinds and internal lighting is in compliance with BREEAM requirements	✖	0	✓	2		
Hea 02	2	Indoor Air Quality	Production of an air quality plan & confirmation of air intake and exhaust locations which should be further than BRE stated criteria	✖	0	✓	2		
			Confirmation that the occupied spaces have a degree of openable windows to provide adequate natural ventilation in accordance with CIBSE guidelines	✖					
Hea 03	2	Thermal Comfort	Confirmation that dynamic thermal modelling will be carried out	✓	2		0		1.00%
			Confirmation that the modelling will inform the development of a thermal zoning and control strategy						
Hea 04	1	Water Quality	Confirmation that all water systems be design to comply with the relevant HSE Approved Code of Practice and Guidance. If humidifying, failsafe humidification specified. Wholesome supply of accessible clean and fresh drinking water to be supplied for the building user	✓	1		0		
Ene 01	15	Reduction of CO2 Emissions	Dynamic Thermal Modelling results using approved software to indicate a % reduction against the notional building Target Emission Rate	✓	6		0		
Ene 02	2	Energy Monitoring	Confirmation that a BMS or sub-meters be specified to monitor energy use from major building services systems	✓	2		0		
Ene 04	5	Low and Zero Carbon Technology	Confirmation of a feasibility study into renewable & low carbon technologies	✓	1		0		0.66%
			Confirmation of the percentage of carbon reduced due to renewable and/or low carbon technologies						
			2 Credits = 10% reduction						
			3 Credits = 20% reduction						
			Exemplary level = 30% reduction (Innovative Credit)						
			Confirmation of the adoption of 'Free Cooling' technology						
Ene 06	2	Energy Efficient Transportation Systems	Confirmation that a transportation system analysis has been carried out to optimise number and size of lifts. Also that energy efficient features proposed under the BREEAM criteria have been adopted (e.g. Regenerative Unit, PIRs)	✓	2		0		
Wat 01	5	Water Consumption	Confirmation of any rainwater harvesting or grey water recycling	✓	2	✓	3		0.67%
			Water efficient fittings to be agreed with architect						
Wat 02	1	Water Monitoring	Confirmation that there will be a water meter installed on the mains water supply to the building. Metering to be included to relevant plant items. The water meters to have a pulse output and be connected to the BMS	✓	1		0		
			Sanitary supply shut off valves to all toilets	✓					
Wat 03	2	Water Leak Detection	Confirmation that a mains water leak detection system be installed on the building's water supply	✓	2		0		
Wat 04	1	Water Efficient Equipment	Confirmation that irrigation for ecology will be via rainwater harvesting	✓	1		0		
Pol 01	3	Impact of Refrigerants	Confirmation that the refrigerant specified will have a global warming potential of less than 10	✖	0		0	✓	0.77%
			State the target range of Direct Effect Life Cycle CO2 eq. emissions	✖	0		0	✓	
			Will a suitable refrigerant leak detection system and containment system by specified	✓	1		0	✓	
Pol 02	3	NOx Emissions	Calculate the target/maximum Nox emission level for the space heating/cooling system	✖	1		0	✓	
			Calculate the target/maximum Nox emission level for the water heating system	✖					
Pol 03	5	Surface Water Run Off	Confirmation that the site is in an area with low annual probablility of flooding	✓	4	✓	1		
			Also, that a compliant flood risk assessment will be carried out						
			That the site meets the BREEAM criteria for peak rate surface water run off	✓					
			Surface water run off attenuation and/or limiting discharge is designed	✓					
			Site has been designed to minimise watercourse pollution	✓					

TOTALS 18.90% 6.78%

Accumulative Pie Chart



Score: 39.18% Potential Credits 8.82%

BREEAM Rating 'Pass'

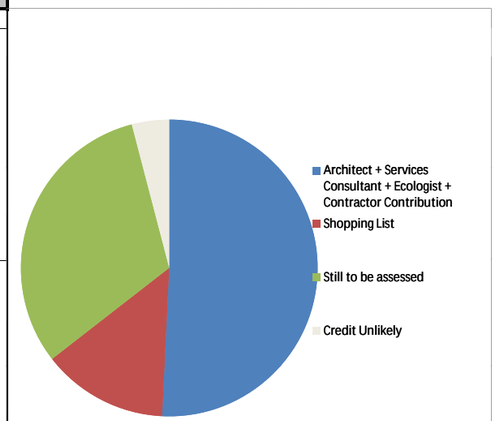
Pass - 30%, Good - 45%, Very Good - 55%, Excellent - 70%, Outstanding 85%

Principal Action / Responsbility
Architect

Credit Ref	No. Credits	Title	Credit Criteria / Question	Credit/s Sought		Shopping List		Unlikely	% Each Credit Worth to Overall Score
Tra 01	5	Public Transport Accessibility	Site plan with transport node distances from building entrance annotated in metres. Transport node timetables to indicate frequency of service etc..	✓	5		0		0.89%
Tra 02	1	Proximity to Amenities	Marked up site plan highlighting the location and type of amentities. The route to the amenities. Distance travelled to those amenities. The building should have 8 of the following amenities within 1000m to award the credit. (Grocery shop or food outlet, Post box, Cash Machine, Pharmacy, GP surgery/medical centre, Leisure/sport centre, Outdoor open lublic access area, Public house, Community Centre, Place of worship)	✓	1		0		
Tra 03	2	Cyclist Facilities	Architect to provide evidence that the acceptable number of compliant cycle spaces and also compliant facilities will be provided. i.e. showers, changing facilities etc..	✓	0	✓	2		
~~Tra 04~~	~~0~~	~~Maximum Car Parking Capacity~~	~~Architect to make known the number of car parking facilities being provided by way of drawings or documentation. The number should not exceed 1 person per 6 building users~~	n/a			0		
Mat 01	5	Life Cycle Impacts	Confirmation to be provided of the materials proposed and their embodied impact as defined within the 'Green Guide to Specification'. External walls, windows, roof, upper floor slab construction, internal walls & floor finishes/coverings to be assessed	✓	2	✓	3		1.04%
Mat 02	1	Hard Landscaping and Boundary Protection	Evidence to be provided that greater than or equal to 80% of all external hard landscaping and boundary protection achieve a Green Guide A or A+ rating	✓	0		0		
Mat 04	1	Insulation	Any new insulation specified for use within external walls, ground floor and roof should generally be an 'A' rated material as defined within the 'Green Guide to Specification'	✓	2		0		
Mat 05	1	Designing for Robustness	Architect to provide evidence that suitable durability/protection measures have been specified and installed to vulnerable areas of the building	✓	1		0		
Wst 03	1	Operational Waste	Architect to provide evidence that there is dedicated space (s) to cater for the segregation and storage of operational recyclable waste volumes generated. A minimum of $10m^2$ for buildings >$5000m^2$. An additional $2m^2$ per $1000m^2$ of net floor area where catering is provided (with an additional minimum of $10m^2$ for buildings >$5000m^2$)	✓	1		0		1.04%

TOTALS 11.59% 4.91%

Accumulative Pie Chart



Score: 50.77% Potential Credits 13.73%

BREEAM Rating 'Very Good'

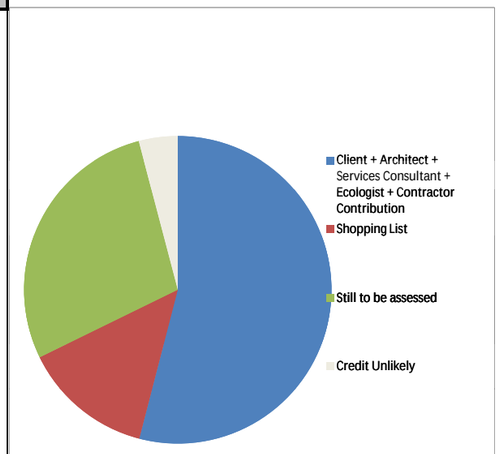
Pass - 30%, Good - 45%, Very Good - 55%, Excellent - 70%, Outstanding 85%

Principal Action / Responsbility
Client

Credit Ref	No. Credits	Title	Credit Criteria / Question	Credit/s Sought		Shopping List		Unlikely	% Each Credit Worth to Overall Score
Man 01	5	Sustainable Procurement	The client confirms that from RIBA Stage B (Design Brief) or equivalent the client, building occupier, design team and contractor are involved in contributing to the **decision making process for the project. As a minimum this includes meeting to** identify and define their roles, responsbilities and contributions during design, construction, Commissioning and handover upto occupation (Stage L) Also confirmation that a schedule of training is identified for relevant building occupiers including the building users guide, clear design strategy, installed system maintenance, operation, replacement and repair and training responsibilities Appointment of a BREEAM AP from RIBA Stage C through to RIBA Stage L who will attend key client progress meetings Client appoints a member of the design team to oversee Commissioning. All commissioning is to be carried out in line with current Building Regulations, BSRIA and CIBSE Guidelines	✓	3		0		0.545%
Man 04	3	Stakeholder Participation	During prepartion of the brief, all relevant partieis and relevant bodies are identified and consulted with by the design team. (Relevant bodies are - Actual intended building users, representative consultation group from the existing community, existing partnerships and networks that have knowledge and experience from existing buildings of the same type, potential users of any shared facilities e.g. operators of clubs and community groups) A consultation plan should have been prepared and includes a timescale and methods of consultation for all relevant parties/bodies and how the relevant parties will be kept informed about progress. Consultation feedback has been given with suggestions made, including how the results of the consultation process have influenced the proposed design The project team ensures that through consultation and the resulting measures **taken any areas of features of historic/heritage value are protected**.	✓	1		0		
			Confirmation that the building is designed to be fit for purpose (appropriate and accessible by all potential users. Hence, development of an access statement in line with the CABE publication, 'Design & Access Statements, How to write, read and use them', based on the principles of inclusive design	✓	1		0		
			Confirmation that a 'Building Users Guide' for the non-technical facilities manager, building staff and users is commissioned	✓	1		0		
~~Wst 04~~	~~0~~	~~Speculative Floor and Ceiling Finishes~~	~~Where the future occupant is not known, carpets, other floor finishes and ceiling finishes are installed in a show area only~~	n/a			0		1.07%

TOTALS 3.27% 0.00%

Accumulative Pie Chart



Score: 54.04% Potential Credits 13.73%

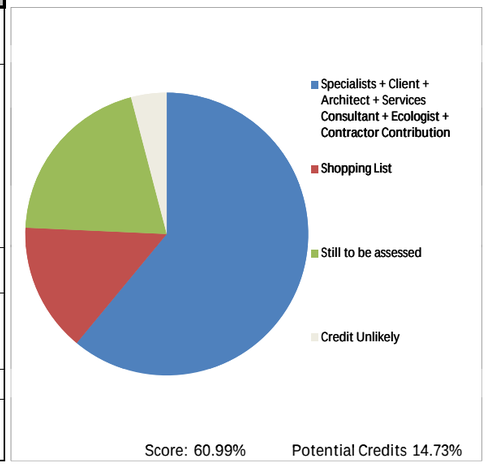
BREEAM Rating 'Very Good'

Pass - 30%, Good - 45%, Very Good - 55%, Excellent - 70%, Outstanding 85%

Principal Action / Responsbility
Specialists / Others

Credit Ref	No. Credits	Title	Credit Criteria / Question	Credit/s Sought		Shopping List		Unlikely	% Each Credit Worth to Overall Score
Man 05	3	Life Cycle Cost & Service Life Planning (Cost Consultant)	A Life Cycle Cost analysis should be undertaken at Stage C / D A strategic and system level Life Cycle Cost Analysis is undertaken A technical design Life Cycle Cost Analysis is undertaken Stages D / E	✓	3		0		0.545%
Hea 05	2	Acoustic Performance (Acoustic Consultant)	The suitably qualified acoustic consultant needs to provide evidence/calculations which show compliance with the relevant BREEAM criteria	✓	2		0		1.00%
Hea 06	2	Safety and Security (Security Consultant)	Confirmation should be provided which shows compliance with the BREEAM criteria in respect to cycle lane & pedestrian access routes. Compliant lighting levels to these routes and the designated goods delivery are not directly accessed through general parking areas and do not cross or share pedestrian and cyclist routes Consultation with a suitably qualified security consultant should have taken place at RIBA Stage C. The final design should reflect the recommendations/solutions and built to conform to either, Secured by Design and/or Safer Parking (SP) Scheme.	✖ ✓	1	✓	1		
Ene 03	1	External Lighting (Lighting Specialist)	External light fittings and controls to be in accordance with BREEAM criteria. Efficacy and either daylight sensing and/or timed control to prevent lighting being on during daylight hours	✓	1		0		0.66%
Ene 04	(Credits taken elsewhere)	Low & Zero Carbon Technologies	A feasibility Study including a Life Cycle Assessment of the carbon impact of the chosen Low or Zero Carbon system (s) is undertaken accounting for its embodied carbon emissions and operational carbon savings and emissions, and this method of supply results in a reduction in life cycle CO2 emissions >20%	✖	(Credits taken elsewhere)		0		-
Tra 05	1	Travel Plan (Architect Sub-Consultant)	Copy of a compliant transport plan based on site specific travel survey / assessment having been developed	✓	1		0		0.89%
Pol 04	1	Reduction of Night Time Light Pollution (Lighting Specialist)	Confirmation to be provided that external lighting is designed in compliance with the ILE Guidance notes for the reduction of Obtrusive Light, 2005	✓	0		0		0.77%
Pol 05	1	Noise Attenuation (Acoustic Consultant)	Noise impact assessment to be carried out and acoustic consultant recommendations on attenuation measures to be adopted	✓	1		0		

Accumulative Pie Chart



Score: 60.99% Potential Credits 14.73%

TOTALS 6.96% 1.00%

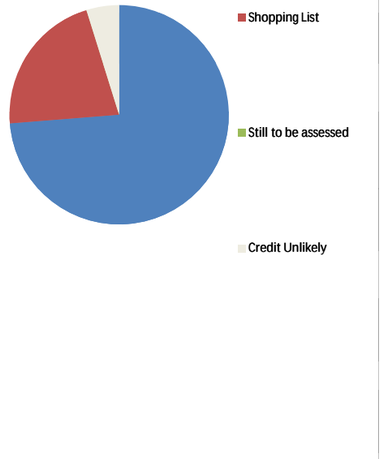
BREEAM Rating 'Very Good'

Pass - 30%, Good - 45%, Very Good - 55%, Excellent - 70%, Outstanding 85%

Principal Action / Responsbility
Incoming Tenants

Credit Ref	No. Credits	Title	Credit Criteria / Question	Credit/s Sought		Shopping List		Unlikely	% Each Credit Worth to Overall Score	
									Tenancy Agreement	Green Building Guide
Man 01	2	Sustainable Procurement	Seasonal commissioning to be undertaken to ensure that building services systems are operating as designed and at peak efficiencies. Defects to be actioned as found Water/energy consumption data to be recorded for at least 12 months after occupation. Analysis against expected design data. Analyse any discrepancies with a view of adjusting systems if not operating as expected/designed. Contract in place to provide aftercare support for the building occupiers - Training of key systems. On-site attendance on a weekly basis for at least 4 weeks after handover. Longer term after care e.g. a helpline or nominated individual to support building users for at least the first 12 months of occupation Innovation - Commitment or contract for the facilities manager or equivalent to undertake at quarterly intervals for the first 3 years after occupation: - Collect the occupant satisfaction, energy and water consumption data - Utilise data to check the building is performing as expected, making adjustments as necessary - Set targets for reducing water and energy consumption and monitor progress - Feedback any 'lessons learned' to the design team and developer - Provision of the actual annual building energy, water consumption and occupant satisfaction data to the BRE	✖	0	✓	2		0.545%	0.27%
Man 04	1	Stakeholder Participation	Commitment is made to carry out a Post Occupancy Evaluation one year after building occupation, to gain building performance feedback. This should be carried out by an independent third party	✖	0		0			n/a
Hea 01	2	Visual Comfort	Confirmation that all fluorescent lamps be fitted with high frequency ballasts All internal and external lighting be specified in accordance with the relevant CIBSE Guides/British Standards Internal blinds or curtains be fitted to prevent glare on all facades	✖	0	✓	2		1.00%	0.54%
Hea 02	2	Indoor Air Quality	Confirmation that the relevant products be specified to meet the emission levels for Volatile Organic Compounds And that post construction, formaldehyde and total VOC levels are measured	✖	0	✓	2			
Ene 05	2	Energy Efficient Cold Storage	Confirmation that the refrigeration system be designed, installed and commissioned in accordance with BREEAM criteria That the refrigeration system demonstrate a saving in indirect greenhouse gas emissions That the refrigeration system be a type described as a 'Future Technology' in the Refrigeration Road Map	✖	0	✓	2		0.66%	0.35%
Ene 08	2	Energy Efficient Equipment	Confirmation that fridges (white goods) are all recommended by the Energy Savings Trust website Confirmation where a kitchen and catering facilities has incorporated at least one energy efficiency measure outlined in each of the following sections of CIBSE Guide TM50, Sections 8, 9, 11, 12, 13, 14, 15)	✖	2	✓	0			

Accumulative Pie Chart



Score: 62.31% Potential Credits 18.11%

TOTALS 1.32% 3.38%

BREEAM Rating 'Very Good'

Note: Excellent can be sought if 'Incoming Tenant' commits to certain credit criteria and other 'shopping list' credits are targeted and satisfied

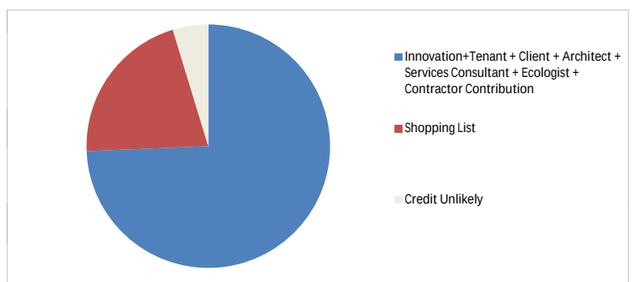
Credits also influenced by the Incoming Tenant

Hea 03	2	Thermal Comfort	Confirmation that dynamic thermal modelling will be carried out	All Credits Assessed above within the 'Shell & Core' section. The BRE deem these credits to be influenced by the 'fit-out' hence, careful consideration should be given to these credits
			Confirmation that the modelling will inform the development of a thermal zoning and control strategy	
Hea 04	1	Water Quality	Confirmation that all water systems be design to comply with the relevant HSE Approved Code of Practice and Guidance. If humidifying, failsafe humidification specified. Wholesome supply of accessible clean and fresh drinking water to be supplied for the building user	
Ene 01	15	Reduction of CO2 Emissions	Dynamic Thermal Modelling results using approved software to indicate a % reduction against the notional building Target Emission Rate	
Ene 02	2	Energy Monitoring	Confirmation that a BMS or sub-meters be specified to monitor energy use from major building services systems	
Ene 04	5	Low and Zero Carbon Technology	Confirmation of a feasibility study into renewable & low carbon technologies	
			Confirmation of the percentage of carbon reduced due to renewable and/or low carbon technologies	
			2 Credits = 10% reduction	
			3 Credtis = 20% reduction	
			Exemplary level = 30% reduction (Innovative Credit)	
			Confirmation of the adoption of 'Free Cooling' technology	
Ene 06	2	Energy Efficient Transportation Systems	Confirmation that a transportation system analysis has been carried out to optimise number and size of lifts. Also that energy efficient features proposed under the BREEAM criteria have been adopted (e.g. Regenerative Unit, PIRs)	
Ene 08	1	Energy Efficient Equipment	Confirmation that the swimming pool has an automatic or semi-automatic pool cover	
Wat 01	5	Water Consumption	Confirmation of any rainwater harvesting or grey water recycling	
			Water efficient fittings to be agreed with architect	
Wat 02	1	Water Monitoring	Confirmation that there will be a water meter installed on the mains water supply to the building. Metering to be included to relevant plant items. The water meters to have a pulse output and be connected to the BMS	
			Sanitary supply shut off valves to all toilets	
Wat 03	1	Water Leak Detection	Confirmation that a mains water leak detection system be installed on the building's water supply	
Pol 01	3	Impact of Refrigerants	Confirmation that the refrigerant specified will have a global warming potential of less than 10	
			State the target range of Direct Effect Life Cycle CO2 eq. emissions	
			Will a suitable refrigerant leak detection system and containment system by specified	
Pol 02	3	NOx Emissions	Calculate the target/maximum Nox emission level for the space heating/cooling system	
			Calculate the target/maximum Nox emission level for the water heating system	
~~Ene 09~~	~~1~~	~~Drying Space~~	~~Confirmation of internal / external drying space for fixing of clothes/towels~~	
Tra 03	2	Cyclist Facilities	Architect to provide evidence that the acceptable number of compliant cycle spaces and also compliant facilities will be provided. i.e. showers, changing facilities etc..	
Tra 04	2	Maximum Car Parking Capacity	Architect to make known the number of car parking facilities being provided by way of drawings or documentation. The number should not exceed 1 person per 6 building users	
Mat 04	1	Insulation	Any new insulation specified for use within external walls, ground floor and roof should generally be an 'A' rated material as defined within the 'Green Guide to Specification'	
Mat 05	1	Designing for Robustness	Architect to provide evidence that suitable durability/protection measures have been specified and installed to vulnerable areas of the building	
Wst 03	1	Operational Waste	Architect to provide evidence that there is dedicated space (s) to cater for the segregation and storage of operational recyclable waste volumes generated. A minimum of $10m^2$ for buildings >$5000m^2$. An additional $2m^2$ per $1000m^2$ of net floor area where catering is provided (with an additional minimum of $10m^2$ for buildings >$5000m^2$)	
Ene 03	1	External Lighting (Lighting Specialist)	External light fittings and controls to be in accordance with BREEAM criteria. Efficacy and either daylight sensing and/or timed control to prevent lighting being on during daylight hours	
Pol 04	1	Reduction of Night Time Light Pollution (Lighting Specialist)	Confirmation to be provided that external lighting is designed in compliance with the ILE Guidance notes for the reduction of Obtrusive Light, 2005	
Pol 05	1	Noise Attenuation (Acoustic Consultant)	Noise impact assessment to be carried out and acoustic consultant recommendations on attenuation measures to be adopted	

Innovation Credits Targetted

Man 01	1	Sustainable Procurement	No	0
Man 02	1	Responsible Construction	Yes	1
Hea 01	1	Visual Comfort	No	0
Ene 01	5	CO2 Emission Reduction	No	0
Ene 04	1	Low & Zero Carbon	No	0
Ene 05	1	Energy Efficiency Cold Storage	No	0
Wat 01	1	Water Consumption	Yes	0
Mat 01	1	Life Cycle Impacts	No	0
Mat 03	1	Responsible Sourcing	No	0
Wst 01	1	Construction Waste Management	Yes	1
Wst 02	1	Recycled Aggregates	No	0

Total Innovation Credits 2%



Score: 64.31% Potential Credits 18.11%

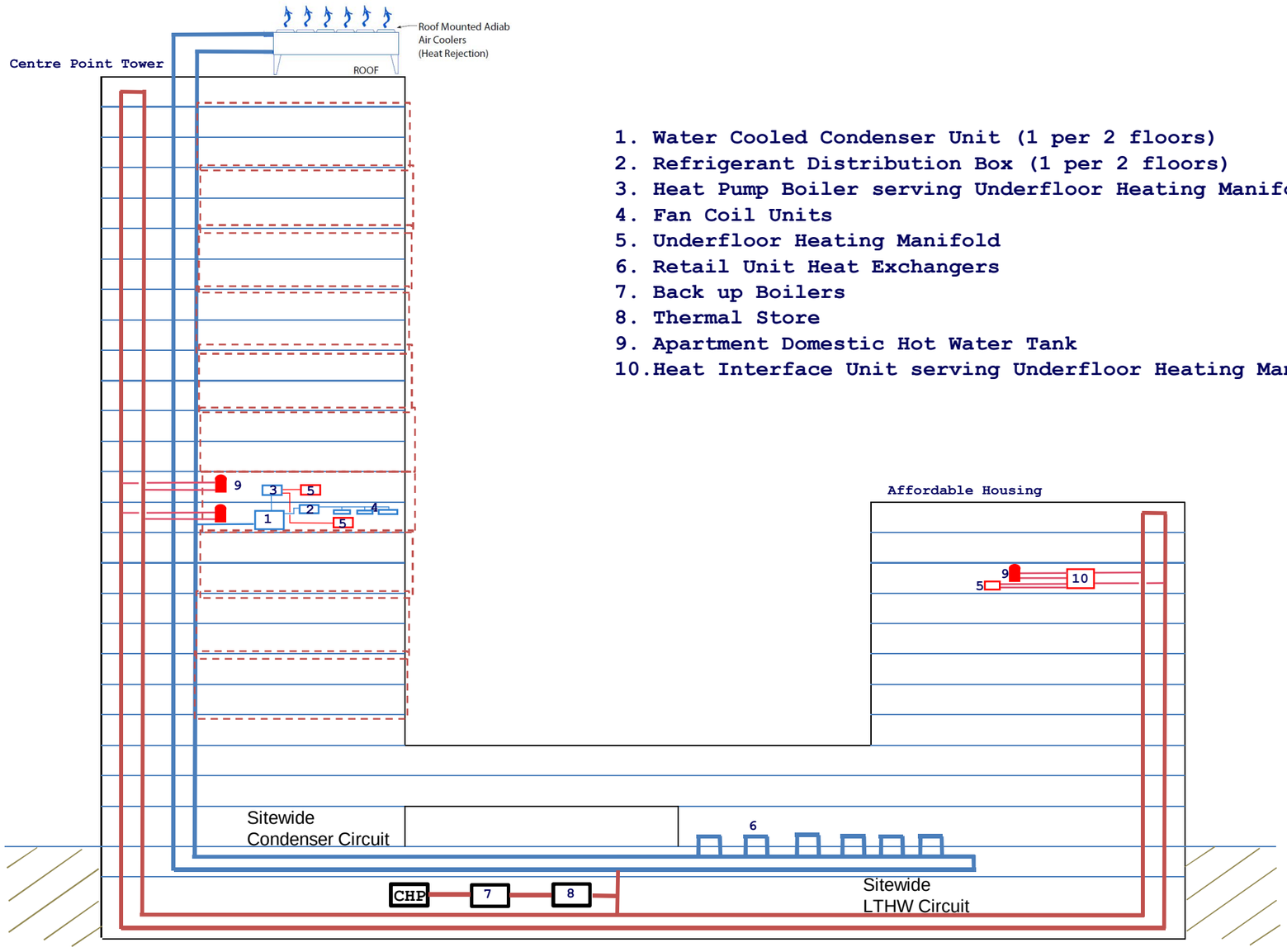
BREEAM Rating VERY GOOD

Appendices

Appendix D - Energy Schematic

106610/LA/120207 Issue 08

Centre Point Energy Strategy



1. Water Cooled Condenser Unit (1 per 2 floors)
2. Refrigerant Distribution Box (1 per 2 floors)
3. Heat Pump Boiler serving Underfloor Heating Manifold (1per 2 floors)
4. Fan Coil Units
5. Underfloor Heating Manifold
6. Retail Unit Heat Exchangers
7. Back up Boilers
8. Thermal Store
9. Apartment Domestic Hot Water Tank
10. Heat Interface Unit serving Underfloor Heating Manifold and Hot Water Tank

Appendices

Appendix E - CHP Analysis

106610/LA/120207 Issue 08

CHP Analysis

Centre Point

106610/LA/130221
Revision 01

Grontmij

Issue	Date	Reason for Issue	Prepared		Checked		Approved	
01	February 2013	For comment	LA		SC		NDB	
02	March 2013	Incorporating comments from team	LA	27/03	SC	27/03	NDB	27/03

CHP Analysis
106610/LA/130221
Revision 01

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value beyond engineering

Contents

1. Executive Summary

A Combined Heat & Power (CHP) unit is proposed for Centre Point. A detailed study has been undertaken to establish the likely performance of the unit. The results of this study are presented in this report.

Load profiling has been conducted to establish the optimal size and running patterns of the CHP. In addition, a thermal storage vessel will enable the CHP to run for extended hours by acting as a load on the CHP during low building load conditions. During high building load conditions, the thermal storage will then revert to acting as a boiler, injecting heat into the building when conditions require.

After detailed study of thermal loads, it is proposed that the following CHP unit will be most suitable to the application:

- Electrical output, kWe = 105kW
- Thermal output, kWth = 146kW
- Electrical efficiency = 32.7%
- Thermal efficiency = 45.5%
- Overall efficiency = 78.2%
- Heat-to-power ratio = 1.39

One number cylindrical water thermal storage tanks with height 3.0m and diameter 3.0m will provide thermal storage of approximately 500kWh.

2. Loads Serviced

Direct servicing of loads by the CHP via LTHW circuits will apply to the following loads:

- Domestic Hot Water: residential units in Centre Point Tower and the Pub site; the leisure pool facilities; and the A1 retail areas
- Air Heating: residential public spaces on ground floor; the Leisure pool facilities
- Space Heating: Leisure pool facilities

Indirect servicing of loads by the CHP via condenser water-loop circuits will apply to the following loads:

- Air Heating: A1 retail units
- Space Heating: residential units in Centre Power Tower and The Pub site; and A1 retail units

2.1 Typical Winter Day Loads

Various sources of heat demand are considered for a typical winter day. These are displayed here grouped by area type, and by load type.

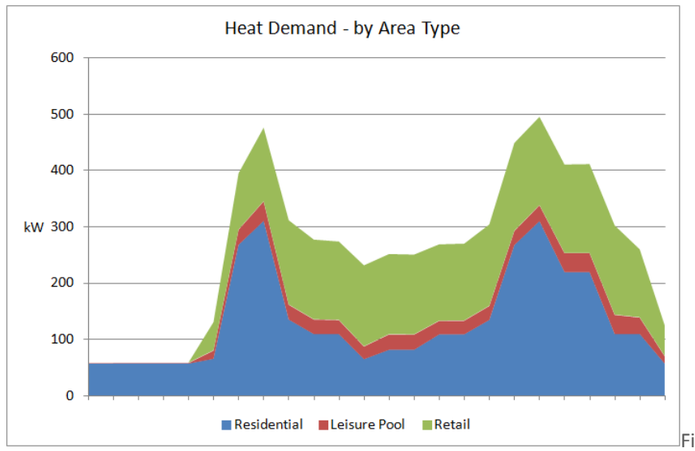

Fig 2.1.1

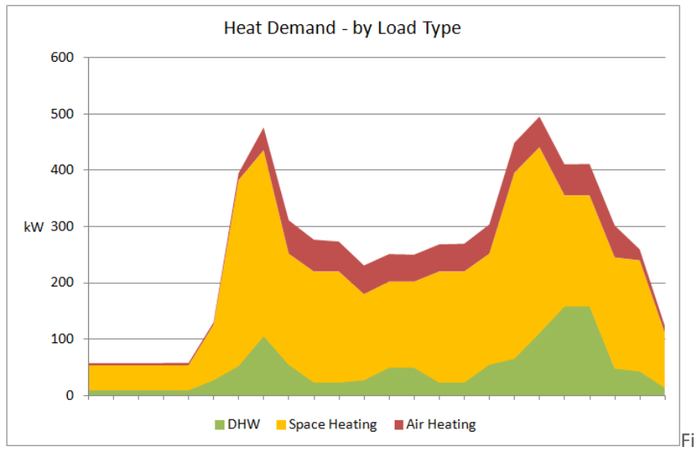

Fig 2.1.2

Not all the heat loads opposite will be served by the CHP alone, since the condenser water loop circuit will allow for the efficient transfer of unwanted heat from one part of the development (e.g. retail space) to another part of the development where heat is required (e.g. residential space heating). The following indicates the loads which the CHP will be expected to serve.

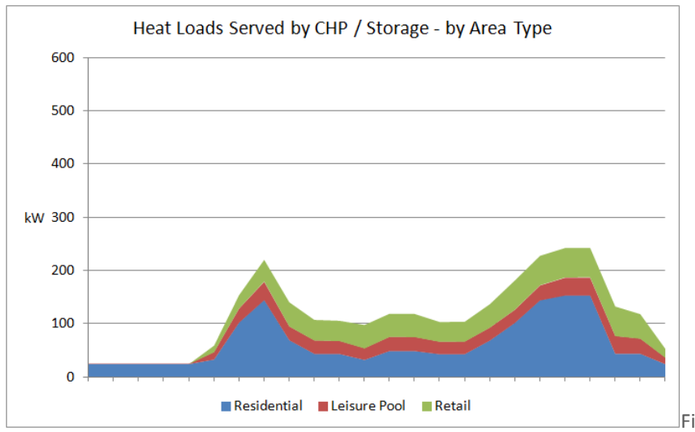

Fig 2.1.3

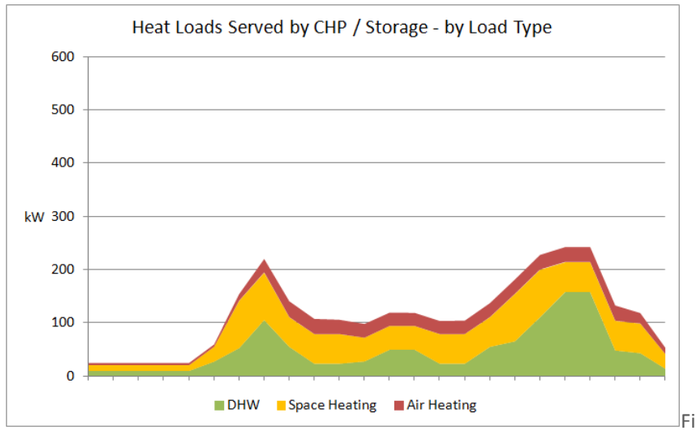

Fig 2.1.4

2.2 Typical Midseason Day Loads

Various sources of heat demand are considered for a typical midseason day. These are displayed here grouped by area type, and by load type.

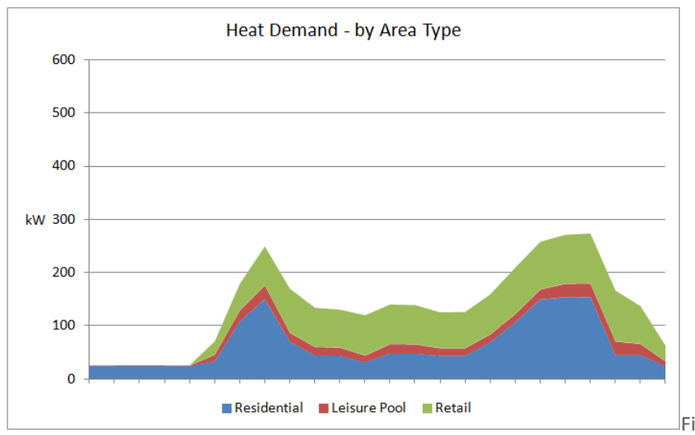

Fig 2.2.1

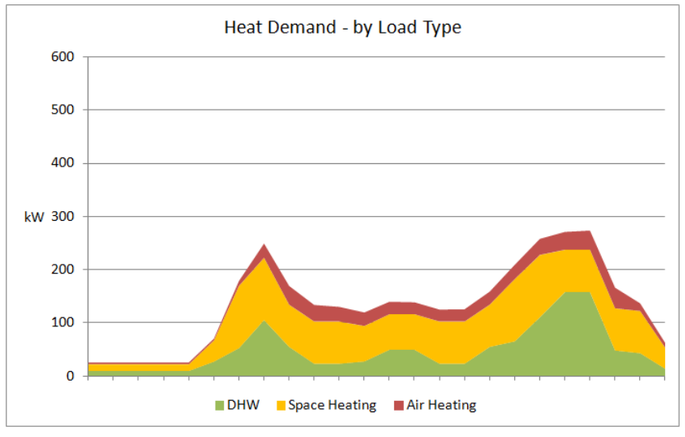

Fig 2.2.2

As in winter, not all the heat loads opposite will be served by the CHP alone, since the condenser water loop circuit will allow for the efficient transfer of unwanted heat from one part of the development (e.g. retail space) to another part of the development where heat is required (e.g. residential space heating). The following indicates the loads which the CHP will be expected to serve.

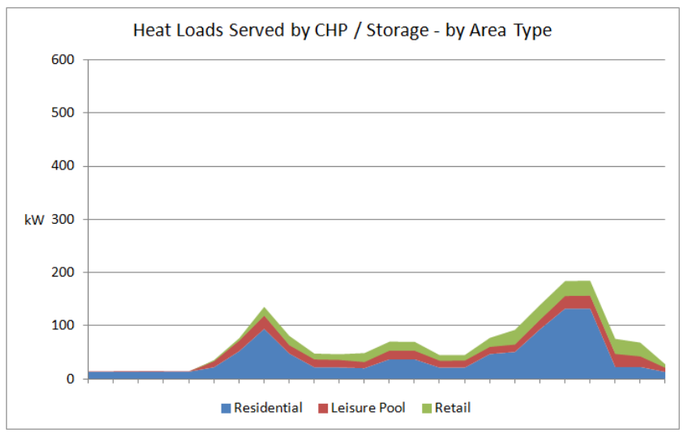

Fig 2.2.3

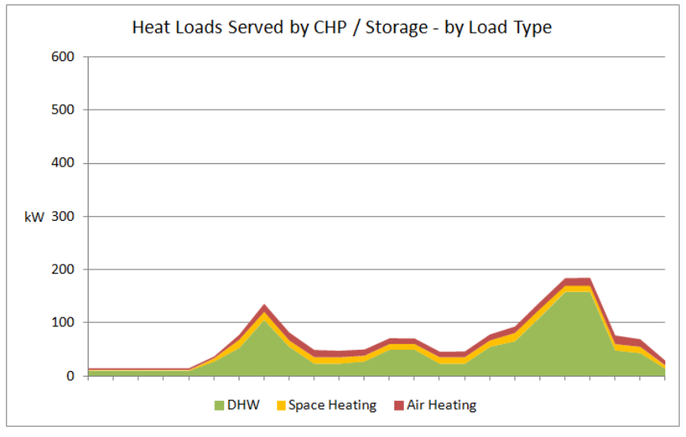

Fig 2.2.4

2.3 Typical Summer Day Loads

Various sources of heat demand are considered for a typical summer day. These are displayed here grouped by area type, and by load type.

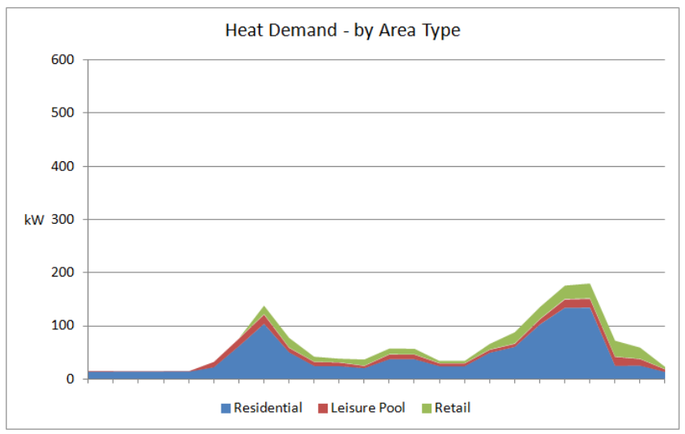

Fig 2.3.1

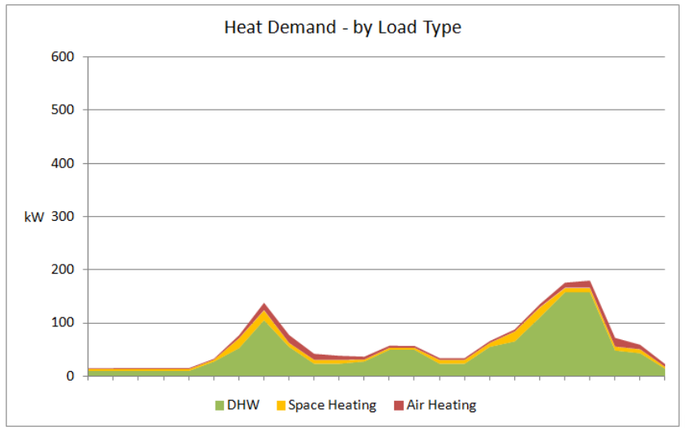

Fig 2.3.2

As in winter and midseason, not all the heat loads opposite will be served by the CHP alone, since the condenser water loop circuit will allow for the efficient transfer of unwanted heat from one part of the development (e.g. retail space) to another part of the development where heat is required (e.g. residential space heating). The following indicates the loads which the CHP will be expected to serve.

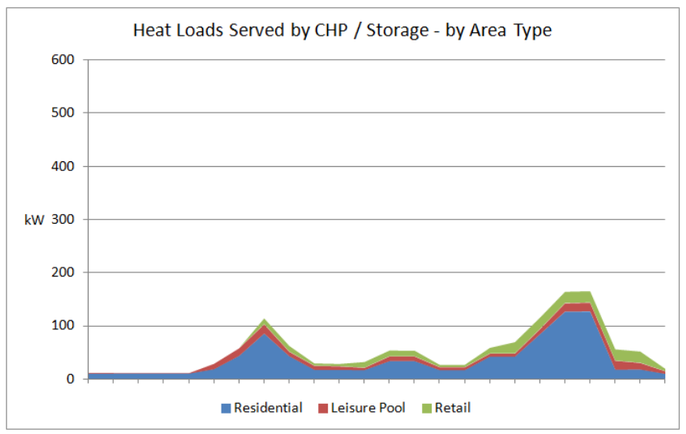

Fig 2.3.3

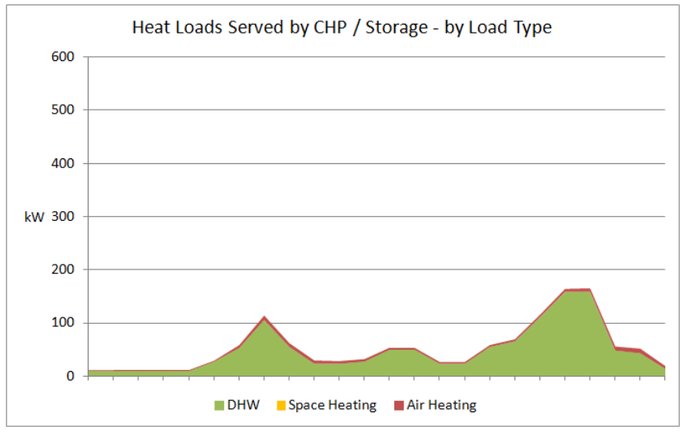

Fig 2.3.4

3. CHP Operation

The energy centre at Centre Point will utilise a CHP unit in combination with thermal storage. This will enable the CHP plant to continue running for longer during times of low load, with its heat output being stored in large buffer vessels that discharge heat, via heat exchangers, to service loads during times of high demand. The available load that the CHP/storage tanks service will vary throughout the year. Hence, the operating hours of the CHP will vary accordingly. The following is the expected operating hours of the CHP.

Season	Hours of Operation	Total
Winter	05:00 – 00:00	19
Midseason	12:00 – 21:00	9
Summer	14:00 – 21:00	7
All Year	-	4,005

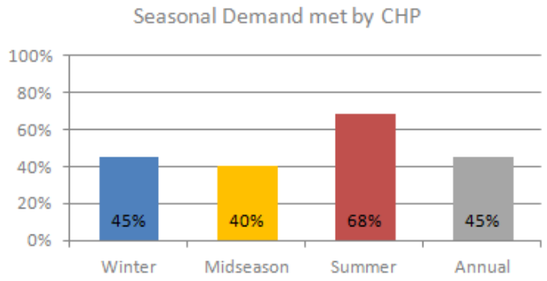

Fig 3.1

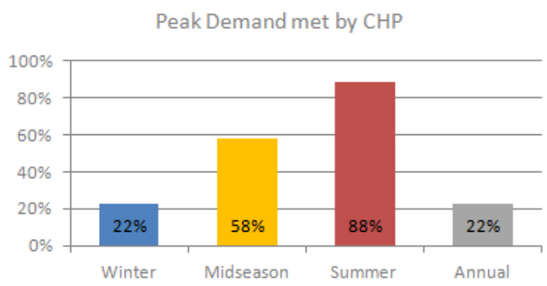

Fig 3.2

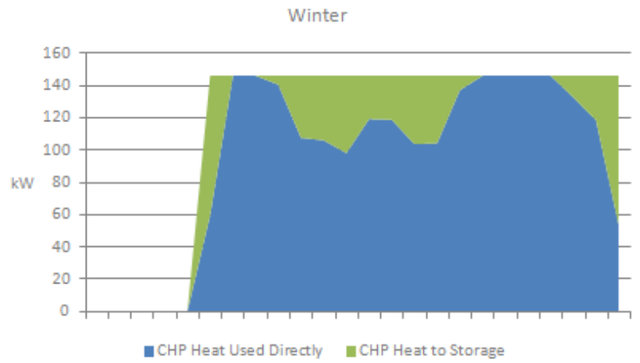

Fig 3.3

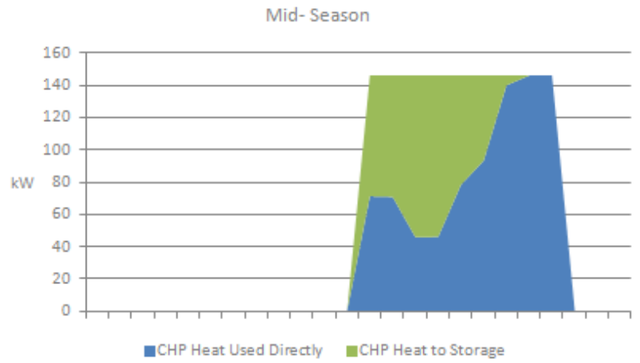

Fig 3.4

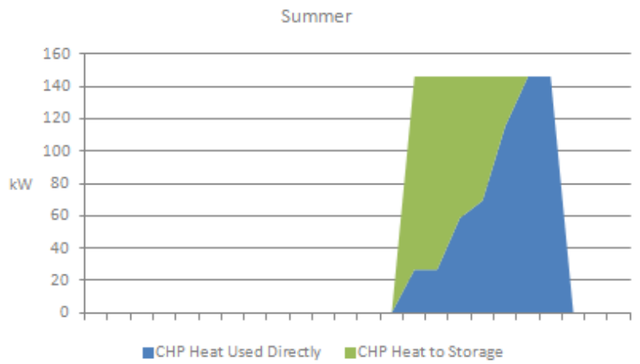

Fig 3.5

4. Thermal Storage Operation

Further analysis is concentrated on optimising the size of the CHP thermal storage tank. This storage will operate as an additional boiler in times of high heat demand, thereby supplementing the heat output from the CHP unit. In times of low heat demand, the CHP will continue running and 'recharging' the thermal storage in readiness for periods of high heat demand.

Analysis indicates one number storage tank will be required, with a water storage volume of 21m^3 (cylindrical tank approximately 3.0m high and 3.0m diameter). Operating with a delta T of 20degC between flow and return temperatures), this tank will have a thermal store capacity of 500kWh.

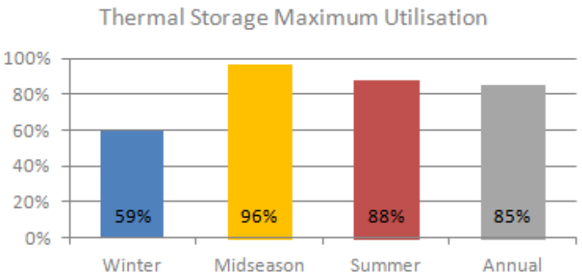

Fig 4.1

The charts opposite indicate the storage tank behaviour during typical operation.

The green areas indicate the heat in storage across each of the day types.

The blue lines indicate the cumulative heat delivered to storage across each of the day types. Note heat is only delivered to storage when the CHP is on and running at a thermal surplus – i.e. when the CHP heat output is not meeting the instantaneous loads directly.

The red lines indicate the cumulative heat extracted from storage across each of the day types. Note heat is only extracted from storage when there is storage heat available for discharge, and when the CHP is not delivering heat to storage.

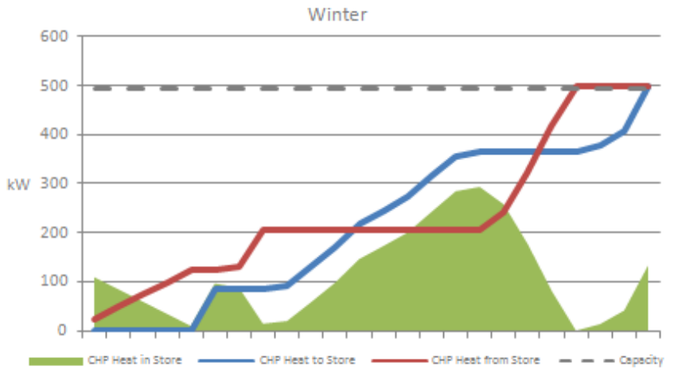

Fig 4.2

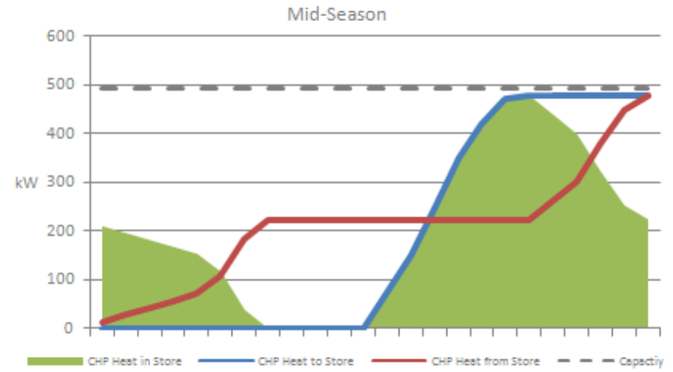

Fig 4.3

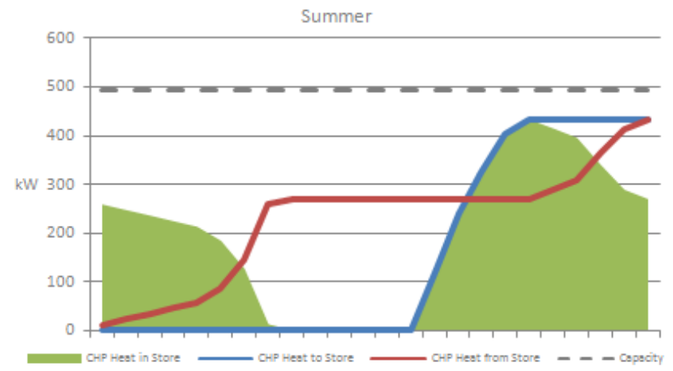

Fig 4.4