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Final Report

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BRENT COUNCIL

Sustainability Strategy
London Borough of Brent Civic Centre

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Executive Summary

Turner & Townsend have been appointed by the London Borough of Brent as sustainability consultants to produce a sustainability strategy for the new Brent Civic Centre development.

As a forward-thinking London Borough, Brent Council recognise the importance of this development and are committed to achieving a high level of sustainability, and so maximise the benefits to the local community. As such, it is important that the development does not simply comply with current and impending legislation, but also has best practice standards embedded within its design, construction and operation. This document considers associated policies and establishes key performance indicators to assist the London Borough of Brent and their appointed design teams in attaining this goal.

The document is set out to:

- Offer a description of sustainability in the context of the built environment;
- Review the legislative drivers for seeking best practice;
- Explain the impacts of climate change on the London Borough of Brent;
- Provide an overview of the London Borough of Brent's vision for sustainability;
- Outline methods for local community involvement in the project;
- Advise on the specialist consultants to be appointed;
- Produce a series of environmental key performance indicators (KPIs) to be addressed during the design stages;
- Discuss methods for monitoring environmental performance during both the construction and operation of the Civic Centre;
- Briefly explain the BREEAM 2008 method for quantifying the sustainable performance of the development and establish the minimum requirement for an 'Excellent' rating.

1 Sustainability in the Built Environment

In recent years, sustainability has been placed at the heart of UK policy, embodied by the UK Government sustainable development strategy *Securing the Future*, 2005. Sustainable development has been formalised in a range of government legislation, including the 2003 and 2007 Energy White Papers and the recent Climate Change Act, 2008, and has been integrated into planning and development policy on a national, regional and local level as a central doctrine. As *Planning Policy Statement 1*: *Delivering Sustainable Development* states:

"Sustainable development is the core principle underpinning planning. At the heart of sustainable development is the simple idea of ensuring a better quality of life for everyone, now and for future generations."

In essence, sustainability is about achieving a balance between economic, social and environmental concerns to the benefit of both the present and the future. The UK government has used this definition to develop its strategy based around five key principles:

- Social progress that recognises the needs of everyone;
- Effective protection and enhancement of the environment, and the prudent use of natural resources;
- Good governance in all levels of society;
- Maintenance of high, stable levels of economic growth and employment;
- Responsible use of science and technology.

It can thus be appreciated that sustainability is rapidly becoming a key driving force behind all development in the UK and any construction project must rigorously address the principles of sustainability from early inception right through the project life-cycle.

1.1 Sustainable Construction

Approaches to addressing sustainability in construction have typically been focused on carbon and the need to reduce both the demand for energy and the carbon impact of buildings. While this continues to be extremely important, sustainable construction is also about the broader picture, such as creating community spaces that are healthy, economically viable and sensitive to social needs; which stimulate biodiversity; and which have low impacts in terms of resource use and pollution.

2 Legislative/ Policy Drivers

2.1 Securing the Future

The UK government produced a sustainable development strategy, *Securing the Future* in 2005, which set broad sustainability objectives for the UK. These included; community engagement; sustainable consumption and production; climate change and energy; protection of natural resources; and the creation of sustainable communities. These objectives were then delivered through a range of sub-policies specific to industry and/or region, including many of those examined in this report.

2.2 Energy White Papers

The Government established its strategy to address the challenges facing the energy system in the 2003 Energy White Paper, *Our Energy Future: Creating a Low Carbon Economy*. This paper outlined a long-term framework for developing policies to ensure that UK has access to sustainable, reliable and affordable energy, through competitive markets. Most importantly, the paper committed the UK to reducing its carbon dioxide emissions by 60% by 2050, "with real progress by 2020" through a combination of energy efficiency and renewable energy sourcing.

A revised *Energy White Paper* was released in 2007, making similar commitments on CO_2 reduction, energy efficiency and energy security. It expanded upon the 2003 paper, incorporating a changing context with regard to rising fossil fuel prices, increased carbon trading and the growing urgency to tackle climate change. The key energy strategies relevant to the Brent Civic Centre are:

- Driving investment to accelerate the deployment of low carbon technologies;
- Promoting policies to improve energy efficiency.

2.3 Climate Change Act

The *Climate Change Act* was passed on 26th November 2008, to formalise the Energy White Papers and establish a policy framework to enable the UK to achieve a 26% reduction in CO_2 emissions by 2020, and an 80% reduction in all Greenhouse Gas emissions by 2050, both against a 1990 baseline. A system of binding five year "carbon budgets" was also introduced, with requirements set out for the Government to report on their progress against these, and on other climate change impacts and policies, every 5 years.

2.4 Carbon Reduction Commitment

The *Carbon Reduction Commitment* (CRC) requires commercial and public sector organisations whose annual half-hourly metered electricity use is above 6,000 MWh, to take part in mandatory emissions trading. The cap-and-trade scheme will begin with a three-year introductory phase commencing in January 2010, before the first capped phase begins in January 2013.

This regulation will encourage large organisations to reduce their carbon emissions, while their reward will be the lower costs resulting from improved energy efficiency. To determine their annual half-hourly metered electricity use, organisations should have recorded their electricity usage during the 2008 calendar year.

2.5 Local Government Performance Framework

DEFRA established a performance framework to drive Local Authorities to reduce their environmental footprint. There are 13 National Indicators (NI) of which the two most relevant to the Brent Civic Centre development, are:

2.5.1 National Indicator 185: % CO_2 Reduction from Local Authority Operations

This indicator is intended to measure the progress of local authorities in reducing the CO_2 emissions from the buildings and transport within their estate.

The London Borough of Brent recognise this NI and have set a short term target of reducing their CO_2 emissions by 3% every year, until 2011. Leading on from this, the Brent '*Carbon Management Strategy and Implementation Plan*' commits to an overall reduction in CO_2 emissions of 20% by 2011, against a 2005/06 baseline.

2.5.2 National Indicator 188: Planning to Adapt to Climate Change

This indicator is intended to have Local Authorities embed the management of climate risks and opportunities across all their services, plans and estates. The London Borough of Brent thus require their Civic Centre to be designed having considered both the current climate and future climate predictions.

2.6 Energy Performance of Buildings Directive

The *EU Energy Performance of Buildings Directive* (EPBD) was introduced to drive a major reduction in the energy consumption and CO_2 emissions of buildings, as these generate around 40% of total EU carbon emissions. The key EPBD requirements, relevant to the Brent Civic Centre, are to:

- Consider the minimum requirements for energy performance of new buildings;
- Calculate the integrated energy performance of the Civic Centre using the new calculation methodology;
- Obtain an energy certification;
- Undertake regular inspections of boilers and air-conditioning systems in these buildings.

2.7 UK Building Regulations

The major provisions of the EPBD were transposed into UK law through the revised Building Regulations 2006. The 2006 amendments to Part L of the Building Regulations are explicitly designed to reduce CO_2 emissions from new and refurbished buildings. They state that 'reasonable provision' should be made for the conservation of fuel and power in buildings, by: reducing energy consumption through a combination of more efficient building services installations; improving the thermal performance of the building; and efficient control of the energy-consuming systems in the building.

Additional requirements of Part L, relevant to the Brent Civic Centre, are:

- New buildings must produce 28% less CO_2 than a 2002 Building Regulations compliant building;
- The projected CO_2 emissions of the building must be calculated using SBEM or an approved dynamic simulation model;
- An Energy Performance Certificate (EPC) must be provided as the building will be over 1,000m^2.

2.8 Waste Management

The *EU Waste Directive* (75/442/EEC) requires all Member States to take the necessary measures to ensure that waste is recovered or disposed of without endangering human health or causing harm to the environment. The *Landfill Directive* (1999/31/EC) aims to prevent or reduce as far as possible negative effects on the environment from the land filling of waste, by introducing stringent technical requirements for waste and landfills and setting targets for the reduction of biodegradable municipal waste going to landfill.

The UK Government set out its second vision for sustainable waste management in *Waste Strategy for England* early in 2007, and it is important the design team for the Brent Civic Centre consider its key objectives, namely to:

- Decouple waste growth (in all sectors) from economic growth by putting emphasis on waste reduction, re-use and recycling;
- Meet and exceed the Landfill Directive targets for reducing biodegradable municipal waste to landfill to 75% of 1995 figures by 2010, and to 35% of 1995 figures by 2020;
- Increase diversion from landfill of non-municipal waste and secure better integration of treatment for municipal and non-municipal waste;
- Get the most environmental benefit from their investment, through increased recycling of resources and recovery of energy from residual waste using a mix of technologies.

The *Site Waste Management Plan* regulations, 2008 were introduced to tackle the problem of construction waste to landfill. This stated that all construction projects in England, which commence after 1st July, 2008 and are worth over £300,000 (excluding VAT), must have a Site Waste Management Plan (SWMP). The SWMP is a live document for recording the quantities and types of waste that will be produced during a construction project, and for addressing the potential for reduction, re-use, recycling and disposal. The SWMP will be initiated during the pre-design stage and revised regularly for the most tangible results. It must be passed over to the Principal Contractor prior to the commencement of enabling works and continue to be updated throughout the construction period.

2.9 Strategy for Sustainable Construction

The construction industry is recognised as having a major influence on regional sustainability objectives, through its £100 billion/ year contribution to the economy, its annual utilisation of 400 million tonnes of raw materials and its annual production of 90 million tonnes of waste. BERR produced the *Strategy for Sustainable Construction* in June 2008, to drive forward the objectives of the UK Sustainable Development Strategy and encourage the creation of a built environment that considers ongoing sustainable performance during construction and operation.

The strategy proposes a range of output focused objectives, encompassing management of energy, water, materials/ waste, transport and ecology and biodiversity. These should be achieved through procurement, design, innovation, social inclusion, improved regulation and business support, in order to deliver substantial benefits to communities and the construction industry.

2.10 Planning Regulations

2.10.1 The London Plan

The London Plan is the Mayor of London's spatial development strategy for London. It was first published in February, 2004, to replace the previous strategic planning guidance for London, *Regional Planning Guidance 3*, with revised versions becoming statute in March, 2007 and most recently, in February 2008. Foremost, this document reiterates the need for Brent Civic Centre to be integrated into the local area, in order to maximise the benefits to the community. It states the design must:

- Be of a high quality, yet inclusive;
- Enhance the public realm;
- Respect the local history, context, character and communities within Brent;
- Provide a safe, secure and sustainable environment;
- Be practical and attractive to look at, and inspire, excite and delight;
- Respect the natural environment and enhance green networks;
- Address health inequalities;
- Contribute to adaptation to, and mitigation of, the effects of Climate Change.

The London Plan also sets out a series of planning requirements. Those of particular relevance to the Brent Civic Centre are:

- The use of 'decentralised energy' on, or around the site;
- An increase from 10% (as was originally set out in The London Plan, 2004) to a 20% reduction in Carbon Dioxide emissions from the development, through on-site energy generation from renewable energy technologies;
- A long-term reduction in Carbon Dioxide emissions from London, of 25% by 2020, and 60% by 2050, both against a 1990 baseline.

This policy is supported by further documents, of which the most important are:

- Supplementary Planning Guidance (SPG);
- Supplementary Planning Documents (SPD);
- Best Practice Guidance (BPG)
- The London Renewables Toolkit

In addition to these, the Communities and Local Government (CLG) have developed a series of Planning Policy Statements (PPS) to replace the Planning Policy Guidance Notes (PPG). The PPSs most relevant to this development include:

2.10.2 Planning Policy Statement 1: Delivering Sustainable Development

At the national level, PPS 1 sets out the Government's vision for planning and the key policies and principles which underpin the planning system. This document places sustainable development at the core of the planning system and establishes policies relating to sustainable design and construction.

The supplement to PPS 1, *Planning and Climate Change*, published in December 2007, deals specifically with climate change. It seeks to ensure that new developments secure the highest viable resource and energy efficiency, and reduction in carbon dioxide emissions to contribute towards delivering Government's climate change and energy policies.

2.10.3 Planning Policy Statement 13: Transportation and Land-Use

PPS 13 is a strategy for the integration of planning and transport, at a national, regional, strategic and local level. Its principle aims are to:

- Promote more sustainable transport choices for both people and freight;
- Improve the accessibility of jobs, shopping, leisure facilities and services to the community by encouraging public transport, walking and cycling;
- Reduce the need for private travel.

2.10.4 Planning Policy Statement 22: Renewable Energy

PPS 22 states that Local Authorities may require a percentage of energy used by the development to come from on-site renewable sources. In line with this national directive, The Mayor of London established a target for London to achieve carbon reductions of 20%, by 2010, relative to 1990 levels. These are set out in the Mayor of London's energy strategy, '*Green Light to Clean Power*'. The strategy also adopts an energy hierarchy which follows good practice in the design of low carbon buildings, namely; use less energy, use renewable energy, supply energy efficiently.

In addition to the above, other PPS guidance documents to consider include:

- PPS 6: Planning for Town Centres
- PPS 9: Biodiversity and Geological Conservation

- PPS 10: Planning for Sustainable Waste Management
- PPS 12: Local Spatial Planning
- PPS 23: Planning and Pollution Control
- PPS 25: Development and Flood Risk

2.10.5 Local Planning Policy

The facility must be designed with consideration given to all legislative guidance, including those relevant to, but not limited to, the following:

- London Borough of Brent planning guidance, including the Unitary Development Plan (UDP) and the subsequent Local Development Framework (LDF);
- CLG, Building Regulations.

2.11 Sustainable Operations on the Government Estate (SOGE): Targets

In June 2006, the Prime Minister launched the SOGE targets. These cover a range of sustainability aspects including energy, water and waste. Central Government departments are required to collect data for its own estate and report performance against these targets every year to the Sustainable Development Commission (SDC). While it is not a requirement for the London Borough of Brent to monitor and report on these targets, they are current best practice targets for the public sector and as such the Civic Centre should aspire to operating in line with them.

The full list of targets has been reproduced overleaf.

Table 1: SOGE Targets.

CLIMATE CHANGE/ ENERGY USAGE	
Carbon Emissions (from offices)	▪ Reduce carbon emissions by 12.5% by *2010/11*, relative to 1999/00 levels. ▪ Reduce carbon emissions by 30% by *2020*, relative to 1999/00 levels.
Carbon Emissions (from road vehicles)	▪ Reduce carbon emissions from road vehicles used for administrative operations by 15% by *2010/11*, relative to 2005/06 levels.
Carbon Neutral	▪ Central Government's office estate will be carbon neutral by *2012*.
Energy Efficiency	▪ Departments to increase their energy efficiency per m² by 15% by *2010*, relative to 1999/00 levels. ▪ Departments to increase their energy efficiency per m² by 30% by *2020*, relative to 1999/00 levels.
SUSTAINABLE CONSUMPTION AND PRODUCTION	
Waste Arisings	▪ Departments to reduce their waste arisings by 5% by *2010*, relative to 2004/05 levels. ▪ Departments to reduce their waste arisings by 25% by *2020*, relative to 2004/05 levels.
Recycling	▪ Departments to increase their recycling figures to 40% of their waste arisings by *2010*. ▪ Departments to increase their recycling figures to 75% of their waste arisings by *2020*.
NATURAL RESOURCE PROTECTION	
Biodiversity	▪ Departments to meet or exceed the aim of having 95% of Sites of Special Scientific Interest (SSSI's) in sole ownership or control in target condition by *2010*.
Water Consumption	▪ Reduce water consumption by 25% on the office and non-office estate by *2020*, relative to 2004/ 05 levels. ▪ Reduce water consumption to around $3m^3$/person/year for all new office builds or major office refurbishments.

3 London Borough of Brent: Mission Statement

3.1 Strategic Vision

Brent Council aspire to develop their council into one of the most sustainable in the UK and be seen as leading light, pro-actively working towards tackling the global issue of climate change. In achieving this, it is hoped that residents and businesses will be encouraged to contribute to the local environmental, social and economic well-being of the area, to the benefit of both existing and future generations.

Their vision is reiterated in the Brent Council Community Strategy 'mission statement' which intends for Brent to become "a safe place, a clean place, a green place, a lively place, a borough of opportunity, a prosperous and healthy place with opportunities for all, a place where income and employment levels will be higher than the London average, where businesses thrive, where residents will enjoy good health and are able to make healthy choices, an inclusive community welcoming to all, where services will respond to the needs of young and old alike, supporting them to achieve independence, enabling them to take a full part in the life of the borough and providing help when the residents need it".

To achieve this goal, Brent Council has established four key values. These are to:

- Providing excellent services;
- Improving the quality of life for all communities;
- Promoting diversity and community cohesion;
- Investing in our capacity

Brent Council intend to take advantage of this once-in-a-lifetime opportunity to create a landmark Civic Centre. To recognise the importance of the above issues, they have established 'environment and sustainability' as one of their four priority themes for this development. The building will be situated adjacent to Wembley Stadium and Wembley Arena, so to match the global recognition of these developments, continue to enhance the regeneration of the area and make a striking contribution to the borough, it is envisaged this Civic Centre will be a global icon for sustainability.

3.2 Corporate Social Responsibility

This project is considered a key element in the modernization and service improvement agenda for the council. It will be integral to business transformation, by co-locating the many disparate council and partner services within a state-of-the–

art public building, improving public access to key frontline services and encouraging investment throughout the borough. There are 8,000 local businesses within Brent, and this investment will help strengthen the local economy for these parties whilst also creating the potential for new businesses to develop. When placed in context of the Wembley development, with its unprecedented influx of sports, leisure, cultural and local community facilities, and its excellent transport links to Central London and the rest of the UK, there is a huge scope for economic development in the borough.

The centre will also provide a safe and welcoming community area for residents and customers alike, be easily accessible to all thanks to the exceptional public transport links, and create a focal point for civic pride. At present, Brent has a reputation as a peaceful, tolerant community, and the Civic Centre will further encourage the socially inclusive spirit of the borough.

3.3 Sustainability Theme

The new Civic Centre will need to be designed to be an exemplar of environmental practice and performance on sustainability issues. In addition, it shall consider the future consequences of climate change, be able to cope with future extreme weather events and need to reflect the objectives and proposals set out in the Brent Council Climate Change Strategy and Action Plan.

In addition to the hub of public services, the proposed centre will contain a state-of-the-art library, a learning resource centre, a café, and the best possible range of retail, leisure, housing and employment opportunities. It shall also act as a hub for improving public transport links, to enable local residents to access the opportunities brought about by this development.

The improved local public transport infrastructure will benefit the more deprived areas of Brent, especially the 37% of residences within the borough that do not have access to private transport. It will also serve to dilute the health and social impacts of the North-South divide across the North Circular Road. As part of the Mayor's London Plan, it is expected that there will be around 11,000 new homes in Brent over the next ten years, so it is vital to raise the bar in the field of sustainable communities and development in order to safeguard the future of the borough.

Brent Council recognise the Civic Centre development is fundamental to achieving their vision for the future of this borough. As such, they intend to drive sustainability within the design process and take all possible measures to deliver efficient, accessible and sustainable services to excellent standards; to develop tailored solutions to meet the needs of the individual, families and communities; and overall, to make Brent a prosperous and lively area that will thrive for generations to come.

4 Specialist Consultants/ Appointments

In addition to the above, the following surveys and/ or modelling should be undertaken, to ensure the design of the Civic Centre is suitable for all operations and occupants:

4.1 Occupant Comfort/ Satisfaction

- A Disability Discrimination Act (DDA) consultant, qualified as an RICS IEC consultant, an NRAC registered auditor, or equivalent, must be appointed to provide advice on access arrangements and ensure the building complies with Part M of the Building Regulations; *BS8300: 2009: Accessible Building Design*; and the DDA guidelines;
- Security Consultation to be undertaken by an Architectural Liaison Officer (ALO) or Crime Prevention Design Advisor (CPDA) from the local police force during Stages A/ B, to allow the development to be certified with *Secured by Design*;
- The M&E engineers within the design team must undertake a formal Renewable Energy Feasibility Study to assess the potential of Low-or-Zero Carbon (LZC) energy generation in this development. Detailed requirements for this have been outlined in *Section 6.2: Renewable/ Low-or-Zero Carbon Technologies*;
- An accredited energy assessor must be appointed to carry out Energy Modelling, using the *National Calculation Method* (NCM) and produce an *Energy Performance Certificate* (EPC);
- The design team must carry out Thermal Modelling, in accordance with *CIBSE AM11: Building Energy and Environmental Modelling*, to confirm the development meets *CIBSE Guide A: Environmental Design*;
- A qualified acoustician must be appointed to ensure all areas comply with *BS8233: 1999: Sound Insulation and Noise Reduction for Buildings*, and carry out pre-completion Acoustic Performance Testing;
- The acoustician must also be tasked with undertaking a post-completion Noise Impact Assessment in line with *BS4142: 1997: Method for Rating Industrial Noise*, to confirm the development does not affect local noise-sensitive areas or amenity or wildlife areas.

4.2 Transport

- Transport Planning should be carried out, with a suitably qualified consultant appointed to produce a Travel Plan for the Civic Centre, and influence the site layout with regard to pedestrians, cyclists, and the car park;

4.3 Whole Life Costing

- A Life Cycle Cost Analysis must be carried out at Stages B (feasibility) and C (outline design), over a period of 25-30 years and again over 60 years, to ensure options specified in the design provide the greatest value. This analysis must address: Construction; Operation; Maintenance; and the End of Life of the building. In addition, two of the following four components must be analysed at both a strategic and system level: Structure; Envelope; Services; and Finishes; in line with *ISO 15686: Service Life Planning, Part 5 (Life Cycle Costing)*. The model must then be updated during Stages D (detailed proposals) or E (final proposals);

- Brent Council should use the LCC exercise and this Sustainability Strategy to identify key priorities for the development. The design team and cost managers should be aware of these, to ensure future 'value engineering' exercises do not design them out.

4.4 Building Systems

- Maintenance of the Civic Centre must be designed out as far as possible. To facilitate this, the design team should complete a critical maintenance appraisal complying with *ISO 15686: Service Life Planning, Part 1 (Buildings and Constructed Assets)*, and the *CIBSE Guide to Ownership, Operation and Maintenance of Building Services*.
- A Specialist Commissioning Agent must be appointed during the design stages. Their responsibilities should extend to providing: design input and carrying out commissionability design reviews; commissioning management input to both the construction programming and during the installation stages; and management of commissioning, performance testing and the handover/ post-handover stages. Guidance on the appropriate responsibilities of the specialist commissioning agent have been outlined in *Section 7: Monitoring Environmental Performance.*

4.5 Land-Use and Ecology

- An Ecological Survey must be carried out prior to the commencement of enabling works, to confirm the land with the lowest ecological value is being developed;
- The ecologist must also be tasked with providing guidance to both protect and enhance the existing site ecology, and in the longer-term, produce a Landscape and Habitat Management Plan covering a period of at least 5 years after project completion to safeguard the new ecosystem and help it thrive in the future;

4.6 Pre-Construction/ Site Investigation

- A Flood Risk Assessment must be carried out, to confirm the land-use has a low annual probability of flooding. This survey will then guide the Structural Engineer in their design of a suitable Sustainable Urban Drainage System (SUDS);
- A Site Investigation must be carried out, with groundwater conditions being assessed in line with *BS5930: Code of Practice for Site Investigations*; soil properties being assessed in line with *BS1377: 1990: Methods of Test for Soils for Civil Engineering Purposes*; and contamination, in line with *BS10175: 2001: Investigation of Potentially Contaminated Sites*. If contamination is detected, adequate remediation will need to be undertaken.

5 Community Involvement

The development must be a positive influence on the social well-being of building users and the neighbouring community. It must improve the health and lifestyle of all parties and provide them with future opportunities. To be assured of providing a building that is relevant to their needs, stakeholder consultation must be undertaken from the earliest stages. For the benefits of the Civic Centre to be fed back into the local area, it is also recommended that local labour and local materials be sourced.

5.1 Stakeholder Consultation

The design team will need to liaise with and draw important briefing information from a number of stakeholder groups from the outset. Brent Council have considered how to manage the formal involvement of the stakeholder groups. It has produced a Stakeholder Engagement Plan which includes the following:

- Members of the local community and appropriate stakeholders whom have been identified, including local residents; local businesses; employees; wildlife protection groups; local archaeological groups; and the Environment Agency;
- Identifying recent Civic Centre/ similar developments to establish partnerships and networks and learn lessons from their experiences;
- Timescales for consultation;
- Methods of consultation;
- Identification of the points at which consultees can contribute; how their proposals will be formally considered; and how they will be kept informed about the overall progress of the project.

5.2 Sourcing Local Labour

The London Borough of Brent also has an aspiration to promote the socio-economic health of the community throughout both the construction and the ongoing operation of the Civic Centre. The preferred method is to harness local employment where possible, as in the short-term this will reduce unemployment in the community and minimise the impacts of transport to the site, while in the long-term the transferable skills provided to these parties will enable them to find additional work in this sector. Businesses and the local economy will also benefit from the increased cash-flow.

KPI: Proportion of Employees from Local Areas

Brent Council have set an aspirational target for 10% of all parties employed on the construction of the Civic Centre, to be residents within the London Borough of Brent. Details on this target can be found using *Building One Stop Shop* and *BrentIn2Work*.

6 Environmental Key Performance Indicators (KPI)

The design team will work with the client team, to create, develop and set in place appropriate KPIs and measurable targets to monitor and demonstrate continuous improvement for the Civic Centre.

To assist this process, KPIs have been developed in the following key areas:

- Energy Consumption;
- Renewable/ Low-or-Zero Carbon Technologies;
- Water;
- Materials (Internal and External Finishes);
- Waste/ Recycling;
- Transport;
- Land Use and Ecology;
- Pollution

For further information, above that provided in this sustainability strategy, please refer to the *London Plan 2007*, *The Carbon Trust: Carbon Management Programme*; the *Sustainable Procurement Task Force: National Action Plan*; and the *BERR: SOGE Targets* guidance.

6.1 Energy Consumption

Brent Council aim to meet the requirements of NI 185 and NI 188, by implementing a best-practice approach to energy management in the Civic Centre. In line with the current view of sustainability, they consider this development to be an energy source as much as an energy sink and there is the potential for a high level of energy and carbon savings if the orientation; form; massing; and insulation of the Civic Centre are optimised.

In terms of intelligent building design, the Civic Centre must also set high standards for the efficient use of energy throughout its functional space. The passive Heating, Ventilation and Air Conditioning (HVAC) and Lighting systems will be configured to minimise the environmental impact of their operation, through:

Heating, Ventilation and Cooling: Maximise the use of natural ventilation and develop passive heating and cooling systems with appropriate flexibility; the capacity to operate efficiently under differing loads; and local controls, where room conditions demand. The London Borough of Brent team are seeking innovative solutions which

draw upon leading edge office environmental standards. Where practical they require the Civic Centre to utilise mixed mode, free cooling and energy efficient ventilation.

One option to investigate is the specification of a structure with a high thermal mass. This passive design will absorb excess heat from the building as the interior space warms and redistribute it as the development cools. The Civic Centre will then require lower heating and cooling loads, and so have a lower energy demand. An additional option is for the design team to integrate heating, ventilation and cooling services to allow heat removed from one area to be utilised elsewhere.

KPI: Ventilation Rates

In the office areas, the design team must ensure fresh air is provided in line with the British Council of Offices, *Guide to Best Practice in the Specification of Offices* which requires a rate of 12 litres/ second/ person. Ventilation rates in the remainder of the building should be in line with *Approved Document, Part F: Means of Ventilation* or *CIBSE AM10: Natural Ventilation in Non-Domestic Buildings*. These rates are intended to minimise the build-up of CO_2 or other pollutants within the Civic Centre. In addition to working to these standards, the design team should specify the use of air filtration units and CO_2 detectors in areas of variable use.

Thermal and Lighting Zoning: The design teams should consider the timings of operations, use and energy efficiency impact, with respect to form and function.

Lighting: Maximise use of natural lighting, and borrowed light, flexibility and zoning appropriate to functional space and grouping to optimise penetration of natural light within the building. Adequate glare control should be installed in all occupied areas and solar shading should also be considered, to limit solar penetration during the summer but allow this during the winter. This will also aid the heating/ cooling strategies of the building. Electrical lights should utilise high efficiency sources, logical switching including PIR and sensor switching, and automatic dimmer controls.

KPI: Daylighting

80% of the net lettable floor area within the Civic Centre should target an average daylighting factor of 3%, plus a uniformity ratio of at least 0.4. At a minimum, 80% of the net lettable floor area must have a daylighting factor of 2%.

KPI: Internal/ External Lighting Levels

High efficient lighting should be specified, to ensure that all internal areas achieve a lux level, as specified in the *CIBSE Code for Lighting 2002, Part 2,* and its *2004 addendum*, with the minimum energy consumption. In addition, areas with computer screens should comply with *CIBSE Lighting Guide 7: Office Lighting*.

All external areas should comply with *CIBSE Lighting Guide 6: Outdoor Environment*. In addition, all external light fittings for the building, access ways, pathways, signs and uplighting must have a luminous efficacy of at least 60 lamp-lumens/ circuit-Watt; while light fittings in parking areas, associated roads and in floodlighting must have a luminous efficacy of at least 80 lamp-lumens/ circuit-Watt.

Develop strategies for energy reduction at the earliest opportunity, by utilising:

- High thermal capacity envelope;
- Smart metering (for further information, see *Section 7: Monitoring Environmental Performance*);
- Heat recovery system;
- Energy efficient infrastructure, such as the specification of lifts and escalators designed in line with *ISO Draft Standard CD25745-1: Energy Performance of Lifts, Escalators and Moving Walks* and the *Electrical and Mechanical Services Dept., Code of Practice for Energy Efficiency of Lift and Escalator Installations*;
- Energy efficient equipment, such as white goods with an A+ rating under the *EU Energy Efficiency Labelling Scheme*;
- Stakeholder education and training;

In addition, sourcing energy from national infrastructure has been demonstrated to be a largely inefficient practice, due to the heat/ energy loss during transmission, so on-site energy generation should be maximised. Decentralised energy generation is a recognised objective in the London Plan.

KPI: Reduction of CO_2 Emissions

The design team will work with London Borough of Brent to examine and consider the options to produce a building which can be considered 'Zero Carbon' when compared to similar building types. In this context, 'Zero Carbon' is defined as being the net carbon dioxide emissions resulting from energy consumed in the *operation* of the building (i.e. through space heating/ cooling, hot-water systems, ventilation, internal lighting, and other process related energy consumption). The intention is to have the energy consumption at a minimum, using intelligent building design and responsive ICT, with as much of the energy required as feasible being sourced from local LZC technologies.

In line with the aspiration of developing a global icon for sustainability, the design team should investigate whether the Brent Civic Centre could pre-empt the UK Government's commitment for all new public sector buildings to be 'Zero Carbon'

from 2018. At a minimum, the building should achieve a CO_2 Index (as defined by the EPC rating system) of 25 or less.

This policy will help Brent Council achieve the SOGE targets of: reducing CO_2 emissions by 12.5% by 2010/11, and 30% by 2020, compared to a 1999/00 baseline; and improving their energy efficiency by per m^2, by 15% by 2010, and by 30% by 2020, both relative to 1999/ 2000 levels.

It should also be noted that in addition to the above environmental and economic benefits, a passive approach to building design has also been shown to have a positive influence on the social attitudes of building users, leading to improvements in their overall health and wellbeing, motivation and productivity.

6.2 Renewable/ Low-or-Zero Carbon Technologies

Brent Council aim to meet the requirements of NI 185 and NI 188, by implementing a best-practice approach to energy generation in the Civic Centre. At an early stage, the design team must produce a formal Energy Feasibility Study which will exhaustively investigate the options and technical solutions required to provide on-site Low-or-Zero Carbon (LZC) energy generation for the Civic Centre, in order to reduce its operational CO_2 emissions. At a later stage, the most appropriate utilities infrastructure should be considered based on both the current needs of the development and the potential future adaptation of the energy generation systems and network.

Options will be evaluated from the following angles, and worked through in consultation with the London Borough of Brent team, under the understanding that energy producing installations must be designed to minimise atmospheric pollution, and improve air quality in the Wembley area:

- Energy generation from each LZC source, per year;
- Energy demand of the development;
- Whole life/ return on investment (in terms of both financial payback AND carbon emission payback/ savings);
- Land use;
- Local planning requirements;
- Noise;
- Feasibility of exporting heat/ electricity from the system;
- Available grants.

The technical studies should also view the Wembley Stadium masterplan to draw upon existing options, such as utilising a district CHP heating network solution. The design team should be aware that this network is unlikely to be in place before the building is operational, so the Civic Centre must have adequate provision of service ducts and piping to both enable this to be connected up at a later date and for the planned energy plant to be integrated into the network.

The Civic Centre will take a pragmatic view of the deployment and incorporation of renewable technologies into the building and operational infrastructure. London Borough of Brent and advisers recognise that the application of renewable technologies will require an integrated blend of renewable solutions, carefully evaluated on a whole life and future operational basis. LZC technologies to consider include:

- Solar Thermal Systems (for hot water production);
- Combined Heat and Power (CHP), both biomass and natural gas;
- Combined Cooling, Heat and Power (CCHP), a tri-generation system;
- Ground Source Heat Pumps (GSHP), heating and cooling solutions;
- Photovoltaic Cells, panels or systems, electrical energy production

It is also recognised that there are a wider choice of systems and technologies which may be applicable, for consideration by the design team and discussion with London Borough of Brent team. These include:

- Anaerobic Digestion, note the planned facility at Park Royal Industrial Estate;
- Biomass Boilers;
- Waste-to-Energy.

KPI: Use of Low-or-Zero Carbon Technologies

The design team should investigate whether the Brent Civic Centre can be developed to be 'Zero Carbon' through the installation of LZC technologies. At a minimum, these technologies, or a combination of them, must reduce CO_2 emissions of the building by 20%, with as much of the remaining energy as possible, being sourced from a 'Green Tariff'. This target is in line with the London Plan 2007, which requires 20% of the total energy consumed in a building over 1,000 m^2 to be sourced from LZC sources; and the BREEAM 2008 assessment criteria. It will also allow Brent Council to operate in line with the Climate Change Act which demands a reduction in CO_2 emissions of 26% by 2020, and 80% by 2050, compared to a 1990 baseline.

6.3 Water

Water usage and drainage is becoming increasingly critical across London, thus the London Borough of Brent is seeking innovative and future proofed design solutions. Technical studies on areas such as greywater recycling; rainwater harvesting will be required and should be supported by cost benefit analysis. In addition, water saving fixtures should be specified, including:

- Dual-flush WCs with an effective flush volume of less than 4.5 litres and a delayed action inlet valve which prevents water from entering the cistern until it has completely emptied, so enables a precise volume of water to be discharged;
- Timed, sensor, aerated/ spray, or low-flow lever taps with a flow rate of less than 6 l/ minute at a water pressure of 0.3 MPa;
- Showers with a flow rate of less than 9 l/ minute at a water pressure of 0.3 MPa;
- Proximity detection, ultra-low flush, or waterless urinals;

Pulsed water meters linked to the Building Management System (BMS) must also be specified. For further information on this, see *Section 7: Monitoring Environmental Performance*. As a result of these measures, water consumption within the building can be considerably reduced.

KPI: Water Consumption

To enable the Civic Centre to operate at best-practice levels of sustainability, an average water consumption of <1.5 m^3 per person, per year, should be attained. At a maximum, an average water consumption of <3 m^3 per person, per year, must be attained, in line with the SOGE target. There will be a catering area in the development, so while good practice should be observed here, it can be exempted from this target. This approach should still enable the Civic Centre to meet the second 'water' SOGE target of reducing water consumption by 25% on their office and non-office estate by 2020, relative to 2004/ 05 levels.

KPI: Water Recycling

To reach the lowest levels of consumption, a combination of rainwater harvesting and greywater recycling will need to be specified. The design team should investigate ways to install a rainwater collection tank that is sized to collect 50% of the total predicted rainwater run-off from the roof catchment area, and an additional system able to collect waste water from 80% of wash-hand basins and showers, both of which should be used to meet WC/ urinal flushing demand. Water from the rainwater collection tank should also be used for external irrigation, as there should not be a dedicated, mains supplied irrigation system.

All water systems within the development must be designed to comply with the Health & Safety Executive, Approved Code of Practice, *Legionnaires Disease: The Control of Legionella Bacteria in Water Systems*, and *CIBSE TM13: Minimising the Risk of Legionnaires Disease*.

6.4 Materials

The London Borough of Brent intend to take the approach that they are the custodians of the materials, not the owners, so wherever practical the design team should utilise materials and components having considered their levels of sustainability, namely through their low embodied energy, proximity of supply and potential end of life uses.

To this end, they require their design team to prioritise the specification of components and materials which have, as far as possible, been rated as A or A+ in the "The Green Guide to Specification, 2008". This guide is published at www.TheGreenGuide.org.uk/. These ratings are calculated based on 13 criteria, ranging from water extraction to human toxicity to mineral resource extraction. Each of these criteria is provided with a normalised value, with the sum of these contributing to a final rating of between A+, for the least environmental impact, to E, for the highest environmental impact.

Elements re-used in-situ will receive an A+ rating, and elements containing reclaimed materials will also have a lesser environmental impact than those containing more 'virgin' raw materials. It is thus important to consider the existing materials and structures on/ around the site.

Along a similar theme, it is important to consider the quantities of raw materials used within the development, as less material will contain less embodied energy, require less processing and lead to less waste. Where possible, materials should be standardised with a focus on reducing complexity in the design and increasing the flexibility of the Civic Centre.

KPI: Materials Specification

80% of all materials within the External Walls; Internal Walls; Roof; Upper Floor Slabs; Windows; and Floor Finishes/ Coverings (by total area), must have received either an 'A' or 'A+' rating in "The Green Guide to Specification, 2008". At a minimum, 50% of all materials within these elements should have received either an 'A' or 'A+' rating.

No materials should be used, which receive either a 'D' or an 'E' rating in "The Green Guide to Specification, 2008".

KPI: Insulation Specification

ALL insulation must receive either an A or A+ rating in "The Green Guide to Specification, 2008".

Brent places a large emphasis on sustainable procurement, i.e. the responsible sourcing of materials for this development. To this end, it is anticipated that where possible, there will be a focus on the use of local firms and suppliers, local labour and a contribution to "Fairtrade" aspirations. The design team will need to investigate local knowledge of materials suppliers, such as the London Borough of Brent based supplier of recycled aggregate, which may form part of the supply chain.

KPI: Procurement of Construction Site Materials

80% of all site timber must be responsibly sourced, i.e. FSC/ CSA/ PEFC/ SFI with Chain of Custody, or re-used from other sites.

KPI: Procurement of Building Materials

100% of all construction timber must be responsibly sourced, as above. This is also in line with the requirements of the Sustainable Procurement Action Plan, and the UK government Timber Procurement Policy, which comes into effect on 1st April, 2009.

95% of all other building elements should be sourced from companies holding a certified Environmental Management System (EMS) from the key process stage, i.e. the manufacture of the material. If available, priority should be given to those companies that can additionally provide evidence of an EMS along the supply chain. An example of this using bricks would be: that Brent require them to be procured from a company holding an EMS that oversees the manufacture of the bricks, however their preferred option would be procuring these from a company holding an EMS which oversees both their manufacture AND the extraction of the clay. At a minimum, 80% of all other building elements must be sourced from companies holding a certified EMS from the key process stage.

KPI: Procurement of Recycled Aggregates

To encourage the use of recycled/ secondary aggregates, a minimum of 25% of the total high-grade aggregates used within this development must consist of such materials. These can either be obtained on-site during the construction process, such as through early consideration of the use of the redundant car park materials that will be excavated from the existing site, where their use will also help attain the KPIs for the diversion of waste to landfill (see *Section 7: Monitoring Environmental Performance*), or they can be obtained from waste processing facilities within 30km.

More information on this, and the use of materials with a high recycled content, can be found in the *WRAP Recycled Content Toolkit*.

With all the procurement KPIs, priority should be given to those goods which can be obtained from local sources. Effort should also be made, to consider local knowledge and establish local partnerships.

6.4.1 Internal Finishes

In addition to their composition and sourcing, the London Borough of Brent team are committed to utilising internal finishes that are sufficiently robust to suit their functional areas, yet selected with regard to longevity and environmental performance. The key criteria to be addressed in this specification are that:

- All internal finishes should be inert and meet best-practice standards for using low levels of Volatile Organic Compounds (VOC) during their manufacture;
- All internal finishes must also have used no Ozone Depleting Potential (ODP) or Global Warming Potential (GWP) materials in their production;
- Adequate protection is given to all areas of the building where pedestrian/ vehicular/ or trolley movements will occur;
- Recycled materials are utilised where practical;

The Brent Council vision for a sustainable Civic Centre must also be adhered to when specifying the fixtures and fittings. The council should consider re-using furniture from the existing Council Offices. Where this is not possible, new equipment should be procured from sustainable sources. The preferred routes would be either to use companies that refurbish and sell on redundant office equipment, such as *Greenworks*, or to use local businesses where the procurement will both benefit the local economy and minimise the distances over which these goods must travel.

6.4.2 External Finishes

As above, in addition to their composition and sourcing, the London Borough of Brent team require the external fabric of the building to also be selected with regard to longevity and environmental performance. Additional criteria to be addressed in their specification are:

- The thermal performance of external materials is important, so the building envelope, including windows, should be specified for their high thermal capacity/ low U-values, and long-life sustainable compositions. The design of major building elements should also minimise heat loss through thermal bridging;

- Energy efficient glazing should be specified for the windows. This includes double/ triple glazing and if required, allows inert gas, such as Argon, to be introduced between the panes of glass, to further reduce heat loss. Additionally, windows can be given a low-emissivity coating to decrease heat loss from the building and increase solar heat gain. Modelling should be undertaken by the design team to determine the most appropriate placement of these measures.
- The building envelope should also be designed to optimise insulation and air tightness, by maximising the use of external fenestration materials. This is crucial to developing a more efficient HVAC system and reducing the overall building energy demand;

KPI: Air Leakage Rates

Building Regulations, Part L, requires air leakage rates through the external envelope to not exceed 10m^3/ hr/ m^2 at an applied pressure difference of 50Pa. At a minimum, the design team should attain air leakage rates of no higher than 5m^3/ hr/ m^2 at an applied pressure difference of 50Pa, but seek to reach best-practice standards of 2m^3/ hr/ m^2 at an applied pressure difference of 50Pa.

To confirm these rates have been met, a comprehensive thermographic inspection of the building fabric should be undertaken after completion, in line with *BS EN 13187: Qualitative Detection of Thermal Irregularities in Building Envelopes* and *CIBSE TM23:2000 Testing Buildings for Air Leakage*. Any defects that are identified should then be rectified, and the inspection be repeated.

In addition to the above, the Brent Council Civic Centre should:

- Maximise the use of recycled aggregates within below ground infrastructure services beddings;
- External landscaping and boundaries should consider soft planting, such as publicly accessible grasslands/ hedges, rather than rigid structures. If hard landscaping is required, the design team should specify permeable materials, so as to not exacerbate the risk of localised flooding.

KPI: External Landscaping Specification

80% of the combined area of materials within the external landscaping and Boundary Protection, must receive either an A or A+ rating in "The Green Guide to Specification, 2008".

6.5 Waste/ Recycling

Waste management and the recycling of materials must be addressed during the design AND construction of the Civic Centre. The key aspects to consider are waste minimisation throughout the construction process, and the adequate provision of waste management facilities to enable exemplar waste and recycling during the operation of the building. Measures to consider include:

Construction Waste Minimisation

Brent Council should appoint a Waste Management Co-ordinator (WMC) to guide the design team and Principal Contractor through best-practice construction waste minimisation practices based upon the waste hierarchy of: reducing waste; re-using the waste produced; recycling; considering energy recovery; and disposing the remaining waste to landfill. Key approaches to minimise waste to landfill include:

- Specification of products containing a proportion of recycled materials;
- Specification of Modern Methods of Construction (MMC);
- Standardising building components;
- Implementing a Logistics Plan;
- Segregation of construction waste into at least five streams;
- Identifying suitable waste management routes;

As the construction value is over £300,000, a Site Waste Management Plan (SWMP) is a legal requirement. To attain the greatest benefits from this plan, a best-practice SWMP should be developed at project inception, with the design team expected to actively contribute to its development and integration into the construction process.

On-Site Construction KPI: Site Waste Management

The aspiration is for the construction process to send zero waste to landfill. To help attain this, KPIs for Site Waste Management have been created in *Section 7: Monitoring Environmental Performance*.

Operational Waste Management

Quintain has installed an *Envac* waste management system as part of the Wembley redevelopment. This provides the facility to easily separate and dispose of organic, recyclable and non-recyclable materials. The design team must investigate linking this system to the Civic Centre with feasibility studies considering the quantities and

types of waste that are likely to be generated during its operation. In addition to utilising this system, the design team will need to:

- Establish a central, dedicated storage space for waste recycling, that is positioned in accessible reach of the building, but also with good vehicular access to aid collection;
- Consider whether it is feasible to establish composting facilities on-site;
- Develop and implement waste streaming policies that encourage zero waste to landfill and recycle organic waste in public service compost centres.

Operational KPI: Provision of Dedicated Storage Facilities

The recyclable waste storage facility must be at least 2 m^2, per 1,000 m^2 of net floor area, up to a minimum of 10 m^2 for buildings of >5,000 m^2. If the Civic Centre has catering facilities, then the storage space must be provided with an additional 2 m^2, per 1,000 m^2 of the net floor area where catering is provided. The provision of these facilities is important for the London Borough of Brent to operate in line with their council-wide 'Zero Waste' policy which allows just 2% of operational waste to be sent to landfill. This approach will help Brent Council meet the SOGE targets of reducing their waste arisings by 5% by 2010, and 25% by 2020, relative to 2004/05 targets; and of increasing their recycling figures to 40% of all waste arisings by 2010, and to 75% of all waste arisings by 2020.

6.6 Transport

The Civic Centre will be located favourably with regard to public transport links and existing infrastructure. The planning and design concepts must thus build upon the existing benefits available, and develop a Civic Centre that minimises transport and travel impacts of the building. All decisions on site transport should be taken having reviewed the Brent Council, *'Council Travel Plan'*. Themes to consider include:

- Limiting car parking spaces for visitors;
- Developing the cyclist and pedestrian routes around the site, and providing safe access across vehicular routes;
- Maximising accessibility for all members of the local communities, through the appointment of a Disability Discrimination Act (DDA) consultant;
- Providing sufficient space for manoeuvring delivery vehicles and storage of external skips, away from staff/ visitor car parking areas;
- Encouraging the use of sustainable public transport to the site.

To reiterate this message of sustainable transport to the local community, it is recommended a specific version of the '*Council Travel Plan*' be developed for the Civic Centre building users based on a site-specific transport survey. The intention is to educate stakeholders on the benefits of the different types of transport and shift travel patterns from private vehicles to public transport, cycling or walking. In addition to the below KPIs, other initiatives include offering free bicycle health checks, providing information on local cycle and public transport routes, and the establishing networks and providing infrastructure to encourage the use of car-club schemes.

KPI: Car Parking Spaces

Specific KPIs have not been set for the number of car parking spaces to be included around the Civic Centre, however as Brent is situated in Greater London, the design team should look to take advantage of the existing public transport, and encourage the use of cyclist and pedestrian networks. The number of parking spaces to be assigned for this project should be determined by local planning policy requirements. Brent Council should also investigate the development of a 'car sharing' network.

KPI: Cyclist Facilities

A sufficient number of covered cyclist storage facilities, such as Sheffield type racks constructed a minimum of 1m apart, should be provided to building users. A sufficient number is regarded to be ≥10% of building users, up to 500, PLUS ≥7% of building users for 501-1,000, PLUS ≥5% of ALL building users over 1,001. As the Civic Centre will be in a central location, this total may be reduced by half, if unavoidable. These racks must also be adequately lit, in accordance with *BS5489: Lighting of Roads and Amenity Areas*, and be within 100m of the building entrance.

As a rule, for every 10 cyclist storage spaces, there should also be one shower, and 1 m^2 of changing facilities. These must contain an equal number of lockers (size: 900 mm x 300 mm x 450 mm) to the number of cyclist facilities.

KPI: Provision of Public Transport Infrastructure

Due to the number of visitors/ building users, it would be advisable for the transport planners to investigate the provision of a new bus node adjacent to the Civic Centre. For ease of access for less abled parties, this should be located within 200 m of the main entrance, and be used by a number of bus routes that have a regular service frequency of at least 15 minutes throughout the opening hours of the building. Until established otherwise, these are considered to be 8am-7pm.

These measures will help London Borough of Brent attain the SOGE target for reducing carbon emissions from road vehicles which are being used for Government

administrative operations, by 15% by 2010/11, relative to 2005/06 levels. They will also be operating in line with The London Plan requirement for 'improving the integration of land-use and transport policy, and reducing the need to travel […] by car'.

6.7 Land Use and Ecology

The existing land-use and potential site contamination are of particular concern to the London Borough of Brent team. It is recommended the design team involve the following parties early in the development of the Civic Centre:

- Investigation of the site must be carried out, in line with the British Standards listed in *Section 4.6: Pre-Construction/ Site Investigation*. If required, adequate remediation of the contaminated land will need to be undertaken;
- A Flood Risk Assessment must be carried out, to confirm the land-use has a low annual probability of flooding. This survey will then guide the Structural Engineer in their design of a suitable Sustainable Urban Drainage System (SUDS), sized to allow for climate change. The SUDS should also be designed to minimise watercourse pollution, by utilising measures such as permeable surfaces and oil/ petrol interceptors, as outlined in *Pollution Prevention Guidelines* (PPG) 3;

KPI: Sustainable Urban Drainage System

SUDS should be sized to attenuate 100% of the peak flow rate of water run off, from hard surfaces to municipal drainage systems, during a design storm event as defined by the CIRIA, *Interim Code of Practice for Sustainable Drainage Systems*. At a minimum, the SUDS must ensure the peak rate of run-off from the developed Civic Centre does not exceed that from the previously developed site.

It is important to London Borough of Brent that the existing site ecology around the Civic Centre be conserved and that flora and fauna biodiversity be encouraged. To this end:

- A qualified ecologist must be appointed to conduct an *Ecological Survey*, prior to the commencement of enabling works;

KPI: Re-Use of Land

100% of the footprint of the Civic Centre should be positioned on an area of land which has been previously developed in the past 50 years. This is in line with the London Plan, Supplementary Planning Guidance and is intended to minimise the impact of development, upon local biodiversity. Due to the central location of the site, this target should have been met almost by default.

- The ecologist must work alongside the design team to investigate urban biodiversity initiatives, such as the construction of a 'Green Roof'. This is a favoured option as the benefits include 'natural' insulation, and the attenuation of rainwater that would otherwise runoff the impermeable roof surface and exacerbate the potential for flooding throughout the site. This particular issue will become more apparent over time as global warming encourages more frequent, intense storm events;

KPI: Protecting and Enhancing Existing Site Ecology

The ecologist must provide guidance to protect and enhance the existing site ecology so the final development will have increased the number of species by 6 (based on a species to area ratio) through planting native species.

- The ecologist must provide guidance to protect and enhance the existing site ecology and produce a *Landscape and Habitat Management Plan* which covers a period of at least five years after project completion;
- The ecologist must then work alongside the contractors, to ensure their recommendations on the protection and enhancement of local ecology have been acted upon during the design and construction process. They should also confirm that these parties have complied with all relevant UK and EU legislation.

6.8 Pollution

The Civic Centre must be conceived in such a fashion so it will not pollute, or have a detrimental impact on the environment. This includes considering any deterioration in local air quality, either internally or externally, any contribution to the problem of global warming, or impacts on the surrounding area through lighting or noise emissions. It is recommended the design team consider the following KPIs to help achieve this goal.

Air Pollution

The most significant sources of air pollution within the development will arise from transport to the Civic Centre, and from building services and equipment used on-site. To reduce the intake of external pollutants into the building, car parks should be situated at least 10 m from the building. To reduce the potential for the recirculation of pollutants, air exhausts should be at least 10 m apart, and air intakes should be over 20 m from either an air exhaust or a different source of external pollution, such as a road or car park. With regard to the building services, the following KPIs should be addressed:

KPI: Refrigerant GWP

Refrigerants used within the building services should have a Global Warming Potential (GWP) or less than 5. Examples include ammonia and hydrocarbons, such as; propane, propene, butane and isobutene. If this is unattainable, then at the least no CFCs and HCFCs can be considered for use within the development. CFCs were phased out by 2000, in line with the Montreal Protocol, while the use of HCFCs will be prohibited from 2010, under the EU Ozone Regulations.

KPI: NO_x Emissions (from heating source)

The plant specified to meet the space heating requirements of the development must have a dry NO_x emission level of less than 40mg/ kWh at 0% excess O_2. It should be noted that some LZC technologies produce large amounts of NO_x and their specification will make it impossible to meet this KPI. Examples of these include: biomass boilers, which release this pollutant due to their inefficient combustion, and Ground Source Heat Pumps (GSHP), as they source their running energy from the National Grid, which due to the large-scale use of coal power throughout the UK releases an estimated 1,200mg/ kWh of NO_x. PVs and wind turbines will not release NO_x emissions so if GSHPs are favoured, these technologies should be considered to power them, while CHP has variable emissions.

Light Pollution

Design decisions must be taken to minimise external light pollution and reduce overspill to surrounding areas. Appropriate measures to take would include committing to switch off all external lighting, excluding safety and security lighting, between 11pm and 7am.

KPI: Reduction of Night-Time Pollution

To minimise the intrusion of light from the building on surrounding spaces, external lighting should also be designed in line with the *Institute of Lighting Engineers (ILE): Guidance Notes for the Reduction of Obtrusive Light*, 2005.

Noise Pollution

The design team must also minimise internal and external noise pollution. Measures to be taken include considering the position and layout of the plant areas while retaining their accessibility for maintenance, and the placement of screening around noise sources.

KPI: Internal Noise Pollution

Pre-completion acoustic testing must be carried out by a qualified acoustician to confirm all areas comply with *BS8233: 1999: Sound Insulation and Noise Reduction for Buildings*.

KPI: External Noise Pollution

A Noise Impact Assessment must later be carried out in line with *BS4142: 1997: Method for Rating Industrial Noise*, to confirm the development does not affect local noise-sensitive areas or amenity or wildlife areas. If required, suitable noise attenuation measures must then be introduced into the design.

7 Monitoring Environmental Performance

The building must be designed to the highest of standards to reach its potential of being a global icon for sustainability, however to attain this recognition it will also need to operated as such. Monitoring of its performance and the provision of adequate Facilities Management is therefore paramount.

This document has broken the provision of monitoring procedures/ equipment into two phases: the *construction* phase, and the *operation* phase.

Construction Performance:

The design team will develop the design for the Civic Centre with a view to the facility being constructed by only those constructors registered under the Considerate Contractors Scheme (CCS). The preliminaries must mention this requirement, so site planning can be developed accordingly.

On-Site Construction KPI: Considerate Constructors Scheme

The Principal Contractor must be registered with the Considerate Constructors Scheme (CCS) and commit to achieving a minimum score of at least 36.

On-Site Construction KPI: Construction Site Impacts

The Principal Contractor must manage the following impacts of the construction site:

- Monitor, report and set targets for CO_2 arising from site activities;
- Monitor, report and set targets for CO_2 arising from transport to/ from the site;
- Water consumption arising from site activities;
- Air (dust) pollution arising from site activities;
- Water (ground and surface) pollution occurring on-site;
- Principal contractor must utilise an environmental materials policy when sourcing construction materials;
- Principal contractor should operate an Environmental Management System (EMS).

On-Site Construction KPI: Site Waste Management

To drive best-practice through the demolition of the existing car park, and the construction of the Brent Civic Centre project, the following resource efficiency benchmarks should be met:

- EITHER <9.2 m^3 OR <4.7 tonnes of non-hazardous construction waste must be produced, per 100 m^2 of Gross Internal Floor Area (GIFA),

Suitable procedures must also be established, so the waste that is produced will be diverted away from landfill and thus have a minimal environmental impact. To this end, the following waste management benchmarks must be met:

- EITHER >85% by volume OR >95% by weight of **demolition** waste must be diverted from landfill (through re-use/ recycling/ or energy recovery). To meet this target, it is recommended the ICE Demolition Protocol be used;
- EITHER >80% by volume OR >90% by weight of non-hazardous **construction** waste must be diverted from landfill (through returning this to the supplier/ re-use/ recycling/ or energy recovery).

The information relating to these targets must be collated within a best-practice SWMP, i.e. one that goes beyond legal compliance and investigates the procedures for minimising, monitoring and reporting the production of waste. From a practical point-of-view, best practice benchmarks can only be attained if waste minimisation is addressed by the design team during the earliest stages of the project, before being continued through the construction phase. London Borough of Brent construction projects have previously attained the 95% target, most notably in the W01 Development, a block of residential flats adjacent to Wembley Stadium; the Wembley Stadium Access Corridor; and Wembley Link. Wembley Stadium achieved a Demolition Recovery Index of 80% and a Materials Recovery from the New Build of 82%. The case studies are available on www.Aggregain.org.uk/.

Commissioning of Building Systems:

To be assured that all systems within the building are fully operational, a specialist contractor should be appointed during the design stage, to carry out pre-commissioning, seasonal commissioning and if required, re-commissioning on all systems, in line with all relevant Building Regulations and CIBSE/ BSRIA guidelines. The CIBSE/ BSRIA guides have been reproduced below:

- CIBSE Commissioning Code A: Air Distribution Systems
- CIBSE Commissioning Code B: Boilers
- CIBSE Commissioning Code C: Automatic Controls
- CIBSE Commissioning Code L: Lighting
- CIBSE Commissioning Code M: Management
- CIBSE Commissioning Code R: Refrigeration

- CIBSE Commissioning Code W: Water Distribution Systems
- BSRIA Application Guide 1/91: Commissioning of VAV systems in Buildings
- BSRIA Application Guide 20/95: Commissioning of Pipework Systems
- BSRIA Technical Memoranda 1/88.1: Commissioning HVAC Systems
- BSRIA Application Guide 3/89.3: Commissioning of Air Systems in Buildings
- BSRIA Application Guide 1/2001.1: Pre-commission Cleaning of Pipework Systems
- BSRIA Application Guide 2/89.3: Commissioning of Water Systems in Buildings
- BSRIA Application Guide 5/2002: Commissioning Management
- BSRIA AG16/2002: Variable Flow Water Systems: Design, Installation and Commissioning Guidance
- BSRIA Photovoltaics in Buildings: Testing, Commissioning and Monitoring Guide.

As established in *Section 4.4: Building Systems*, the responsibilities of the specialist commissioning agent should entail:

- Review of the commissionability of the systems, during the design stage;
- Input during the construction programming phase and installation stage;
- Management of post-completion commissioning/ handover/ post handover stages.

The post-completion commissioning should include the following tasks:

- Reviewing the thermal comfort, ventilation and lighting at 3, 6 and 9 month intervals after initial occupation.
- Testing of all building services under full- and part-load conditions, such as heating equipment in winter, and cooling systems in the summer;
- Testing of all building services during periods of extreme (high/ low) occupancy;
- Interviews with building occupants should be carried out to identify problems or concerns regarding the effectiveness of the systems;
- Re-commissioning of the building systems, if required.

The post-completion commissioning of the BMS should extend to:

- Commissioning of air and water systems when all control devices are installed, wired and functional. This will include air and water flow rates; physical measurements of room temperatures; off coil temperatures; and all other key parameters as appropriate;

- Installing the BMS/ controls so the system is operational and the building has attained satisfactory internal conditions, prior to handover;
- Installing all BMS schematics and graphics so the system is functional, prior to handover;
- Training the occupier in the operation of the system.

Operational Performance:

Extensive monitoring of the building operations is ideal for collating usage data and aiding the development of efficient facilities management strategies. To this end, the design team should specify the following:

- Sub-meters on all substantial energy uses;
- Sub-meters on all high energy load areas and tenancies;
- Sub-meters on the lighting circuits on each floor;
- A primary water meter on the mains water supply to the building, plus pulsed sub-meters on all water consuming areas and tenancies, including the café and changing facilities;
- A central Building Management System (BMS) to which all of these meters are connected and which allows localised occupant control of the HVAC system;
- A programmable leak detection system on the water supply to the building which is able to detect variable flow rates over time;
- Sanitary supply shut-offs to all toilet areas, which control the flow through the specification of solenoid valves on the water supplies to each area.
- Refrigerants must be contained within a mechanically ventilated plant room (or moderately air tight enclosure) with a refrigerant leak detection system installed, which covers the high-risk parts of the plant. On detection of high concentrations of refrigerants, the system must have the facility to automatically shutdown and pump down the remaining refrigerant in the system.

The design team should also produce a simple, easy-to-understand Building User Guide, separate from the Operations & Maintenance manual. This should explain the operational procedures for all building services and so ensure the building occupants utilise them appropriately. Brent Council may also consider developing a Building User Education Programme post-occupation, to inform occupants on the reasons for seeking to attain good-practice building management and the methods by which they can Brent Council meet this aspiration.

Information and Communication Technology (ICT):

These automated approaches are in line with the ICT vision of Brent Council. It is proposed the new centre will be an *intelligent building* with a converged network integrating voice, data, video over IP, CCTV, Security, and most building systems. All elements such as HVAC control, lighting control, access control, scheduling, data logging, temperature, plant control and metering will all be linked together via the BMS and be able to respond to the real-time needs of occupants.

KPI: Energy Efficient Performance

This approach will reduce operational costs over time while enhancing the building performance and help Brent Council achieve the SOGE targets of: reducing CO_2 emissions by 30% by 2020, compared to a 1999/00 baseline; and improving their energy efficiency by per m^2, by 15% by 2010, and by 30% by 2020, both relative to 1999/ 2000 levels.

8 Measuring Sustainable Performance (BREEAM 2008)

BREEAM (Building Research Establishment Environmental Assessment Method) is an established, international methodology for assessing the sustainable performance of a building. It sets the standards for best practice in sustainable development and quantifies their level of achievement. Credits are awarded in nine categories according to performance, then combined to produce a single overall score, rated on a scale of 'Pass', 'Good', 'Very Good', 'Excellent' and 'Outstanding'.

The New Civic centre will be a landmark building for Brent, and as such will demand a high level of environmental performance. The building will be measured using the environmental standards set out in BREEAM and will achieve at least an "Excellent" rating, with an ambition subject to design development, cost justification and return on investment to achieve an 'Outstanding' rating. Attaining an 'Excellent' rating is a minimum requirement laid out in Central Government sustainability mandates, and a key environmental performance challenge for the design team. It should be noted that a BREEAM 'Outstanding' rating will require a post contract review, plus a '*BREEAM In Use'* Certification of Performance within the first three years of the building's operation and use.

Glossary

ALO	Architectural Liaison Officer
ASHP	Air Source Heat Pumps
BERR	Department for Business, Enterprise and Regulatory Reform
BEMS	Building Energy Management System
BMS	Building Management System
BPG	Best Practice Guidance
BS	British Standard
CHP	Combined Heat and Power
CCHP	Combined Cooling, Heat and Power
CCS	Considerate Contractors Scheme
CFC	Chlorofluorocarbons
CIBSE	Chartered Institution of Building Services Engineers
CLG	Communities and Local Government
CPDA	Crime Prevention Design Advisor
CRC	Carbon Reduction Commitment
CSA	Canadian Standards Association
DDA	Disability Discrimination Act
EA	Environment Agency
EIA	Environmental Impact Assessment
EMS	Environmental Management System
EPBD	Energy Performance of Buildings Directive

EPC	Energy Performance Certificate
FRA	Flood Risk Assessment
FSC	Forest Stewardship Council
GSHP	Ground Source Heat Pumps
GWP	Global Warming Potential
HCFC	Hydrochlorofluorocarbons
HFC	Hydrofluorocarbons
HSE	Health & Safety Executive
HVAC	Heating, Ventilation and Air Conditioning
KPI	Key Performance Indicators
LBB	London Borough of Brent
LCC	Life Cycle Cost
LDF	Local Development Framework
LZC	Low-or-Zero Carbon Technologies
M&E	Mechanical and Electrical
MMC	Modern Methods of Construction
NCM	National Calculation Method
NI	National Indicator
NIA	Noise Impact Assessment
NO_x	Nitrous Oxides
ODP	Ozone Depleting Potential
PEFC	Programme for the Endorsement of Forest Certification
PPG	Pollution Prevention Guideline

PPG	Planning Policy Guidance
PPS	Planning Policy Statement
PV	Photovoltaic
SBEM	Simplified Building Energy Model
SDC	Sustainable Development Commission
SFI	Sustainable Forestry Initiative
SOGE	Sustainable Operations on the Government Estate
SPD	Supplementary Planning Documents
SPG	Supplementary Planning Guidance
SUDS	Sustainable Urban Drainage System
SWMP	Site Waste Management Plan
VOC	Volatile Organic Compounds
WLC	Whole Life Cost
WMC	Waste Management Co-ordinator
WRAP	Waste and Resources Action Programme