

**MMK226179 BREEAM**

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## ***INTRODUCTION***

This paper aims to provide strategies to improve the sustainability by assessing the focused building through Breeam. The building is a 230-240 bed hotel named “St Enoch Square Hotel” at the city Centre in Glasgow. The main purpose is to enhance the overall breeam rating of the building by applying sustainable methods on building. The paper will first discuss the concept of breeam followed by the analysis of ethos, scope and application of breeam. The paper will also discuss the rating criteria of breeam and related proposals to improve the overall rating of the concerned building to reduce its environmental impacts.

## ***WHAT IS BREEAM?***

BREEAM is the short form for Building Research Establishment Environment Assessment methodology and as the name suggests it is the method of assessing projects against sustainability and is used by various stakeholders of the project to learn about the environmental impacts of their projects in order to utilize resources effectively.

At present, it has been used in more than 50 countries with building assessments to over 260,000.  
(Introduction to breeam, 2014)

## ***BREEAM ETHOS:***

BREEAM can assist in improving the sustainability of buildings by assessing them on environmental criteria hence developing a best practice standard worldwide. This will be beneficial for both the building and the building users because it will increase the efficiency of the building and maintain the wellbeing of people of the building.

(Parker, n.d), (Breeam, n.d)

## ***SCOPE AND APPLICATION OF BREEAM:***

Bream has extended its scope from new individual buildings only at the construction stage to include the whole life cycle of buildings. Its regular updates and revisions that now include planning, operation and refurbishment stages are compelled by the requirements to improved sustainability.

The standards of bream can be applied to typically any building and on any location with versions available for existing and new buildings and large projects and projects for renovations.

Following are the major manuals available from oldest to latest.

**Breem Communities:** this manual helps in assessing the sustainability of large scale projects. (Breem communities, 2012)

**Breem refurbishment:** this manual helps in assessing the sustainability of the refurbishment projects. It has different versions available for domestic and non-domestic refurbishments and the one is for international and one is solely for UK. (Breem refurbishment, 2014), (Breem international, 2015)

**Breem in use:** this manual helps in improving the sustainability of existing building with an aim to reduce running cost and reducing the environmental impacts (Breem in use, 2015)

**Breem International new construction:** this manual helps in improving the sustainability of new buildings worldwide except for UK because UK has its own manual for new building's sustainability assessment (Breem International, 2015)

**Breem UK new construction:** this manual helps in assessing the sustainability of non-domestic buildings in UK. (Breem UK new construction, 2016)

### ***BREEAM METHODOLOGY OF ASSESSMENT:***

Through Breeam, the sustainability of the project is assessed based on various factors and then the project receives an overall rating in sustainability. The rating of the project depend on the total scores that the project receives based on various factors and different aspects of the project. If the project receives a score of above 85% or above, the project is regarded as outstanding in terms of sustainability. Similarly, ratings vary from excellent to very good, good, pass and unclassified based on the scores. Table, 1 illustrate the ratings in relation with the scores.

<b>BREEAM Rating</b>	<b>% score</b>
Outstanding	≥ 85
Excellent	≥ 70
Very good	≥ 55
Good	≥ 45
Pass	≥ 30
Unclassified	< 30

Table 1: breeam rating benchmark (breeam, 2020)

### ***BREEAM ASSESSMENT MAIN AREAS OF FOCUS:***

BREEAM has published several technical manuals which detail the scope of the assessment, the scoring process, the evidential requirements and the areas which will be assessed.

The BREEAM UK NEW CONSTRUCTION 2018 technical manual (BREEAM, 2018) addresses the 10 main categories of assessment that will contribute to the overall rating of the project.

<b>Management</b> <ul style="list-style-type: none"> <li>- Man 01 Project brief and design</li> <li>- Man 02 Life cycle cost and service life planning</li> <li>- Man 03 Responsible construction practices</li> <li>- Man 04 Commissioning and handover</li> <li>- Man 05 Aftercare</li> </ul>	<b>Health and Wellbeing</b> <ul style="list-style-type: none"> <li>- Hea 01 Visual comfort</li> <li>- Hea 02 Indoor air quality</li> <li>- Hea 04 Thermal comfort</li> <li>- Hea 05 Acoustic performance</li> <li>- Hea 06 Security</li> <li>- Hea 07 Safe and healthy surroundings</li> </ul>
<b>Energy</b> <ul style="list-style-type: none"> <li>- Ene 01 Reduction of energy use and carbon emissions</li> <li>- Ene 02 Energy monitoring</li> <li>- Ene 03 External lighting</li> <li>- Ene 04 Low carbon design</li> <li>- Ene 05 Energy efficient cold storage</li> <li>- Ene 06 Energy efficient transportation systems</li> <li>- Ene 07 Energy efficient laboratory systems</li> <li>- Ene 08 Energy efficient equipment</li> </ul>	<b>Transport</b> <ul style="list-style-type: none"> <li>- Tra 01 Transport assessment and travel plan</li> <li>- Tra 02 Sustainable transport measures</li> </ul>
<b>Water</b> <ul style="list-style-type: none"> <li>- Wat 01 Water consumption</li> <li>- Wat 02 Water monitoring</li> <li>- Wat 03 Water leak detection</li> <li>- Wat 04 Water efficient equipment</li> </ul>	<b>Materials</b> <ul style="list-style-type: none"> <li>- Mat 01 Environmental impacts from construction products - Building life cycle assessment (LCA)</li> <li>- Mat 02 Environmental impacts from construction products - Environmental Product Declarations (EPD)</li> <li>- Mat 03 Responsible sourcing of construction products</li> <li>- Mat 05 Designing for durability and resilience</li> <li>- Mat 06 Material efficiency</li> </ul>
<b>Waste</b> <ul style="list-style-type: none"> <li>- Wst 01 Construction waste management</li> <li>- Wst 02 Use of recycled and sustainably sourced aggregates</li> <li>- Wst 03 Operational waste</li> <li>- Wst 04 Speculative finishes (Offices only)</li> <li>- Wst 05 Adaptation to climate change</li> <li>- Wst 06 Design for disassembly and adaptability</li> </ul>	<b>Land Use and Ecology</b> <ul style="list-style-type: none"> <li>- LE01 Site selection</li> <li>- LE02 Ecological risks and opportunities</li> <li>- LE03 Managing impacts on ecology</li> <li>- LE04 Ecological change and enhancement</li> <li>- LE05 Long term ecological management and maintenance</li> </ul>
<b>Pollution</b> <ul style="list-style-type: none"> <li>- Pol01 Impact of refrigerants</li> <li>- Pol02 Local air quality</li> <li>- Pol03 Flood and surface water management</li> <li>- Pol04 Reduction of night time light pollution</li> <li>- Pol05 Reduction of noise pollution</li> </ul>	<b>Innovation</b> <ul style="list-style-type: none"> <li>- Inn 01 Innovation</li> </ul>

Table 2: Breeam Assessment Categories (Breeam, 2018)

***STRATEGIES AND METHODS APPLIED TO “ST. ENOCH SQUARE HOTEL”:***

This building is going to establish in UK after demolishing some portion of existing buildings.

Hence to establish its assessment categories, BREEAM UK NEW CONSTRUCTION, 2018 and BREEAM UK REFURBISHMENT, 2014 has been taken into consideration.

S.NO.	CATEGORY	DESCRIPTION	STRATEGY
1	MANAGEMENT	It is the adoption of management practices in design, construction and after construction phases that enhances the sustainability in projects	The management should be sourced to local laborers that would decrease the overall distance and cost of transport.
	MAN 01	Adoption of process that optimize project performance by avoiding needless cost	
	MAN 02	Adoption of process that use life cycle costing to improve design, specification and process.	
	MAN 03	Adoption of environmentally and socially managed construction sites and continuous monitoring of sites while reducing utility consumption	
	MAN 04	Adoption of process that ensure identification and rectification of defects and ensure fulfilling the needs of residents.	

	MAN 05	Adoption of providing assistance after operation during the initial year of the building to ensure that the building is responding according to the design and the need of the residents.	
2	HEALTH AND WELL BEING	Creating a healthy and safe environment both internally and externally by adopting methods that encourage health and safety of building users.	From the elevation of Howard street and Dixon street it seems that the opening is provided from ground to second. The opening should be covered with glass allowing full sunlight into the mall reducing the need of internal lightening. Also, to improve the security of the occupant's security guards should be provided.
	HEA 01	Adoption of methods that facilitate the building users by comfort of visual by providing external day light factors and maximize outside views.	
	HEA 02	Adoption of process that enhance improved air quality by catering pollution and harmful emission in the design and construction phases	
	HEA 03		
	HEA 04	Adoption of process that consider current as well as future climatic conditions and temperature control strategies to ensure thermal comfort to the users.	
	HEA 05	Adoption of process to provide suitable acoustic level to the	

		users for the activities in the residential spaces	
	HEA 06	Adoption of process to ensure safety of the residents by fulfilling their security needs	
	HEA 07	Providing safe sites and access to outdoor space to the residents that enhances their safety and well being	
3	ENERGY	The adoption of process that ensures energy efficient buildings by improving efficiency of the building and reducing emissions from carbon.	Installing of solar panels could improve the overall energy efficiency of the building as the solar energy has reduced impact on global warming. (Dincer, zamfirescu, 2012)
	ENE 01	Making design and accurate modelling that ensure energy efficient buildings	
	ENE 02	Adoption of process that assists in identifying and reducing high demands of energy by measuring the energy consumption of building accurately	
	ENE 03	Provision of external lightning that is energy efficient to reduce the energy consumption of building	
	ENE 04	Adoption of design solutions that are passive and zero carbon sources of energy to reduce the energy consumption of building.	



	ENE 05	Adoption of energy efficient systems of refrigeration that reduce the carbon emissions through design and installation.	
	ENE 06	Provision of optimum number and size transportation systems that are energy efficient to deduce the energy consumption of building	
	ENE 07	Provision of energy efficient instruments for building that reduces total energy demand that is un regulated.	
4	TRANSPORT	Adoption of process that provides building users with sustainable means of transports that reduces the carbon emission throughout the life span by reducing journeys through cars.	The provision of bus services at fixed time will encourage the occupants to arrive and depart at fixed times and hence ensuring sustainability by
	TRA 01	Reducing pollution through transport by providing good public transport	lowering the number of journeys. (sustainable transport solution)
	TRA 02	Development of facilities in close proximity that is accessible to the building residents	
5	WATER	Adoption of method that focus on identifying reduced water consumption means over the life span of the building	Rainwater recycling system is the process of recycling rain water for toilet flushing. It is an

	WAT 01	Adoption of method that reduce the water consumption demand by providing water collection and recycling systems.	ecofriendly method that and was used effectively in the One Angel Square Headquarters project and can also be used in St. Enoch Square hotel project.
	WAT 02	Adoption of methods that identify areas of high water usage and its causes to reduce its use.	
	WAT 03	Provision of leak detecting system and control devices to prevent unintended water consumption.	
	WAT 04	Provision of efficient system' to improve the design of process that utilize water other than sanitary and domestic use.	
6	MATERIALS	The adoption of methods that ensure efficiency of construction products in order to reduce environmental and social impacts.	Research says that aluminum windows lasts longer as compare to UPVC windows, which are cheaper in cost (Dardalis, 2012), hence the windows should be constructed of aluminum.
	MAT 01	Adoption of decision making process in the design after conducting life cycle assessment of the building to reduce environmental impacts	
	MAT 02	Declaring the environmental impacts of construction products so that they can be comparable for use.	

	MAT 03	This includes sourcing and transporting products at site responsibly	
	MAT 04		
	MAT 05	Adoption of products in design that prevent from degradation and hence increasing the building's life span	
	MAT 06	It encourage the efficient and optimum use of products in all stages of projects to reduce environmental impacts	
7	WASTE	The adoption of methods to ensure sustainable waste management by encouraging optimized design for waste minimization, functional requirements of present and future and measures to reduce waste in future.	As the St. Enoch square hotel will be built after demolishing the existing area, the demolished material could be recycled and used for the new construction and hence would minimize waste.
	WST 01	Adoption of resource management plan that focus on material recovery during demolition	
	WST 02	Use of aggregates that have less environmental impact to reduce waste and optimizing efficiency of materials.	

	WST 03	Provision of amenities to store recycled waste to divert the landfill's operational waste.	
	WST 04	To reduce waste only the agreed area should be provided with floor and ceiling finishes	
	WST 05	Adoption of measure to prevent extreme weather impacts during the building's life span.	
	WST 06	Adoption of methods in design that provide options related to adaptability and disassembly that ensure future changes.	
8	LAND USE AND ECOLOGY	The adoption of process which ensures sustainable use of land, biodiversity and protection of habitat.	The amount of landfill waste could be minimized by the provision of recycle plan which is an effective way in improving the sustainability credits of the building.
	LE 01	Encouraging reuse of land after appropriate remedy that has been established and contaminated previously.	
	LE 02	Determination of the strategy that provides opportunity related to site after identifying the ecological risks	
	LE03	Adoption of measures to reduce effects of ecology on existing site.	
	LE 04	Adoption of measures to enhance ecology of site.	

	LE 05	Adoption of measures to manage and maintain site ecology for thrive of both current and new ecological features.	
9	POLLUTION	Adoption of methods to ensure pollution control and surface water run off due to the location and function of building.	Sustainable sources of materials should be used and preference should be given to local suppliers because it will limit the fuel and carbon emissions due to travel time.
	POL 01	Reducing the impact of gas emissions due to refrigeration.	
	POL 02	Adopting methods to improve air quality by limiting their impact through the provision of combustion plants.	
	POL 03	Reducing the damage due to on site and off site flooding	
	POL 04	Provision of adequate light sources that reduces the impact of light pollution at night	
	POL 05	Adoption of measures to reduce external noise in the building	
10	INNOVATION	Adoption of innovative process and products for which a credit can be claimed.	

## ***CONCLUSION***

To conclude, In order to improve the sustainability breem provides 10 categories for assessment. The proper implementation of the strategies provided against each category would earn a credit for each and hence more the credits, the building would gain more rating and potentially improving sustainability.

For the St Enoch Hotel, number of methods and processes provided above that could be adopted to ensure sustainability for example: sourcing work to the locals, provision of glass on openings and aluminium on windows, installing solar panels, rainwater recycling systems, provision of fixed time bus services, that would all assists in achieving the overall “excellent” rating for the building.

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