

Encouraging resilient assets using BREEAM



Foreword



The year 2020 will go down in our collective history as the year in which the resilience of our environment, society and economy all came sharply into focus.

The threats to the society and the economy caused by the COVID pandemic, and the need to build back better, have only highlighted the urgency of climate change and the

imperative to act, not only to mitigate it, but also to adapt to its consequences. The BREEAM family of standards has a strong impact on the built environment, ranging from infrastructure and communities to domestic and non-domestic buildings at various lifecycle stages. We believe that instilling resilience in response to physical, social and transition risks is becoming a priority, as part of a risk management mechanism that can protect people, property and the planet.

At the same time, all those changes, whether they are directly related to climate change and physical risks or to the transition to a low-carbon economy, bring with them opportunities. BREEAM encourages these opportunities to be embraced, so that they can lead to a successful adaptation to the changing climate and the evolving social and financial needs.

The BREEAM family of standards has a role to play in shaping decisions that positively influence the resilience of the built environment. We want to see a world where resilience is an integral part of sustainability and creates a better future for the environment and society.

A handwritten signature in black ink, appearing to read 'Shamir Ghumra'.

Shamir Ghumra
BREEAM Director

Resilience in a changing world

The physical risks and impacts climate change poses to the built environment are no longer theoretical but beginning to impact assets and portfolio values. The threats and losses that the sector faces as a result of climate change have only been amplified by the arrival of the COVID pandemic and the subsequent social and economic impacts. However, leaders of the industry are also beginning to better appreciate the urgent need to understand and manage the risks and opportunities related to the transition to a low-carbon economy.

The world is always changing, with known threats and opportunities shifting and new ones emerging. The ability to successfully endure and thrive in this changing world depends on how quickly the impact of these changes is acknowledged, opportunities are embraced and the risks are mitigated. There is a clear imperative for the rating of the sustainability performance of assets; not just how they have performed to date but how prepared they are for the changes coming tomorrow. Evaluating and acting to strengthen the resilience of assets and portfolios, along with other aspects of social and environmental performance, is business-critical to managing financial risks and to delivering business value over time.

The aim of this paper is to bring together elements of resilience from different BREEAM standards and lifecycles and to present our vision for this topic moving forward. It also aims to demonstrate the resilient characteristics of BREEAM certified assets and the value to be gained when assets identify and manage risks related to climate change and other challenges. The paper presents this as part of the wider work that BRE has conducted and continues to deliver in the field of resilience within the built environment, reinforcing the robustness of our standards.

Defining resilience

Resilience goes beyond surviving physical events like natural disasters; it is at the heart of how asset value is protected and grows over the longer term, whatever the challenges our environment, society and economy face.

For the purposes of BREEAM, we have adopted the definition of resilience as **'the capacity of built assets and infrastructure to endure acute shocks and chronic stresses while successfully adapting to long term changes'**.

The scope of this includes all built systems and infrastructure assessed under BREEAM. This includes the implementation of risk management and other procedures for the assets' operation and maintenance, but it excludes organisational management.

Resilience across BRE

Resilience is not only an integral part of BREEAM, but is also at the heart of BRE's research capabilities. Projects such as the dementia friendly home or the flood resilient repair house have been carried out by our [Centre for Resilience](#). Our long and proven experience in these areas and the learning from other parts of the company, puts us at the forefront of Resilience in the built environment.

BRE Centre for Resilience



The virtual BRE Centre for Resilience was established to conduct research, learn, trial and test innovations and to develop new standards and approaches to climate and societal change, extreme weather and other unforeseen disruptions to homes, buildings and infrastructure. In addition to physical risks, it tackles issues in society such as changing demographics, the ageing population and growing pressures on health and social care services. Projects have included the creation of a demonstration home that is both resistant and recoverable after flooding events and a dementia friendly home which can support occupants at every stage of their lives, and through illness and the changes that are part of the ageing process.

[Learn more about the Flood Resilient Repair House.](#)

The role of security in resilience

SABRE
delivered by **bre**

Resilience in many ways is about risk management, particularly in the case of security. When determining appropriate, proportionate and effective security measures able to mitigate the constantly evolving threats of crime and terrorism, linking performance to risk is key. **SABRE** is a security assessment and certification standard for buildings and built infrastructure assets owned by BRE Global and offers users an independently assessed security risk management rating. In an increasingly security conscious world, **SABRE** allows organisations to evidence their commitment to security and to communicate their ability to manage security risks. This provides valuable assurance to tenants, insurers, investors, regulators, planning authorities and other interested parties. The learnings from **SABRE** are used within BREEAM, where it is recognised as a standard that meets the security-related requirements for new build non-domestic projects, as well as in-use assets, at an exemplary level.

The vision

Our vision is that of a built environment where resilience is considered integral to the definition of a sustainable asset, along with environmental performance and the protection and enhancement of the users' health and wellbeing. This includes resilience across different scales and projects where:



Climate change-related physical risks are assessed, mitigated and adaptation measures are taken.



The risks related to a transition to a low carbon economy are identified and mitigated, whilst the relevant opportunities are recognised and embraced.



Risks related to security and to the changing needs of the assets' users are identified and managed.



Building and infrastructure dependencies and interdependencies are considered in the evaluation of risks and the application of solutions.



Building occupant support and wider social community cohesion are encouraged and recognised.

Value Drivers for Resilience

The value of resilience is increasingly recognised by the real estate industry. As risks are managed more efficiently and hazards are mitigated, building operating costs become lower and spaces become more desirable. This means lease downtimes are shorter, whilst there is a potential for rent premiums and increased tenant retention. Resilience can translate to higher net operating incomes whilst also growing and protecting value. Resilience is not only a valuable risk management mechanism, but it often comes with considerable financial and operational benefits.

Features of resilient assets

Resilience can be characterised by four key features, known as the 4Rs: **R**esistance, **R**eliability, **R**edundancy, **R**esponse and **R**ecovery. These can have different focus across sectors, life cycle stages and asset types. This framework provides the basis for understanding how the BREEAM family of standards address this topic now and informs what aspects need to be incorporated in the future. Resistance and reliability have been, so far, the main focus of our standards. Response and recovery, as well as redundancy, are now identified as areas to explore further in the future.

The 4Rs of Resilience

Resistance

Preventing damage or disruption by providing the strength or protection to resist the hazard or its primary impact.

Reliability

The asset or systems are designed to operate under a range of set conditions and hence mitigate damage or loss from an event.

Redundancy

The availability of backup installations or spare capacity to enable operations to be switched or diverted to alternative parts of the system in the event of disruption to ensure continuity of service.

Response and Recovery

Enabling a fast and effective response to and recovery from disruptive events.

The scale and sector are significant factors determining the aspects of resilience that are most critical for various projects. For example, an industrial building project may focus more on functional adaptability and being flexible to the changing needs of the market, as well as on business continuity. On the other hand, an infrastructure project involves much longer-term planning and aspects like the dependency¹ on other infrastructure is a concern that has to be accounted for. At this scale, both, upstream and downstream dependencies as well as interdependencies, are crucial when designing infrastructure projects in ensuring that the measures taken to design for future needs are effective.

The journey so far

The BREEAM family of standards have, for many years, included requirements that cover various aspects of resilience. This was mostly expressed through measures that support adaptation to climate change and functional adaptability.

Climate change adaptation involves the identification of vulnerable materials and building areas and the implementation of measures that can protect them. BREEAM aims to minimise the impact of any acute events by seeking to protect the physical asset and its operational value. The approach that BREEAM takes towards physical risks and resilience ensures that occupants, and surrounding communities remain safe during incidents.

Functional adaptability aims to address the risk of an asset becoming obsolete due to the occupants' or owners' changing needs, and associated with lack of flexibility. BREEAM enhances the ability to adapt to those changing needs and hence helps manage relevant risks.

Case Study

Canary Wharf Group – One & Five Bank Street



Picture taken on behalf of Canary Wharf Group

The Canary Wharf Group has been an early adopter of the climate change requirements of BREEAM. For their One & Five Bank Street Canary Wharf, which achieved an Outstanding BREEAM rating, the team developed a Climate Change Adaptation and Resilience Strategy, in line with the BREEAM requirements. This resulted in implementation of viable design solutions to mitigate risk over the development lifetime.

Key insights from One & Five Bank Street are already informing Canary Wharf Group's approach to another seven BREEAM Outstanding buildings within its development pipeline to 'build back better' from the COVID-19 pandemic.

¹ A dependency is a relationship between two products or services in which one product or service is required for generating the other product or service (or both are interdependent on each other).

The 4Rs of Resilience expressed across the BREEAM family of standards

	Resistance	Reliability	Redundancy	Response and Recovery
Adaptation to climate change: ensuring the building can withstand extreme weather changes resulting from climate change and changing weather patterns	✓	✓		
Functional adaptability: ensuring that disruption and cost are minimised if future adaptation is needed	✓		✓	✓
Flood and surface water management: minimising the risk and impact of localised flooding on-site and off-site	✓	✓	✓	✓
Material durability and resilience: reducing the need to repair and replace materials due to extreme weather	✓	✓		
Physical security: ensuring the reduction of security risks	✓	✓		
Natural hazards: assessing and mitigating natural hazard risks	✓	✓		
Future thermal comfort: designing for adaptation to overheating under projected climate change scenarios	✓	✓		
Water leak detection: decreasing the risk of damage due to water	✓			
Risk assessment and mitigation: assessing and mitigating the risks and negative impacts associated with natural hazards, intentional threats and climate change	✓	✓		
Alarm systems: ensuring the asset is equipped with appropriate alarm systems to prevent damage	✓	✓		
Emergency plans and climate-related physical risks: aiming to protect property and the environment in addition to people	✓	✓		
Climate-related transition risks and opportunities: encouraging the assessment of the exposure to climate-related transition risks and opportunities	✓			
Social risks and opportunities: encouraging the assessment of the asset's exposure to social risks and opportunities	✓			

Integrating a resilience category

In 2019, BREEAM established a Resilience Core Technical Team (CTT) to review how the BREEAM family of standards currently supports resilience at all lifecycle phases of buildings, communities and infrastructure and to identify opportunities to improve and expand the ways in which resilience is encouraged and recognised.

With the launch of BREEAM In-Use v6, BREEAM became the first assessment method to explicitly integrate resilience alongside environmental performance in a sustainability standard. This brought together existing issues which used to be parts of other environmental categories, but also allowed BRE to include new areas of interest, such as social risks and opportunities and those related to the transition to a low carbon economy, aligning BREEAM with The Task Force on Climate-related Financial Disclosures (TCFD). It also firmly established resilience as a key component of the assessment of the sustainability of building assets, communities and infrastructure.



BREEAM International 2016 New Construction – Outstanding

Site selection and resilience

Sustainability needs to be integrated early in the design process of any project and this is when BREEAM standards can have the maximum impact. Considering sustainability requirements later in the process, means some opportunities for improving or maximising the potential might be lost.

Natural hazards and climate change related physical risks, as well as digital, geographical and physical dependencies are very often related to the specific site and are an important aspect to consider when selecting a site and later when designing for this site. This is an area the BREEAM standards have a challenge influencing and enhancing, as site selection is determined by multiple other factors and typically happens before the decision to use BREEAM is made.

BREEAM has focused on mitigation later in the project lifecycle by requiring risk assessments that will identify, mitigate and encourage the adaptation to any physical threats, in the context of the specific site and project. However, we recognise that in this case prevention or avoidance may result in more sustainable and cost-effective outcomes. We are considering how best to encourage site selection during the planning and design phases in future versions of BREEAM.

Task Force on Climate-related Financial Disclosures

The transition to a low-carbon economy is linked to policy, legal, technological and market risks, but also opportunities for organisations focused on climate change mitigation and adaptation solutions. BREEAM In-Use v6 encourages and recognises the assets being assessed for social risks and opportunities, as well as the external disclosure of the metrics used in this process. This, along with the assessment and mitigation of physical risks, is in alignment with the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD), which bring the 'future' nature of climate-related issues into the present and solicit forward-looking information on potential financial impacts of climate change.

To learn more, please visit www.fsb-tcfid.org

“The BREEAM assessment process gave us much broader outlook onto the way we should approach design. We learned the importance of combining project management, design and build processes. We are convinced that the eco-friendly perspective allowing enhanced performance should lay at the centre of our future projects. Thanks to BREEAM we noticed the factors that have the strongest impact at the way the buildings should be designed and built – the current and forecast changes in climate force us to take into account the type of materials are being used – if they are certified, how they are sourced and transported. The analysis carried out as a result of BREEAM assessment will become a standard procedure for our future commercial projects.”

SKYSAWA Building A,
Poland

Just before publication of this paper, the world's first BREEAM In-Use Residential certification was awarded to Federated Hermes-managed Cargo Building in Liverpool. The asset underwent a rigorous evaluation process to benchmark and assess its sustainability performance across a selection of key areas, focusing on energy efficiency, health and wellbeing and resilience. The high score in the Resilience category shows that the asset is well-prepared for physical risks and future-ready, giving assurance to all stakeholders that the asset meets a high standard of sustainability performance.

“As responsible investors, we adopt a long-term approach to investment and believe that assets which can demonstrate active responsible management, supported by the credentials of a world recognised benchmark, perform more strongly over time than others in the same asset class. Rather than looking at investment decisions in purely financial terms, we take a holistic view of how our portfolio impacts on our wider ecosystem, always looking at ways to deliver strong returns while making a positive contribution to society as a whole.”

Sharon Brown, Director,
Real Estate Risk & RPM Implementation at the
international business of Federated Hermes

Dependencies and interdependencies

For infrastructure projects, identifying and communicating dependencies is a key aspect, described as a minimum standard for the most ambitious infrastructure projects, aiming for an ‘Outstanding’ rating under CEEQUAL v6. Due to the scale of those projects, the criticality of the relevant assets and their elements at a local, regional or national level needs to be determined, to assess how other assets, the community or the environment would be impacted if the asset was to fail or not function as intended. At a building level, assets are seen as part of the wider community, where upstream dependencies are equally critical and should become part of the early consideration and decision making.

Case Study

Resilience in the Sustainable Development Goals



Goal 11 of the United Nations’ SDGs focuses on ‘sustainable cities and communities’, with the target to ‘significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters’ by 2030. Many assets are at a significant risk of flooding, i.e. they have a greater than 1 in 75 chance each year of being flooded. Apart from the initial effects of being flooded, once flood water has been drained, considerable resources (time and cost) are required to clean, refit and re-open buildings for operation. This has major impacts on business continuity that can be costly and time-consuming to manage. Understanding the risk of flooding that an asset is exposed to, is the first step to managing this risk. Flood risk assessment and management form the cornerstone of the resilience approach encouraged by the BREEAM family of standards, at all lifecycle stages of building assets, communities or infrastructure.

Quatuor-Building C in Belgium incorporated the Sustainable Development Goals to create an outstanding office space. In 2017, the project developer, Befimmo, integrated 15 of the 17 United Nations SDGs within its strategy thanks to an in-depth analysis of the 169 sub-goals of the SDGs. It has since then fully integrated its CSR policy in its Company strategy by means of 6 strategic axes that guide its day-to-day activities (integration in the city, the world of work, setting an example, mobility, dialogue and use of resources). The BREEAM standard offers a tool in line with this strategy. The criteria of the BREEAM New Construction standard have been a crucial driver to ensure that all aspects to create a sustainable building have been considered.

[Learn more about the relationship between BREEAM and the Sustainable Development Goals](#)





An evolving approach

Resilience should also be seen as a risk management mechanism, where the physical risks are identified and mitigated, adaptation measures are implemented, and this process consequently decreases compliance risks and potentially insurance costs. Assessing and identifying the risks early is critical, and it should involve their potential impact to assets' value, building users and the surrounding community.

At the same time, opportunities linked to energy efficiency, the use of low-carbon or renewable sources and the resulting cost savings should be evaluated and maximised. This ultimately is of interest to investors and future occupants who can benefit from the resilience features of the asset.

Social risks and opportunities

Social risks are particularly apparent and relevant now, as we experience the impacts of COVID-19 to our communities and economies. This crisis has made clear the interactions between different systems and the vulnerabilities asset value is exposed to from social risks. Resilience at the asset level is the first step of understanding and preparing in the context of the broader community. The next step includes identifying opportunities that can benefit not only an asset or an organisation, but also the wider community to which a particular asset contributes. Planning and decision-making should not only relate to and protect a specific asset and its occupants, but should also intentionally seek to protect neighbouring communities and interdependent infrastructure. The latest BREEAM In-Use v6 encourages social cohesion, by requiring the provision of a place that can be used not only by the building users, but by the broader community in case of an emergency.

Physical risks

- Flooding
- Natural disasters of geological origin
- Natural disasters of climatic or meteorological origin
- Wildfires
- Water damage
- Overheating
- Intrusion
- Recovery/business interruption losses

Transition risks

- Functional obsolescence
- Down cycle valuation
- Energy and resource expenses
- Reputation and social license to operate
- Regulatory compliance
- Fiduciary liability
- Insurance premium increases

Social risks

- Social disruption
- Public health
- Poverty
- Modern slavery/forced labour

The wider mission of BRE

BRE has been raising the standards of the built environment since 1921, and in the last few years has grown significantly, both through the achievements of our people and the acquisition of businesses with beliefs and goals aligned with our own.

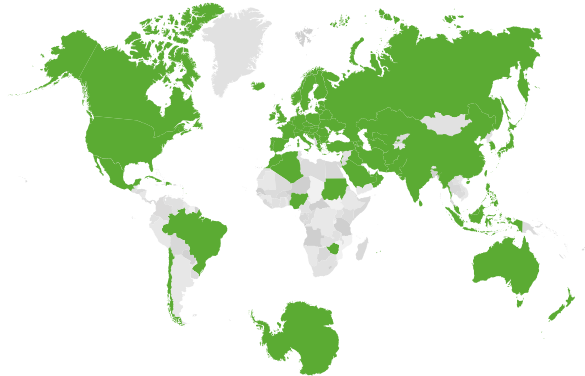
Our multi-disciplinary teams include leading experts – working in world-class facilities – in virtually every element of the built environment. They operate internationally, with offices, representatives and partners around the globe, and at our Head Office and major facilities in the UK. Our long heritage of putting progressive thinking into practice means that our customers and partners, wherever they are in the world, trust us to deliver. BRE is part of the BRE Trust, which uses the profits we make from our services to fund new research and education programmes.

We are committed to developing knowledge on every aspect of the built environment. Using that knowledge, we set the standards for the way buildings, homes and communities are made to keep people safe, protect the environment, make buildings affordable and to create places where people want to live, work and play.

BREEAM

Over the last 30 years BREEAM has evolved and grown to reflect advances in science, technology, policy and business. BREEAM is the world's leading sustainability assessment method for buildings and communities, with more than 572,000 certificates issued and a global reach encompassing over 87 countries.

BREEAM is now used in more than 87 countries worldwide



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BRE Global Limited

Headquarters
Bucknalls Lane
Watford, WD25 9XX
United Kingdom
+44 (0)333 321 8811
www.breeam.com