

# BREEAM & CEEQUAL: On The Move



# Foreword

Across the globe people are living increasingly urbanised lives – by 2050 an estimated 70% of the world’s population will be living in cities<sup>1</sup>. Transport networks providing access and mobility to, from and around these cities will continue to be a significant part of their growth.

If cities are to be resilient, the sustainability of these transport networks will be an important consideration. They will need to be low carbon, flexible enough to meet the demand of increasingly high population density, and support good air quality. They will need to ensure that networks continue to be safe and accessible, enabling individuals to be connected to spaces which are convenient and allow them to use their time efficiently.

Electric car infrastructure offers one potential sustainable transport solution. However where space is limited and the number of individuals is high, private car use is not always an appropriate form of transport, whether electric or otherwise. Therefore, city planners and developers must use intelligent design and take a holistic approach in updating our public transport networks.

They must factor in the concept of Placemaking, linking people to nearby spaces of convenience, which will ultimately reduce the number of trips made, putting less strain on our transport systems, and promote more sustainable options such as cycling and walking.

The importance of considering sustainability in these systems has not gone unnoticed and can be seen through the work of organisations such as the United Nations in Sustainable Development Goals, and the World Bank’s Sustainable Mobility for All Initiative.

Our family of schemes have always offered a holistic approach to master planning and transport infrastructure. Ensuring that these large scale projects consider their effect on the wider community and surrounding environment through robust, independent verification.

Our objective is to support planners in providing spaces that work for their citizens, and continue to work for many years to come, creating resilience in their networks and communities.

This publication takes a look at how BREEAM and CEEQUAL have helped city and town planners deliver better, and more sustainable, transport systems for their communities.



Dr Shamir Ghumra  
BREEAM Director

A handwritten signature in black ink that reads "Shamir Ghumra".



<sup>1</sup> <https://stateofgreen.com/en/sectors/transportation-urban-planning/>



Transport accounts for:

**27%** of world energy emissions

**23%** of carbon dioxide emissions<sup>1</sup>

**97%** of which come from burning fossil fuels<sup>2</sup>

With the rise in electric cars many peoples' first thought when it comes to sustainable transport will be the vehicles used and how the energy to power these is sourced. However, the infrastructure used to accommodate the transport and the impact of these structures is just as important.

The aviation, rail and public transport industries are embracing sustainability and have begun to consider the social, environmental and climate impacts of their businesses. These different modes of transport have their own unique challenges, but all typically experience a high number of users and a complex network of operations and logistics.

To ensure that sustainability has been considered throughout their network, these industries are turning to BREEAM and CEEQUAL certification for their major transport hubs and associated connecting infrastructure. In this publication we provide examples of these transport hubs and how certification against our products has helped them.

<sup>1</sup> <https://www.who.int/sustainable-development/transport/health-risks/climate-impacts/en/>

<sup>2</sup> <https://www.climatebonds.net/files/files/Low%20Carbon%20Transport%20Background%20Paper%20Feb%202017.pdf>

## Why Us

Launched in 1990, BREEAM is the world's first and foremost sustainability standard and rating system for the built environment.

With BREEAM and CEEQUAL it's possible to address sustainability issues specific to any building in any location. Through adaption we can produce category weightings specific to the country of assessment, reflecting the marked changes in environmental conditions in different regions of the world, or even within the same country.

Weightings are based on robust and independent information provided by 'local experts' who understand local conditions and standards, making the scheme accessible to any country. When requested, BREEAM will review local equivalents of standards or best practice documents specified within the criteria and confirm their acceptance in the Approved Standards and Weightings List (ASWL).

The 2015 RICS report, 'Going for Green', found BREEAM has an 80% market share across Europe for sustainable building certification.

CEEQUAL, originally launched in September 2003 by a team led by the Institution of Civil Engineers (ICE), joined the BRE Group in November 2015, operating alongside BREEAM.

Applicable for the assessment of civil engineering, infrastructure, landscaping and public realm projects anywhere in the world by using the CEEQUAL International Manual. For those who wish to further tailor their assessment to suit the target country's cultural influences on sustainability performance, and the environmental conditions in the locality of the project, a weightings exercise can be undertaken.



# Come Fly With BREEAM



## Finavia Helsinki Airport T2 - Southern Extension (BREEAM-0073-4517)

**Scheme:** BREEAM International 2013

**Rating:** Excellent

**Score:** 74.3%

**Net Floor Area:** 8,365m<sup>2</sup>

**Assessor:** Pirjo Niemi-Järvelin

**Assessor Company:** Granlund Oy

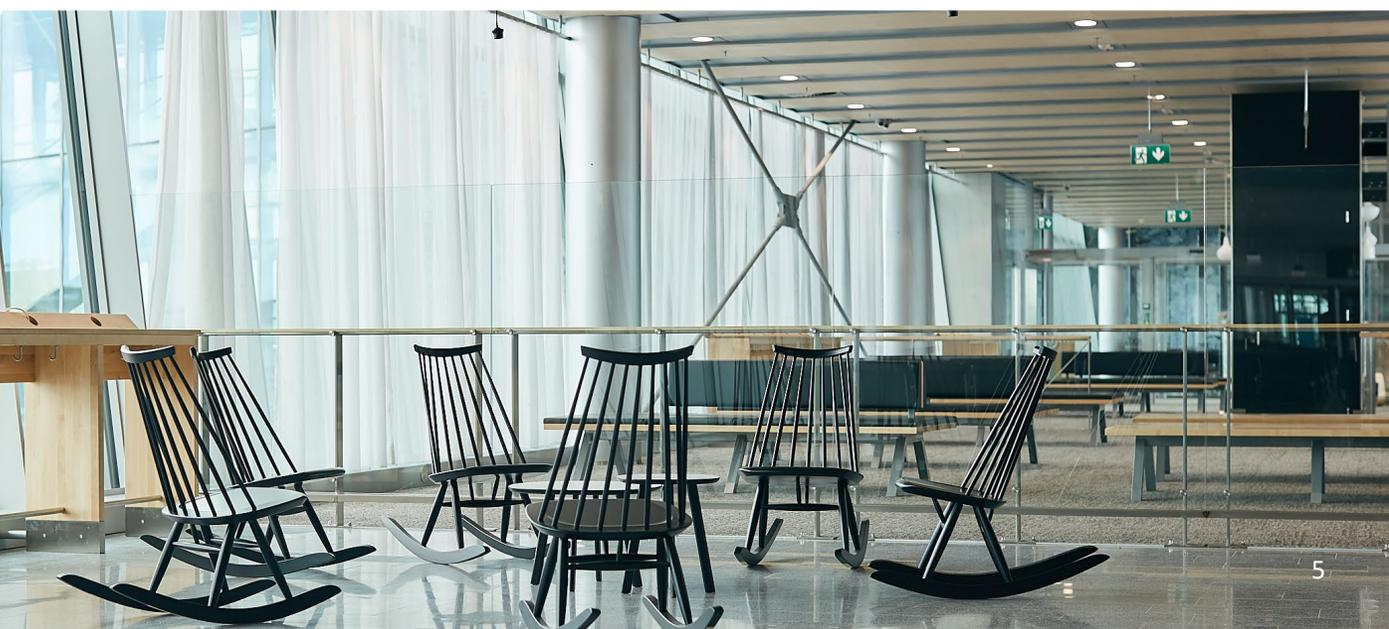
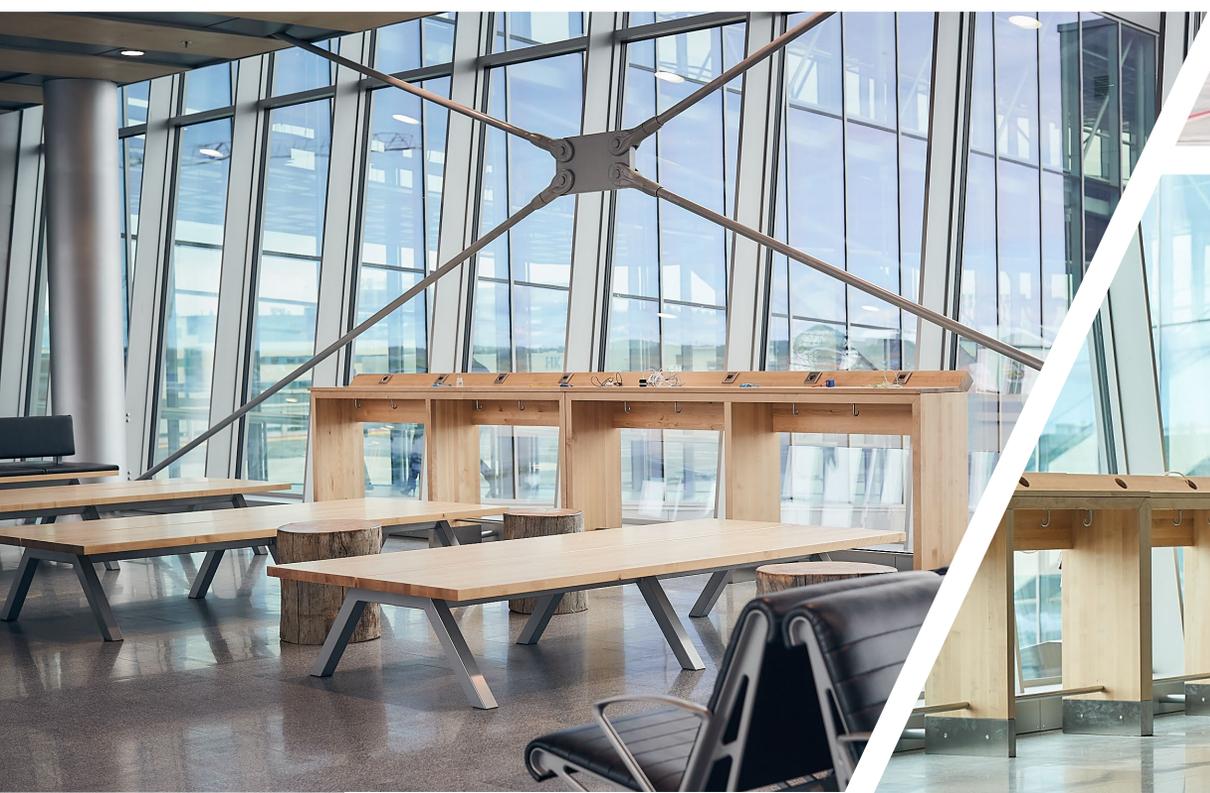
**Developer:** Finavia

Helsinki Airport opened in 1952 welcoming the Olympic Games to Finland and has continued to attract visitors from all over the world. It now serves a total of 21 million users per year, with a daily average of around 57,500 passengers.

To keep up with the demands of a modern airport Finavia's base in Helsinki needed to be expanded. The company's corporate strategy emphasises responsibility and sustainability for construction projects, as well as energy efficiency. Finavia opted to certify all major extension projects at Helsinki Airport with BREEAM, aiming to achieve an Excellent rating. **Finavia found that BREEAM's holistic approach ensured Finavia covered all aspects of their corporate strategy seamlessly.**

### Innovation

This is clear from Helsinki Airport South Pier's performance in the Management and Waste categories, where it achieved scores of 96% and 80% respectively. Key to achieving these scores were Stakeholder collaboration and CAVE consultations, for which the project achieved an Innovation Credit. CAVE is a form of consultation that involves a virtual reality experience of the building prior to completion, giving participants the opportunity to provide feedback therefore reducing the need for late design and building alterations and / or user complaints. These CAVE consultations, called "safaris", were organised several times during the design process. The virtual reality events proved beneficial as major changes were made to the design saving money, time and natural resources due to the reduced need for alterations later on in the project or to the finished building. Some of these changes would not have been noticed had the stakeholder collaboration been based on 2D drawings. Each group participated in numerous virtual reality events, and were able to see how their comments had influenced the end design.



## Energy

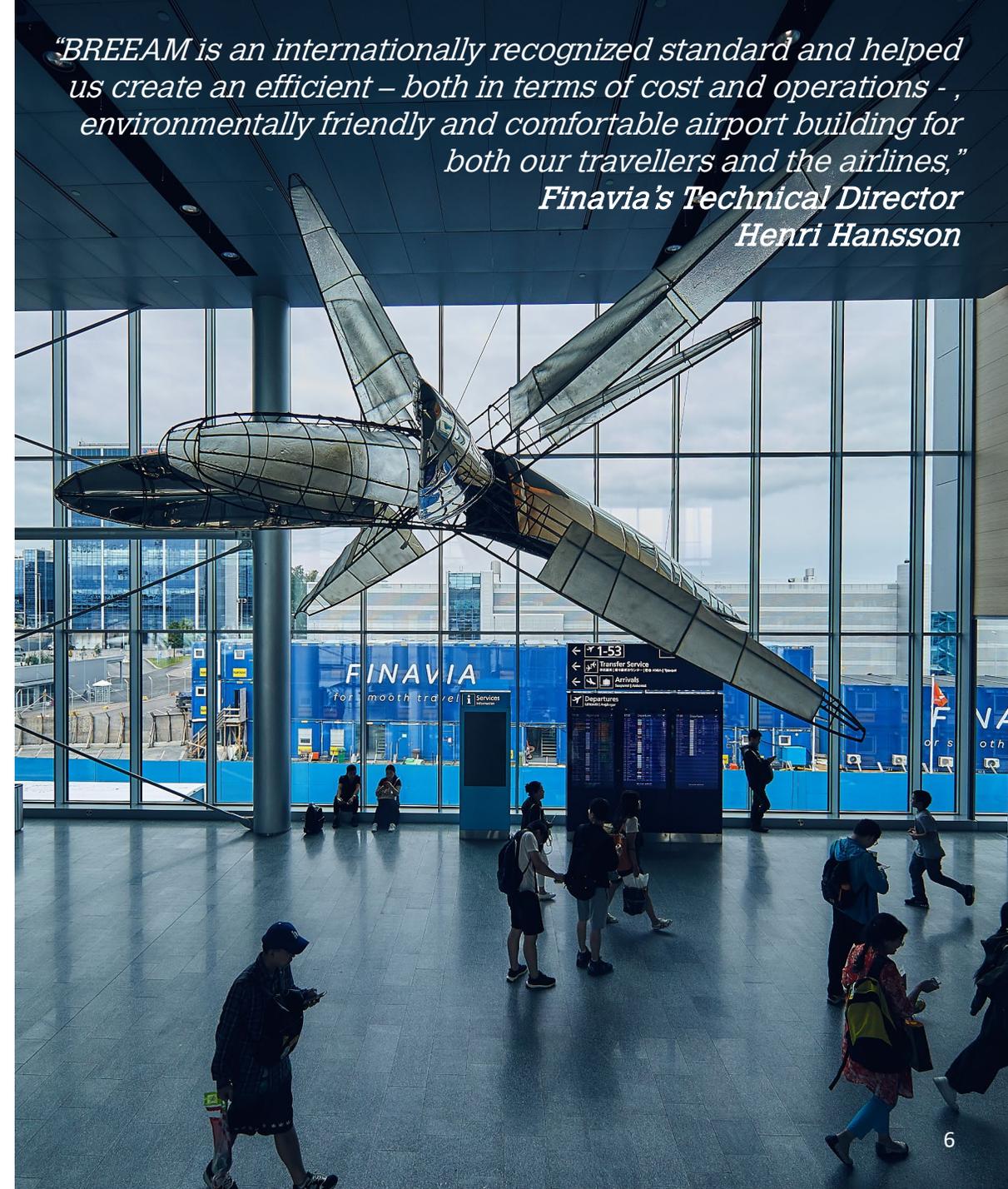
Energy efficiency is a key part of Finavia's strategy and is a significant factor when working towards the goal of carbon neutral airports. Helsinki Airport became carbon neutral in 2017, and the rest of Finavia's 20-airport network aims to be carbon neutral in 2019. Low carbon features include efficient use of electricity provided by solar panels installed on the rooftop of the terminal and heating from district heating systems. There is energy efficient transportation, external lighting and energy monitoring throughout the building. Finland's first moving airport walkway was installed and chosen based on its energy efficiency features. These measures allowed for the project to achieve a category score of 83% for Energy within BREEAM.

## Health and Wellbeing

Finavia has found that **certifying against BREEAM has contributed to the creation of a smooth traveller experience**. Prior to opening 200 volunteers tested the functionality of the extension. The new extension was found to be full of light, comfortable and well-functioning. The 4,500m<sup>2</sup> of external glass facades allows for plenty of daylight to penetrate all corners of the building and provides travellers with views of planes soaring off the runway.

The southern extension was the first phase of Helsinki Airport to be completed and receive final certification, the western extension is to be completed late 2019 and is pursuing its own final BREEAM certification after completion.

*"BREEAM is an internationally recognized standard and helped us create an efficient – both in terms of cost and operations – , environmentally friendly and comfortable airport building for both our travellers and the airlines,"*  
**Finavia's Technical Director  
Henri Hansson**



## Partnerships

The success of BREEAM and CEEQUAL is due to the support and input we receive from our partners, stakeholders and assessors, all of whom promote best practice in terms of sustainability. One project which has provided invaluable insight to BRE as we work to develop and adapt BREEAM and CEEQUAL is **Crossrail**.

Working with BRE Crossrail developed a tailored criteria to ensure BREEAM was appropriate for this type of project. The criteria evolved over the course of the project and the need for modification and deletion of credits became evident due to the unique challenges the sites and building type would face.

Due to the scale of the scheme, Interim CEEQUAL assessments were carried out for eight separate work packages, each achieving an 'Excellent' rating. Work packages included portals, shafts, the running tunnels and sprayed concrete lining.

### Landscape and Ecology

As the project involved existing sites with over station developments outside the scope of the assessment, the ability to enhance the ecology was limited. Crossrail had already established a relationship with the RSPB to help develop Wallasea Island as a wetland bird habitat by using materials from station excavations to create Jubilee Marsh, a wetland conservation area. Discussions with BREEAM allowed Land Use and Ecology credits, to be awarded for the creation of Jubilee Marsh, an ecologically relevant site remote from the stations.

Detailed consideration of materials and vegetation are examples of two measures which meet a number of CEEQUAL criteria including minimising maintenance, improving visual screening and mitigating visual intrusion of the scheme. The scheme design includes green roofs and planting at the Eleanor Street Headhouse – both of which will encourage biodiversity.





An estimated 200 million annual passengers will use Crossrail<sup>1</sup>



### Challenges

For an underground station, the natural light requirement in Health and Wellbeing is challenging. A large glass canopy was constructed at Paddington Station to allow natural light to filter down to the below ground ticket hall. As a result, the use of more daylight will need to be a focus point for future underground stations.

Construction noise is one potential impact on neighbours to the project and the Crossrail Construction Code was developed with the aim of managing and minimising a host of noise and vibration effects. Noise & Vibration Management Plans within CEEQUAL seeks to control and limit noise and vibration levels to ensure that adjacent properties and other sensitive receptors are protected from excessive levels. This was achieved through temporary relocation and noise insulation, monitoring, selection and use of low-impact equipment. For example, Vibro concrete columns was originally proposed for piling at the Connaught Tunnel, but this was replaced by a less noise-intensive construction method – Controlled Modulus Column piling – to reduce the impact on neighbours.

A Tunnelling and Underground Construction Academy was created by Crossrail to develop local skills. Providing training on the key skills required to work in and around a tunnel excavation and built environment, the Academy addresses the shortage of people with the necessary skills to work on the project. Over 3,500 people will be trained at the Academy during the construction of Crossrail, ensuring all personnel on the project achieve the Crossrail Safety Card before working on any Crossrail site.

<sup>1</sup> <http://www.crossrail.co.uk/news/crossrail-in-numbers>

## Relations with the local community and other stakeholders

Crossrail carried out extensive stakeholder and public consultation in advance of the Parliamentary process. In 2003 and 2004, over 50 days of exhibitions were held to explain the proposals at over 30 different locations. Over 200,000 invitations were distributed to the properties of residents and businesses along the proposed route. A planning forum was established to providing a theatre for the main point of discussion of key issues with local authorities. The Crossrail Community Relations Strategy ensures that communication with the public is facilitated. This has been achieved through leaflets, letters, Community Liaison Panels, Area Community Relations Officers, monthly and annual community relations reports and the Crossrail Bulletin. There is a helpdesk for the public with a contact number published on all site hoardings, and a Crossrail Visitor Centre for members of the public to visit. A community drop-in centre is operated prior to any sensitive works. This allowed the Crossrail scheme to score highly in CEEQUALs Relations with the Local Community and other Stakeholders category.

## Lessons Learned

Crossrail found that the **early adoption of BREEAM and CEEQUAL is crucial** to minimising design costs and delivering better environmental solutions.

Keeping a record of credits that were unable to be sought due to a late application of BREEAM can help educate future projects and allow them to obtain these credits and improve performance. Additionally, the use of CEEQUAL on the project provided a clear framework for evidence collection which has assisted the overall contract closeout process.

Another issue faced by projects such as Crossrail is the long duration. Where almost a decade passes between launch and breaking ground, design teams need to look at their designs and how it will hold up to performance expectations when built.

For an overview on Crossrail's experience with BREEAM please read their report *BREEAM for Underground Stations*; <https://learninglegacy.crossrail.co.uk/documents/breem-for-underground-stations/>

For insights into Crossrail's experience with CEEQUAL please visit the CEEQUAL case studies website; <http://www.ceequal.com/category/case-studies/crossrail/> and the Crossrail Learning Legacy Report; <https://learninglegacy.crossrail.co.uk/documents/ceequal-in-complex-projects/>



# On the Road

Buses and Coaches play a vital role in joining communities and linking those who might otherwise be isolated. They are part of the fabric of every town, taking us to school, hospital and keeping our high streets busy.

While public transport is a more efficient travel option than car use, the system is heavily reliant on fossil fuels, and the challenge will be to better align development of the network with low-carbon options.

Here you'll find examples of where BREEAM and CEEQUAL have helped bus, coach stations and associated infrastructure achieve sustainable outcomes.



**Stoke-on-Trent Bus Station (BREEAM-0035-7202)**  
**Assessor: Waterman Infrastructure & Environment Ltd**  
**Developer: Stoke-on-Trent City Council**  
**Scheme: UK Bespoke 2008**  
**Rating: Very Good**

*“The tenets of CEEQUAL have been integral throughout the design, construction and operation of the guided busway.”*

*The compilation of evidence for the submission has served as an educational tool, it has enabled project team members to reflect on success and failures and highlight where environmental record keeping needs to be improved.*

*On future projects it is envisaged that greater reference will be made to CEEQUAL evaluation criteria which will ultimately improve the environmental credentials of future project’s design and construction.”*

**- Transport for Greater Manchester**



*'Translink are committed to focusing on the circular economy, capitalising on opportunities to develop innovative solutions to improve resource efficiency and reduce, reuse, recycle and recover materials.'*

*'As a result Translink have targeted the BREEAM 'Excellent' Standard for new builds and 'Very Good' for refurbishment projects over £1m.'*

- Translink NI

<https://www.translink.co.uk/Documents/Corporate/publications/CorporateResponsibility/CorporateResponsibilityStrategy.pdf>



**Antrim Integrated Bus and Rail Station (BREEAM-0035-4118)**  
Assessor: AH Design  
Developer: Translink NI  
Scheme: UK Bespoke 2008  
Rating: Excellent  
Score: 70%



**Exeter Bus Station (BREEAM-0070-9097)**  
Assessor: Ove Arup and Partners  
Developer: Exeter City Council  
Scheme: UK Bespoke 2008  
Rating: Very Good  
Score: 59.7%

*“Birmingham Coach Station was one of the first of the city's new major transport gateways and has played a key role in the ongoing regeneration of Digbeth.*

*It was also the first coach station to receive a BREEAM excellent rating for environmental build, featuring a number of significant green benefits including: sustainable construction methods and materials used throughout the rebuild, rainwater harvesting which provides 100% of the water used for customer toilets, and energy saving technology such as motion light sensors”.*

**- National Express  
Adam Cook, UK Property Director**

**Digbeth Coach Station (BREEAM-0021-4841)**

**Assessor: Ambient Energy & Environment Ltd**

**Developer: National Express**

**Scheme: UK Bespoke 2006**

**Rating: Excellent**

**Score: 72.51%**





Slough Bus Station (BREEAM-0029-4371)

Assessor: Buro Happold  
Developer: Slough Borough Council  
Scheme: UK Bespoke 2008  
Rating: Very Good  
Score: 56.14%

*“Sustainability was a key imperative for Slough Borough Council and a variety of efficiency measures were incorporated into our design approach.*

*The bus station uses ground source heat pumps connected to high efficiency heating and cooling systems to reduce energy consumption, with a closed loop well field situated under the main forecourt of the bus station. Rainwater from the main canopy is collected and recycled on site to be used for toilet flushing. As a result, the bus station achieved a BREEAM ‘Very Good’ rating.”*

- Buro Happold

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