



**COMPARATIVE ANALYSIS OF  
SUSTAINABLE BUILDING CERIFICATION TOOLS:  
APPLICATION FOR THE DEVELOPMENT  
OF A SUSTAINABLE  
REHABILITATION PROFILE.**

**GRADUATION PROJECT**

MASTERS IN SUSTAINABLE DEVELOPMENT  
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**Stefanie Madriz**

Director: Albert Cuchí



**UNIVERSIDAD POLITÉCNICA DE CATALUÑA**

Instituto de la Sostenibilidad

Catedra Unesco

Escuela Técnica Superior de Arquitectura del Vallés

Escuela Técnica Superior de Ingenieros de Caminos, Canales y Puertos de Barcelona

Escuela Universitaria de Ingeniería Técnica Industrial de Terrassa

**Gracias a mi tutor Albert Cuchí, a mi familia y a mis amigos.**

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## ABSTRACT

A big percentage of the environmental impacts caused by industry come from the construction sector. In Spain almost 30% of the total CO<sub>2</sub> emissions come from the use of residential and non-residential buildings. Apart from the energy and water consumption of the operational stage of the building, the resource extraction and material manufacture stages must also be considered, as they represent between 25-30% of the total energy consumption of the building's life cycle<sup>1</sup>. Therefore a building as a single body represents a great impact in the environment, the amount of resources consumed and waste produced are excessive and, without any doubt, unsustainable.

Under these considerations, this investigation intends to define the rehabilitation of buildings as an answer to address environmental impact. By optimizing management, organization and improving the physical performance of the stock of existing buildings, the rehabilitation with environmental goals embraces the possibilities of transforming the construction sector, by giving way to the concept of re-use and recycle and encouraging these answers in order to recover resources from existing structures instead of extracting them, and improving the buildings operation and management to increase its life cycle performance.

But rehabilitating a building is not a simple process. Many factors must be taken into account especially when the building is operating. Certifying tools for sustainable buildings give the guidance, through a list of criteria, to accomplish a level of sustainable efficiency in the building, for either new construction or existing buildings. The certifying tools for existing buildings have been developed to assess their current performance in operation and maintenance, and the potential they have to improve. The certifying tool for new constructions guides the building from the design stage to the construction stage to accomplish a physical and inherit sustainable performance. By analyzing and comparing both types of assessment tools and from different organizations (LEED and BREEAM), it is intended with this work to develop a tool that will not only certify a rehabilitated building, but will also shows the steps, the criteria and procedures for a Sustainable Rehabilitation.

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<sup>1</sup> Gerardo Wadel "La Sostenibilidad en la Construcción Industrializada: La Construcción Modular Ligera Aplicada a la Vivienda"

## **OBJECTIVES**

### **General Objective**

Develop a Profile that defines criteria, steps and procedures to rehabilitate a building with environmental objectives, and that may be used as an assessment tool to achieve a certification for sustainable rehabilitation.

### **Specific Objective**

Analyze the differences and relationships between the assessment for new constructions and the assessment for existing buildings of each of the defined certifying tools.

## 1. INTRODUCTION: Rehabilitation in a Sustainable Context

If we thought of a building as a living organism that can be compared to any individual living creature, we would realize there are great similarities in the way they work. All living organisms are capable of reproduction and growth, they need food (energy) and water in order to develop and stay alive and throughout their whole life they consume resources and produce waste until the day they die and decompose, becoming nutrients that are then absorbed back into earth. This is the law of nature, to be born, to live and die, and like this every single living organism closes the life cycle to let other new organisms be born and repeat the cycle over and over again.

Buildings work in a similar way, they are also reproduced and created by manufactured materials and piece by piece they grow to become habitable for us human beings. In every step of the process the building consumes energy and water in order to grow and develop and maintain its operations, and also in every step of the way it consumes resources and produces waste until it is demolished and sent away to a landfill. So, in theory, yes they could be compared, but in reality the difference is vast. Buildings also have a life cycle but different from the one of a living organism, they are not born from the nutrients of other dead buildings and they are not demolished and taken to landfill to become absorbed by earth again. Unlike the living organism's life cycle that is circular and closes with every life, a building has a linear cycle of extraction, manufacture and waste production. And in every step of the way they consume large amounts of valuable resources and contaminate air, water and soil.

This difference comes from the materials that each are made of. Living organisms are all made of living, organic material; the one that is produced and developed naturally. However, modern buildings are made of manmade materials; the ones that are extracted from nature but have to go through chemical alterations (that need vast amounts of energy and water), in order to become standardized and accepted by the construction market.

It does sound nice to think of a building as a living organism that closes its cycle. However, facts show us that a building can have a great impact on the environment if it is not designed, built and operated the right way. Fig. 1 shows the average energy consumption and CO<sub>2</sub> emissions a building can have during its life cycle. When analyzing these figures, it can be seen that the highest energy consumption and CO<sub>2</sub> emissions is done in the operation and maintenance period the building is in use, followed by the extraction and manufacture of the materials to build it. Transport, construction, demolition and waste seem to be insignificant next to the two mentioned above, though they are also factors that can create a lot of impact since they depend on factors that can vary from case to case, i.e. transport can be a great impact if the materials used for the construction of a building in Brazil are being brought from China.

Let's concentrate first on the operation and maintenance of a building in use. With an average life of 60 years a building can emit 1600kgCO<sub>2</sub>/m<sup>2</sup>, 64% of the total emission related to energy consumption generated throughout its life. Energy efficiency is one of the biggest challenges architects and engineers face when designing and constructing a building. It is one of the two most important resources that are indispensable for the operation of a building, and it represents a high operational cost for every organization.

## LIFE CYCLE OF BUILDING

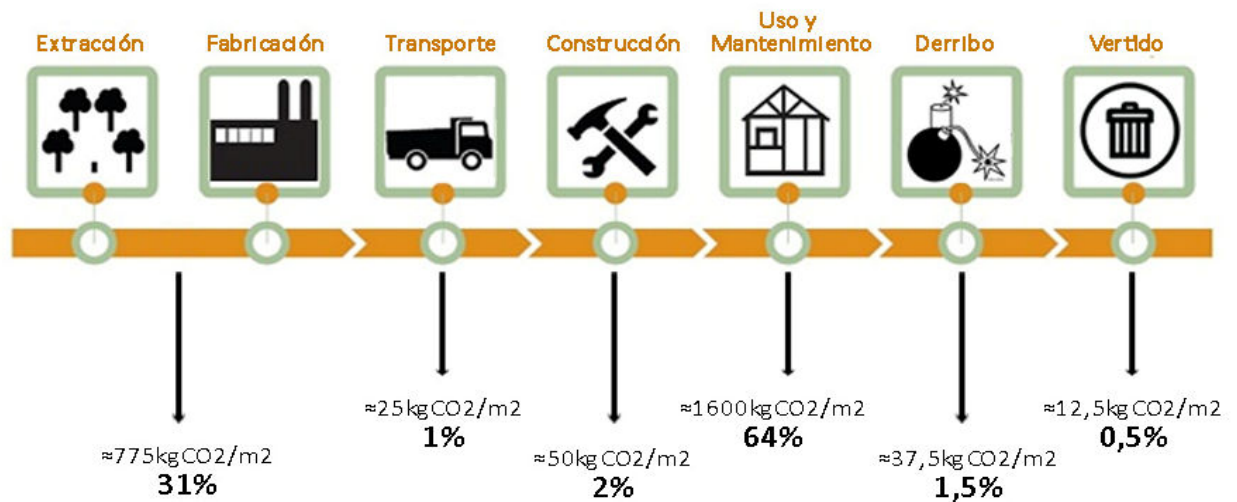


Figure 1: Energy consumption and CO<sub>2</sub> emission generated by a building during its life cycle.<sup>2</sup>

The second of the two most important resources is water. Although in many countries of the world it is still considered an abundant resource and price is still not as high as energy, it will in a close future start to run short and when it does it does it will represent high costs such as the energy ones. When it comes to water consumption it's the same as CO<sub>2</sub> emissions and energy, the highest amount and percentage takes place during the stage of operation and maintenance of the building in use.



| Water Consumption     | m <sup>3</sup> /m <sup>2</sup> | %    |
|-----------------------|--------------------------------|------|
| Materials Manufacture | 13,92                          | 16%  |
| Construction          | 0,14                           | 0,2% |
| Occupancy (60 years)  | 70,84                          | 83%  |

Figure 2: Building's water consumption.<sup>3</sup>

Most of the water consumption during the occupancy of a building is because of the use of inefficient fixtures and plumbing that consume a lot more water than what they really need to work. "Each day 5 billion gallons of potable water are used solely to flush toilets"<sup>4</sup>. On the other hand, the erroneous mistake of designing inappropriate landscapes, using species that are not local and demanding excessive quantities of water, is also a main reason for the rise of water consumption per year.

<sup>2</sup> ALBERT SAGRERA – El cicle de vida dels materials de construcció. La problemàtica dels residus. Aspectes aplicats.

<sup>3</sup> ALBERT SAGRERA – El cicle de vida dels materials de construcció. La problemàtica dels residus. Aspectes aplicats.

<sup>4</sup> USGBC – Introduction to the LEED for Existing Buildings Operation and Maintenance Reference Guide.



Waste is also an important issue since a building produces waste from the day it starts to be built until it is demolished and becomes waste itself. “A typical North American commercial building generates about 1.6 pounds of solid waste per employee per day. In a building of 1500 employees, that can amount to 300 tons of waste per year.”<sup>5</sup> Figure 3 shows the average per person per day for domestic and construction waste.



Figure 3: Waste Generation of a Building.<sup>6</sup>

On the other hand, most of the time all this waste generated was ones virgin, natural, non-renewable organic material extracted from earth and transformed into something inorganic. Once it's been used, it ends up in landfills and new material has to be extracted all over again to produce the same material.

All this impacts contribute year after year to the planet's depletion. In addition other factors come together and make the effect even bigger. Greenhouse gases produced by industrialization of the construction sector pollute the air every day and chemicals contaminate rivers and oceans. Sites are contaminated and damaged to become brownfields and trees are cut year after year to give space to urban developments, because the demand of buildings grows as well as all the resources that create them.

After knowing all this, the idea of comparing the building to a living organism is hard to conceive. Getting to know a buildings footprint can be overwhelming, especially when the whole life cycle is considered. The biggest challenge a building has is to accomplish the closure of the material cycles. This would lead to the absence of extraction from earth and the absence of waste flows, without mentioning the considerable reduction of energy and water used in these procedures.

The current productive model (extraction » manufacture » residue), is inherited from an industrial vision practiced in the past century. The amount of resources extracted, energy consumed and waste produced is excessive and, without any doubt, unsustainable. The opposite

<sup>5</sup> Office of the Federal Environmental Executive - <<http://ofee.gov/wpr/wastestream.asp>>

<sup>6</sup> ALBERT SAGRERA – El cicle de vida dels materials de construcció. La problemàtica dels residus. Aspectes aplicats.

of this idea would be one set out by an ecological point of view, where the concept of residue is eliminated and the cycle can be summarized to (recycle » manufacture » recycle)<sup>7</sup>.

By giving way to the concept of **re-use and recycle**, this work defines rehabilitation as an answer to the environmental problem, the kind of rehabilitation that involves a change of physical, operational and organizational aspects of the building. These are three aspects that allow the building to stay alive. If they are carried out and done correctly the impact can be reduced considerably but if they are not then the building becomes an unsustainable consuming waste machine.

Rehabilitation can be seen as an opportunity to address the environmental impacts by improving the management, organization and physical performance of the existing building stock. The average unoccupied housing buildings in Europe is 6,8% of the total. In the U.K. it is 4,8%, in Germany 3,6% and in the Netherlands 2,3%. A sustainable scenario for unoccupied housing buildings would be to reach a 2% of the total by the year 2050<sup>8</sup>. These figures show the large amount of buildings that are empty or abandoned, most of the time because they are old buildings that have become uninhabitable, unaffordable or insecure.

These are the buildings that need rehabilitation, instead of an increasing demand for new buildings; there should be an increasing demand for establishing new models of habitability for the existing ones that respond to the social and environmental parameters. But rehabilitation is not a simple task, especially if it is aimed to fulfill environmental objectives. Making physical changes to a building can be hard, but making changes to people's behavior can be even harder.

The purpose of this investigation is to once more contribute to this change. Sustainable building certifications provide the guideline to achieve the best sustainable performance within a new building. They can also provide the guidelines for the best operation and maintenance performance of an existing building. But there is still not a certification tool for the process of rehabilitation that will include all the aspects in a single. The aim of this work is to examine the existing certification tools in order to compare and analyze the criteria each uses in order to evaluate buildings. And by doing this examination develop a sustainable rehabilitation profile that will allow the project teams to use as a guideline to follow in the pursuit of a certification.

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<sup>7</sup> Gerardo Wadel "La Sostenibilidad en la Construcción Industrializada: La Construcción Modular Ligera Aplicada a la Vivienda"

<sup>8</sup> Cambio Global España 2020/50

## 2. SUSTAINABLE BUILDINGS CERTIFICATION TOOLS

### 2.1. Background



Before the comparative analysis is presented it is important to state the importance of the Sustainable Building Rehabilitation Tools. First of all, the Sustainable Building Certification Tools can be defined as environmental assessment systems or methods that are used as tools to recognize a building that complies with certain sustainability criterion and therefore has an efficient performance and a low environmental impact. The aim of these tools is to stimulate the demand for sustainable buildings and enable them to

be recognized according to their environmental benefits and with a credible environmental label.

These tools have been designed and developed to ensure the best environmental practices incorporated in building planning, design, construction and operation and raise the awareness amongst owners, designers and operators of the benefits of buildings with reduced life cycle impact on the environment. By creating this awareness, the tools challenge the market to provide innovative, cost effective solutions that minimize the environmental impact of buildings.

These tools have been designed and developed to meet a list of sustainability principals<sup>9</sup>:

1. Ensure **environmental quality** through an accessible, holistic and balanced measure of environmental impacts.
2. Use **quantified measures** for determining environmental quality.
3. Adopt a **flexible approach**, avoiding prescriptive specification and design solutions.
4. Use **best available science** and **best practice** as the basis for quantifying and calibrating a cost effective performance standard for defining environmental quality.
5. Reflect the **social and economic benefits** of meeting the environmental objectives covered.
6. Provide a **common framework** of assessment that is tailored to meet the ‘local’ context including regulation, climate and sector.
7. **Integrate construction professionals** in the development and operational processes to ensure wide understanding and accessibility.
8. Adopts **third party certification** to ensure independence, credibility and consistency of the label.
9. Adopts **existing industry** tools, practices and other standards wherever possible to support developments in policy and technology, build on existing skills and understanding and minimize costs.
10. **Stakeholder consultation** to inform ongoing development in accordance with the underlying principles and the pace of change in performance standards (accounting for policy, regulation and market capability).

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<sup>9</sup> BREEAM 2011 Scheme Document - <http://www.breeam.org>

For this work, two of the most important Sustainable Building certification systems will be analyzed in order to understand how they work, what they evaluate and how they evaluate it:

- Leadership in Energy & Environmental Design (LEED)
- BRE Environmental Assessment Method (BREEAM)

## 2.2. Leadership in Energy & Environmental Design (LEED)



LEED stands for *Leadership in Energy & Environmental Design*, it is an internationally recognized green building certification system developed by the United States Green Building Council (USGBC); a non-profit trade organization that promotes guidance in how buildings are designed, built, and operated under sustainable principals.

This green building certification is voluntary but required or under consideration as a requirement for certain buildings in many U.S. localities. It has the purpose of providing building owners and operators a concise framework for identifying and implementing practical and measurable green building design, construction, operations and maintenance solutions. In addition, it provides third-party verification that a building is designed and built using strategies intended to improve performance in concerns such as energy savings, water efficiency, CO<sub>2</sub> emissions reduction, improved indoor environmental quality, and resource consumption.

The evaluation system refers to several institutions, norms, guidelines or procedures created in the United States; however this hasn't limited LEED certification to American territory. There are many countries adapting the criteria to their context to achieve LEED certification for their projects and buildings. The formation of accredited technicians and auditors around the world has each time become a greater interest for construction companies or consultancies in environmental matters. Since its inception in 1998, the U.S. Green Building Council has grown to encompass more than 7,000 projects in the United States and 30 countries. The hallmark of LEED is that it is an open and transparent process where the technical criteria proposed by USGBC members are publicly reviewed for approval by the almost 20,000 member organizations that currently constitute the USGBC.

Since its foundation in 1998, LEED has evolved to more accurately represent and incorporate emerging green building technologies. LEED NCv1.0 was a pilot version. These projects helped inform the USGBC of the requirements for such a rating system, and this knowledge was incorporated into LEED NCv2.0. LEED NCv2.2 was released in 2005, and v3 in 2009. Today, LEED consists of a suite of nine rating systems for the design, construction and operation of buildings, homes and neighborhoods.

Five overarching categories correspond to the specialties available under the LEED Accredited Professional program. That suite currently consists of:

1. Green Building Design & Construction

2. Green Interior Design & Construction
3. Green Building Operations & Maintenance
4. Green Neighborhood Development
5. Green Home Design and Construction

### Methodology

All LEED certification systems use a verification checklist methodology. This list consists of a series of criteria that will evaluate, through the acquisition of points, if the project meets the requirements to receive one of the different certification standards. Within the list of criteria there is a number of PREREQUISITES. These are considered criteria that must be achieved as an obligatory requirement in order to obtain the Green Building certification. In other words, when a LEED certification is desired, two things must be accomplished; first, the minimum number of points required for the lowest rating, and second, to comply with all the PREREQUISITES specified in the assessment tool list.

All LEED prerequisites and credits have identical structure:

- Intent: The objective of each prerequisite or credit.
- Requirements: What must be done to earn each prerequisite or credit.
- Potential Strategies and Technologies: Possible methods for achieving each prerequisite or credit.

This methodology is widely used by other assessment systems in the building sector; some organizations adapt the requirements to the conditions and specifications of their countries, keeping the same structure and organization of the evaluation system.

To determine the weighting each one of the criteria has, a quantitative study has been made to estimate the impacts generated by construction activities, by using models of study cases that are also used to establish the action that can potentially be taken to mitigate the impacts. The weighting of each criterion was determined depending on the proportion of the contribution this has on the mitigation of the total impact.

Below is a list of the impacts that are considered by LEED to be present in construction activities.

- Carbon Footprint
- Fossil fuel depletion
- Water use
- Land Use
- Acidification
- Eutrophication
- Ozone Depletion
- Smog formation
- Particulates
- Human Health
- Indoor Quality

LEED addresses to several environmental issues that buildings must deal with in order to respond to these environmental impacts:

1. Sustainable Sites
2. Water Efficiency
3. Energy and Atmosphere
4. Materials and Resources
5. Indoor Air Quality
6. Innovation

Each one of the assessment tools belonging to LEED has its own quantity of points depending on the weighting of the criteria used. According to the points obtained a building can be awarded the following ratings:

**CERTIFIED → SILVER → GOLD → PLATINUM**

### **2.2.1 LEED for New Building and Major Renovations**

The LEED for New Constructions and Major Renovations (LEED-NC) provides a set of performance standards for certifying the design and construction phases of commercial, institutional buildings and high-rise residential buildings. The specific credits in this assessment tool provide guidelines for the design and construction of buildings of all sizes in both public and private sectors. The intent for LEED New Construction is to assist in the creation of high performance, healthful, durable, affordable and environmentally sound commercial and institutional buildings.

LEED for New Constructions addresses to the six Environmental Issues mentioned above; *Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Air Quality, Innovation in Design*. It can be used to certify all commercial buildings as defined by standard building codes, including (but not limited to) offices, retail and services establishments, institutional buildings (libraries, schools, museums, churches, etc.), hotels and residential buildings of four or more habitable stories.

This tool is modeled for assessing design and construction for both new buildings and major renovations of existing building. A major renovation involves elements of major HVAC renovation, significant envelop modifications and major interior rehabilitation. If however, the project scope does not involve significant design and construction activities and focuses more on Operation and Maintenance, LEED for Existing Buildings is the most appropriate tool for the project.

The LEED for New Constructions ratings are awarded according to the following scale:

|           |                |
|-----------|----------------|
| CERTIFIED | 26 – 32 points |
| SILVER    | 33 – 38 points |
| GOLD      | 39 – 51 points |
| PLATINUM  | 52 – 69 points |

The project checklist of LEED for New Construction and Major Renovations, containing all the criteria that are evaluated in the process and the weighting of each credit can be found in APPENDIX 1.

### **2.2.2 LEED for Existing Buildings: Operations & Maintenance**

The LEED for Existing Buildings: Operation and Maintenance Rating System is a set of voluntary performance standards for the sustainable ongoing operation of buildings not undergoing major renovations. It provides sustainability guidelines for building operations, periodic upgrades of building systems, minor space-use changes, and building processes. It is intended to provide existing buildings an entry point into the LEED certification process.

LEED for Existing Buildings addresses the six Environmental Issues mentioned before; *Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Air Quality, Innovation in Operation*. It can be used to certify all commercial buildings as defined by standard building codes, including (but not limited to) offices, retail and services establishments, institutional buildings (libraries, schools, museums, churches, etc.), hotels and residential buildings of four or more habitable stories.

This tool addresses building exteriors and site maintenance programs, efficient and optimized use of energy and water, the purchase of environmentally preferred products and food, waste stream management and ongoing indoor environmental quality. In addition, it provides sustainability guidelines for whole-building cleaning and maintenance, recycling programs and systems upgrades to improve building energy performance, water consumption, indoor air quality and material use.

Buildings that pursue a LEED for Existing building certification must meet the following minimum requirements:

- The building(s) must be fully occupied for at least the 12 continuous months preceding certification application.
- The LEED project scope must include 100% of the total floor area of each building in the certification application, with the exception separate management controlled operations.
- The building(s) must be in compliance with federal, state and local environmental laws and regulations.

In order to recollect performance data and other documentation, the LEED for Existing Building requires the evaluation to be submitted to a *performance period*. This is the specific, defined time interval for which sustainable operations performance is being measured. This may be defined by the project team depending on the criterion to be evaluated, but the performance period will be limited to a minimum of three months for all prerequisites and credits except for some in Energy & Atmosphere which have longer minimum duration. The performance period can be extended to a maximum of 24 months after application.

The LEED for Existing Building ratings are awarded according to the following scale:

|           |                |
|-----------|----------------|
| CERTIFIED | 34 – 42 points |
| SILVER    | 43 – 50 points |
| GOLD      | 51 – 67 points |
| PLATINUM  | 68 – 92 points |

The project checklist of LEED for Existing Buildings: Operation & Maintenance, containing all the criteria that are evaluated in the process and the weighting of each credit can be found in APPENDIX 1.

### 2.3. BRE Environmental Assessment Method (BREEAM)



BREEAM stands for *BRE Environmental Assessment Method*, it is an internationally recognized green building certification system developed in the UK by the Building Research Establishment (BRE); an originally government establishment but now a private organization, funded by the building industry, that

carries out research, consultancy and testing for the construction and built environment sectors in the United Kingdom.

This green building certification is voluntary and it has the purpose of providing building owners and operators a concise framework for identifying and implementing practical and measurable green building design, construction, operations and maintenance solutions. In addition, it provides third-party verification that a building is designed and built using strategies intended to improve performance in concerns such as energy savings, water efficiency, CO<sub>2</sub> emissions reduction, improved indoor environmental quality, and resource consumption.

BREEAM for Existing Buildings works under the custody of BRE Global Limited's, criteria, guidelines and procedures; however this hasn't limited BREEAM certification to UK territory. There are many countries adapting the criteria to their context to achieve BREEAM certification for their projects and buildings. The formation of accredited technicians and auditors around the world has each time become a greater interest for construction companies or consultancies in environmental matters. Since it was established in 1990, BREEAM has grown in scope and geographically, with 200.000 buildings certified since it was first launched. The hallmark of BREEAM is that it uses a straightforward scoring system that is transparent, flexible, and easy to understand and supported by evidence-based science and research.

#### Methodology

The BREEAM certification system also uses a verification checklist methodology. This list consists of a series of criteria that will evaluate, through the achievement of points, if the project meets the requirements to receive one of the different certification standards.

The criteria listed in the BREEAM assessment tools are grouped into a series of environmental issues:



1. Management
2. Health and Wellbeing
3. Energy
4. Transport
5. Water
6. Materials
7. Waste
8. Land Use & Ecology
9. Pollution
10. Innovation (additional)

Each environmental issue has its own weighting depending on the number and weighting of the criteria in it. Each one of the assessment tools belonging to BREEAM has its own quantity of points. According to the points obtained, a building can be awarded the following ratings:

**UNCLASSIFIED → PASS → GOOD → VERY GOOD → EXCELLENT →  
OUTSTANDING**

The two assessment tools that belong to BREEAM and will be examined in this work (BREEAM for New Construction and the BREEAM In Use), have different methodologies, these will be explained separately below.

### **2.3.1 BREEAM for New Constructions**

BREEAM for New Constructions provides a set of performance standards for certifying the design and construction phases of new buildings. The main purpose of BREEAM New Construction is to reduce the life cycle impacts of new buildings on the environment in a cost effective manner. This is achieved through integration and use of the scheme by clients and their project teams at key stages in the design and procurement process. This enables the client, through the BREEAM Assessor and the BRE Global certification process, to measure, evaluate and reflect the performance of their building against best practice in an independent way. This performance is quantified by a number of individual measures and associated criteria stretching across a range of environmental issues.

This tool is modeled for assessing design and construction while the certificate and rating confirms that a new buildings 'as built' environmental performance meets the requirements of the BREEAM Standard. In order to maintain the building's performance into and throughout the operation and use stages of its life cycle, and to help building managers and users reduce the running costs of their building, regular assessment, auditing and certification against the BREEAM In Use Assets scheme is recommended.

BREEAM for New Constructions is designed to certify all commercial buildings as defined by standard building codes, including (but not limited to) offices, retail and services establishments, institutional buildings (libraries, schools, museums, churches, etc.), hotels and residential buildings of four or more habitable stories. It addresses to the same nine individual Environmental Issues mentioned above; *Management, Health and Wellbeing, Energy,*

*Transport, Water, Materials, Waste, Land Use & Ecology, Pollution*, plus a tenth category called *Innovation (additional)*. Within this issues there are forty nine individual criterions addressing to specific building related environmental impact and has a number of credits assigned to it. Credits are awarded when the building demonstrates that it meet the best practice performance defined for that criterion. The number of point that can be achieved per criterion depends on the importance of the criterion in terms of mitigating its impact.

Compared to the LEED tool, BREEAM for New Construction does not have Prerequisites (obligatory criterions for achieving the certification), what it does have are Minimum Standards. To achieve a particular BREEAM rating, the minimum overall percentage score must be achieved and the minimum standards, detailed and defined by a BREEAM table, applicable to that rating level must be achieved. For instance if the building achieves a minimum score percentage that reaches a VERY GOOD rating, then in order to be granted with it, it also needs to comply with the minimum standards (energy, water, waste etc.) defined for this level of rating.

The BREEAM for New Construction environmental section weighting is the following:

|                                |       |
|--------------------------------|-------|
| <b>Management</b>              | 12%   |
| <b>Health &amp; Wellbeing</b>  | 15%   |
| <b>Energy</b>                  | 19%   |
| <b>Transport</b>               | 8%    |
| <b>Water</b>                   | 6%    |
| <b>Materials</b>               | 12.5% |
| <b>Waste</b>                   | 7.5%  |
| <b>Land Use &amp; Ecology</b>  | 10%   |
| <b>Pollution</b>               | 10%   |
| <b>TOTAL</b>                   | 100%  |
| <b>Innovation (additional)</b> | 10%   |

The BREEAM for New Constructions ratings are awarded according to the following achieved percentages:

| <b>BREEAM Rating</b> | <b>% Score</b> |
|----------------------|----------------|
| OUTSTANDING          | ≥85            |
| EXCELLENT            | ≥70            |
| VERY GOOD            | ≥55            |
| GOOD                 | ≥45            |
| PASS                 | ≥30            |
| UNCLASSIFIED         | <30            |

The project checklist of BREEAM for New Construction and Major Renovations, containing all the criteria that are evaluated in the process and the weighting of each credit can be found in APPENDIX 1.

### **2.3.2 BREEAM In Use**

The BREEAM In Use assessment tool is a set of voluntary performance standards for the sustainable ongoing operation of buildings. It provides sustainability guidelines for building operations, periodic upgrades of building systems, quality of asset, and building processes. It helps building managers reduce the running costs and improve the environmental performance of existing buildings. It consists of a standard, easy-to-use assessment methodology and an independent certification process that provides a clear and credible route map to improving sustainability.

In order to gain credibility in its sustainability and carbon footprint levels, an organization's built asset must have an environmental performance credential. A building's operational cost can also be excessive when it doesn't have an efficient energy and water performance, plus other issues badly managed that can result on high costs. BREEAM helps organization to improve profitability, it is designed to:

- Change occupants behavior
- Reduce operational costs,
- Enhance the value and marketability of property assets,
- Provide a transparent platform for landlords, owners and tenants to identify and negotiate building improvements,
- Provide a route to compliance with environmental legislation and standards, including energy labeling and ISO 14001,
- Facilitate engagement with staff in the identification of productivity improvements and sustainable business practices,
- Provide a vehicle to evaluate and improve Corporate Social Responsibility (CSR),
- Provide genuine evidence of sustainability and CSR.
- Improve productivity

BREEAM In Use is designed to certify all commercial buildings as defined by standard building codes, including (but not limited to) offices, retail and services establishments, institutional buildings (libraries, schools, museums, churches, etc.), hotels and residential buildings of four or more habitable stories. It addresses to the same nine individual Environmental Issues mentioned above; *Management, Health and Wellbeing, Energy, Transport, Water, Materials, Waste, Land Use & Ecology, Pollution.*) Within this issues there are individual criteria addressing to specific building operational related environmental impact and has a number of credits assigned to it. Credits are awarded when the building demonstrates that it meets the best practice performance defined for that criterion by answering a series of question exposed on the online BREEAM In Use questionnaire. The number of point that can be achieved per criterion depends on the importance of the criterion in terms of mitigating its impact. Credit scores are multiplied by the category weighting factor assigned resulting in an overall points scores used to determine the asset's final rating.

This tool addresses building exteriors and site maintenance programs, efficient and optimized use of energy and water, the purchase of environmentally preferred products and food, waste stream management and ongoing indoor environmental quality. In addition, it provides sustainability guidelines for whole-building cleaning and maintenance, recycling programs and systems upgrades to improve building energy performance, water consumption, indoor air quality and material use.

The BREEAM In Use assessment tool evaluates three different sections of the building that are determining factors in its operation performance:

- a) **Asset Rating:** evaluates the building’s inherent performance characteristics based on its built form, construction and services.
- b) **Building Management Performance:** evaluates the management policies, procedures and practices related to the operation of the building; consumption of key resources such as energy, water and other consumables; and the environmental impacts.
- c) **Organizational Performance:** evaluates the quality of understanding and implementation of these management policies, procedures and practices; staff engagement; and delivery of key outputs.

Each one of these sections has a list of the nine environmental issues listed above, each with its respective number of criteria to evaluate.

A final rating is awarded when the appropriate number of credits has been achieved in each of the criteria. A star rating from one star to six stars is awarded alongside the rating of acceptable to outstanding. The BREEAM In Use ratings are awarded according to the following scale:

| <b>BREEAM Rating</b> | <b>% Score</b> | <b>Stars</b> |
|----------------------|----------------|--------------|
| OUTSTANDING          | ≥85            | *****        |
| EXCELLENT            | ≥70            | *****        |
| VERY GOOD            | ≥55            | ****         |
| GOOD                 | ≥45            | ***          |
| PASS                 | ≥30            | **           |
| UNCLASSIFIED         | <30            | *            |

The project checklist of BREEAM In Use, containing all the criteria that are evaluated in the process and the weighting of each credit can be found in APPENDIX 1.

### 3. COMPARATIVE ANALYSES BETWEEN ASSESSMENT TOOLS

To understand the differences and relationships between the assessment tools, this phase of the project is aimed to make a comparative analysis between the evaluation made to new constructions and the evaluation made to existing buildings in each one of the organizations (LEED and BREEAM).

#### 3.1 Comparison between LEED for New Construction & Major Renovations and LEED for Existing Buildings: Operation & Maintenance

LEED for NC & MR evaluates the same environmental issues as LEED for EB: 1) *Sustainable Site*, 2) *Water Efficiency*, 3) *Energy and Atmosphere*, 4) *Materials and Resources*, 5) *Indoor Air Quality*, and 6) *Innovation in Operations*. But they are each destined to evaluate the building in a different stage of its life cycle; therefore even though the issues are the same, they are in some cases, approached in a different manner.

A comparative table has been made for each one of the environmental issues, describing briefly the main purpose of all criteria, and identifying the different approaches made in each one. It is important to remember the stages of a building’s life cycle in order to understand the intention of each assessment tool and what each one is evaluating. LEED for New Construction is aimed for the buildings first stages of preparation, design and construction. In the case of Major Renovations this assessment tool behaves in a similar way but starting from the upgrade design. In both cases the criteria evaluate basically the building’s physical performance and are presented as cautious and preventing strategies to achieve the certification. On the other hand, LEED for Existing Buildings evaluates the management, procedures and practices related to the operation of the building during a performance period, and the impact these have in the environment. In other words, it evaluates how the building is handled by the occupants and the efficiency of their organization.

The methodology of associating the criteria was basically done by putting two columns together under the same environmental issue, one representing LEED for NC and the other LEED for EB. In this way the list of criteria of each tool is presented side by side so that they can be compared.

| ENVIRONMENTAL ISSUE  |  |
|--|--|
| LEED FOR New Construction and Major Renovations  | LEED Existing Buildings: Operation and Maintenance   |
| <b>CREDIT # :</b> <b>Credit Name</b><br>Criterion description.<br><div style="text-align: right;">Available Points</div> | <b>CREDIT # :</b> <b>Credit Name</b><br>Criterion description.<br><div style="text-align: right;">Available Points</div> |

Fig. 4: Model of comparative table.

During the analysis, different comparative cases were shown. Fig. 5 is an example of how two criterions with the same topic are approached in a different way in each case. Optimizing

Energy Performance of a non-existent building represents reducing design energy cost compared to a regular energy cost budget. To accomplish this, the design team must come up with a building envelope and building system to maximize energy performance. The use of a computer simulation model to assess the energy performance and identify the most cost effective energy efficient measures, is needed to prove an accomplished credit. The higher the percentage of reduction, compared to a baseline building, the more credits the building can obtain.

On the other hand, Optimizing Energy Performance credits of an existing building are obtained by achieving energy performance ratings, by using ENERGY STAR Portfolio Manager Tool to achieve an EPA rating or another LEED method used to measure throughout a performance period during the building operational stage.

| ENERGY AND ATMOSPHERE  |   |
|--|---|
| LEED FOR New Construction and Major Renovations  | LEED Existing Buildings: Operation and Maintenance  |
| <p><b>EA CREDIT 1: Optimize Energy Performance</b></p> <p>It is intended as a credit in the stage of design to achieve increasing levels of energy performance above the prerequisite standard to reduce environmental impacts associated with excessive energy use, through a functional design of the building's envelope and building's system.</p> <p style="text-align: right;">1-10 points</p> | <p><b>EA CREDIT 1: Optimize Energy Efficiency Performance</b></p> <p>It is intended as a credit in the stage of building's operation to achieve an increased level of operating energy efficiency performance relative to typical building of similar type to reduce environmental impacts associated with excessive energy use, by achieving EPA rating or demonstrating energy efficiency percentiles.</p> <p style="text-align: right;">(2 mandatory points) 1-15 points</p> |

Fig. 5: Comparative table of the Optimizing Energy Performance criterions.

Another case brought up during the analysis was that of the criteria that are applicable in one stage of the building but not in another, even though they are assessed under the same environmental issue. Fig. 6 shows an example of this case. Site Selection is an important issue for a non-existing building and a criterion that should be dealt with in the stage of preparation of the building. Obviously for an existing building it is not an applicable criterion since the building is already located on a site. Other criterions like Urban Redevelopment and Brownfield Redevelopment, in the Sustainable Site Issue, are also examples of criteria that can be applied on a new building but are not applicable in an existing one.

| LEED FOR New Construction and Major Renovations   | LEED Existing Buildings: Operation and Maintenance |
|---|--|
| <p><b>SS CREDIT 1: Site Selection</b></p> <p>It is intended as a credit in the stage of preparation to pursuit an appropriate site selection for the project development, in this way reducing environmental impact from the building's location.</p> <p style="text-align: right;">1 point</p> | <p>Not applicable to an existing building.</p>     |

Fig. 6: Comparative table between the Site Selection criteria on the Sustainable Site Environmental Issue.

The same thing happens the other way around. Certain criterions are not applicable to a non-existing building, usually the once that are related to management, measurement and

monitoring. Fig. 7 shows how the criterion Water Performance Measurement is intended to keep track of potable water consumption and performance over time; this is obviously not applicable to a non-existing building.

| WATER EFFICIENCY                                |   |
|---|---|
| LEED FOR New Construction and Major Renovations | LEED Existing Buildings: Operation and Maintenance  |
| Not applicable to a non-existing building.      | <p><b>WE CREDIT 1: Water Performance Measurement</b></p> <p>It is intended as a credit in the stage of building operation to implement water metering systems to measure and track potable water consumption and performance over time, in order to understand consumption patterns and identify opportunities for additional water savings.</p> <p style="text-align: right;">1-2 points</p> |

Fig. 7: Comparative table between the Water Performance Measurement criteria on the Water Efficiency Environmental Issue.

LEED also has criterions that could be taken into account in both cases but are only applied in one tool. Fig. 8 shows the criterion of *Green Cleaning: Entryway Systems* only under the LEED for Existing Building column. It is being approached as a management issue, one that should be taken into account during the operation stage of the building. Though, in a way it also involves physical aspect of the building that could be revised and prevented during the design stage, it is not mentioned in the LEED for New Construction tool. In this case the criterion box in this column remains blank.

| INDOOR ENVIRONMENTAL QUALITY                    |   |
|---|---|
| LEED FOR New Construction and Major Renovations | LEED Existing Buildings: Operation and Maintenance  |
|   | <p><b>EQ CREDIT 3.8: Green Cleaning: Entryway System</b></p> <p>It is intended as a credit in the stage of building's operation to reduce the exposure of occupants and maintenance personnel to potentially hazardous chemical, biological and particulate contaminants, which adversely affect air quality, human health, building finishes, building systems and the environment, by using entryway systems (grilles, grates, mats) to reduce the amount of dirt, dust, pollen and other particles entering the building at all public entryways.</p> <p style="text-align: right;">1 points</p> |

Fig. 8: Comparative table between the Green Cleaning Entryway System criteria on the Indoor Environmental Quality Issue.

Fig. 9 shows a different case where one criterion can be divided into different criterions when it is applied to another stage of the building. The Waste Management criterion for a New

Construction has one purpose (one criterion); to make sure all the waste produced during the construction stage of the building is being managed correctly. However, in an Existing Buildings, Waste Management has different purposes; four criteria, one for each relevant solid waste produced during the occupancy of a building, and that are considered to be a potential menace to the environment. This is another good example of how, in some cases, a criterion can be evaluated differently in each tool. It also shows the importance that management and organization have since the beginning of the building's life cycle, and how complex this can become in the stage of operation and occupancy.

The same thing happens in the criteria that are considered Prerequisites. Some are related, some are different, sometimes they are applicable in one case but not in the other, and in some cases they are considered a Prerequisite in one stage but a normal criterion in the other.

| INDOOR ENVIRONMENTAL QUALITY  |  |
|---|--|
| LEED FOR New Construction and Major Renovations   | LEED Existing Buildings: Operation and Maintenance   |
| <p><b>EQ PREREQ 2: Environmental Tobacco Smoke (ETS) Control</b></p> <p>Minimum requirement in the design and development stage to prevent the exposure of nonsmokers to ETS by prohibiting smoking in the building OR, designating separate smoking rooms with isolated ventilation systems.</p> | <p><b>EQ PREREQ 2: Environmental Tobacco Smoke (ETS) Control</b></p> <p>Minimum requirement in the stage of building's operation to prevent the exposure of nonsmokers to ETS by prohibiting smoking in the building, OR, providing separate smoking rooms with isolated ventilation systems.</p>  |
|   | <p><b>EQ PREREQ 3: Green Cleaning Policy</b></p> <p>Minimum requirement in the stage of building's operation to follow a green cleaning policy to reduce the exposure of building occupants and maintenance personnel to potentially hazardous chemicals, biological, and particulate contaminants, which affect air quality, human health, building finishes, building systems and the environment.</p> |

Fig. 10: Comparative table between the Green Cleaning Entryway System criteria on the Indoor Environmental Quality Issue.



| MATERIALS AND RESOURCES   |  |
|---|--|
| LEED FOR New Construction and Major Renovations   | LEED Existing Buildings: Operation and Maintenance   |
| <p><b>MR CREDIT 2: Construction Waste Management</b></p> <p>It is intended as a credit in the construction stage to implement a waste management plan to achieve recycle and/or salvage of construction, demolition and land clearing waste, in order to divert these debris from landfill disposal and redirect recyclable material back to the manufacturing process.</p> | <p><b>MR CREDIT 9: Solid Waste Management: Facility Alterations and Additions</b></p> <p>It is intended as a credit in the stage of building's operation to divert construction and demolition waste from disposal to landfills and incineration facilities and redirect recyclable recovered resources to the manufacturing process and redirect reusable material to appropriate sites. Divert at least 70% of waste.</p> <p style="text-align: right;">1 points</p>   |
|   | <p><b>MR CREDIT 6: Solid Waste Management: Waste Stream Audit</b></p> <p>It is intended as a credit in the stage of building's operation to facilitate the reduction of ongoing waste and toxins generated by building occupant and building operation that are hauled to and disposed of in landfills or incineration facilities All this by conducting waste management stream audits of the building's ongoing consumable waste stream.</p> <p style="text-align: right;">1 points</p>  |
|   | <p><b>MR CREDIT 7: Solid Waste Management: Ongoing Consumable</b></p> <p>It is intended as a credit in the stage of building's operation to facilitate the reduction of ongoing waste and toxins generated from the use of ongoing consumables products by building occupant and building operation that are hauled to and disposed of in landfills or incineration facilities. All this by reusing, recycling or composting 50% or more of the ongoing consumables waste stream.</p> <p style="text-align: right;">1-2 points</p>             |
|   | <p><b>MR CREDIT 8: Solid Waste Management: Durable Goods</b></p> <p>It is intended as a credit in the stage of building's operation to facilitate the reduction of ongoing waste and toxins generated from the use of durable goods by building occupant and building operation that are hauled to and disposed of in landfills or incineration facilities. All this by maintaining a waste reduction, reuse and recycling program that addresses durable goods that are replaced infrequently.</p> <p style="text-align: right;">1 points</p> |
| 1-2 points  |  |

Fig. 9: Comparative table between the Green Cleaning Entryway System criteria on the Indoor Environmental Quality Issue.

The following tables show an example of the comparative analyses made for the Energy and Atmosphere. The rest of the environmental issues can be found in Appendix 2:

# ENERGY AND ATMOSPHERE

| LEED FOR New Construction and Major Renovations  |  | LEED Existing Buildings: Operation and Maintenance   |  |
|--|--|--|--|
| <b>EA PREREQ 1:</b>  | <b>Fundamental Building System Commissioning</b> | <b>EA PREREQ1:</b>   | <b>Energy Efficiency Best Management Practices: Planning, Documentation and Opportunity Assessment</b> |
| Minimum requirement in the design and development stage to verify and ensure that fundamental building elements and systems are designed, installed and calibrated to operate as intended, by implementing fundamental best practice commissioning procedures.                           |  | Minimum requirement in the stage of building's operation to promote continuity of information to ensure that energy-efficient operating strategies are maintained and provide a foundation for training and system analysis, by implementing building operation plans and preventive maintenance programs to regularly monitor and optimize the performance. |  |
| <b>EA PREREQ 2:</b>  | <b>Minimum Energy Performance</b>                | <b>EA PREREQ 2:</b>  | <b>Minimum Energy Efficiency Performance</b>   |
| Minimum requirement in the design stage to establish the minimum level efficiency for the base building and systems, by using design tools and computer simulation models to assess and maximize the energy performance of the building.   |  | Minimum requirement in the stage of building's operation to establish the minimum level of operating energy efficiency performance for the building and system, by implementing building commissioning and using energy-saving operational and management practices. It is required to earn at least two points under Energy & Atmosphere Credit 1.          |  |
| <b>EA PREREQ 3:</b>  | <b>CFC Reduction in HVAC&amp;R Equipment</b>     | <b>EA PREREQ 3:</b>  | <b>Refrigerant Management: Ozone Protection</b>  |
| Minimum requirement in the design and development stage to reduce ozone depletion by preventing the use of CFC-based refrigerants in HVAC&R base building systems.   |  | Minimum requirement in the stage of building's operation to reduce stratospheric ozone depletion by eliminating the use of CFC-based refrigerants in HVAC&R base building systems if economically feasible or developed a phase-out plan that identifies a schedule for future replacement.  |  |
| <b>EA CREDIT 1:</b>  | <b>Optimize Energy Performance</b>               | <b>EA CREDIT 1:</b>  | <b>Optimize Energy Efficiency Performance</b>  |
| It is intended as a credit in the stage of design to achieve increasing levels of energy performance above the prerequisite standard to reduce environmental impacts associated with excessive energy use, through a functional design of the building's envelope and building's system. |  | It is intended as a credit in the stage of building's operation to achieve an increased level of operating energy efficiency performance relative to typical building of similar type to reduce environmental impacts associated with excessive energy use, by achieving an EPA rating or demonstrating energy efficiency percentiles.                       |  |
| 1-10 points  |  | (2 mandatory points) 1-15 points   |  |
| <b>EA CREDIT 2:</b>  | <b>Renewable Energy</b>                          | <b>EA CREDIT 4:</b>  | <b>On-Site and Off-Site Renewable Energy</b>   |
| It is intended as a credit in the stage of design to encourage and recognize increasing levels of self-supply through renewable technologies to reduce environmental impacts associated with fossil fuel energy use, by reaching higher than 5% rate in the use of renewable energies.   |  | It is intended as a credit in the stage of building's operation to encourage and recognize increasing levels of on-site and off-site renewable energies to reduce environmental impacts associated with fossil fuel energy use.  |  |
| 1-3 points   |  | 1-4 points   |  |

| LEED FOR New Construction and Major Renovations   |  | LEED Existing Buildings: Operation and Maintenance   |  |
|---|--|--|--|
| <b>EA CREDIT 3: Additional Commissioning</b><br><p>It is intended as a credit in the stage of design and development to verify and ensure that the entire building is designed, constructed and calibrated to operate as intended, by implementing additional commissioning to the Fundamental Building Commissioning Prerequisite 1 that will last since the early design phase till the end of construction.</p> <p style="text-align: right;">1 points</p> |  | <b>EA CREDIT 2: Existing Building Commissioning: Investigation and Analysis, Implementation, Ongoing Commissioning</b><br><p>Three intended credits in the stage of building's operation: 1) To develop an understanding of the operation of the building's major energy-using system;2) To implement minor improvements and identify planned capital projects to ensure that the building's major energy-using systems are repaired, operated and maintained;3) To implement commissioning to address changes in facility occupancy, usage, maintenance, and repair. Make periodic adjustments and reviews of building operating systems and procedures essential for optimal energy efficiency and service provision;all three with the purpose of optimizing energy performance.</p> <p style="text-align: right;">1-6 points</p> |  |
| <b>EA CREDIT 4: Ozone Depletion</b><br><p>It is intended as a credit in the stage of design to prevent the use of HCFC's or Halon in HVAC&amp;R equipment, in order to reduce ozone depletion and support early compliance with the Montreal Protocol.</p> <p style="text-align: right;">1 points</p>   |  | <b>EA CREDIT 5: Refrigerant Management</b><br><p>It is intended as a credit in the stage of building's operation to eliminate the use of refrigerants in base building HVAC&amp;R systems or try to operate the facility without mechanical cooling and refrigeration equipment, with the purpose of reducing ozone depletion and support early compliance with the Montreal Protocol while minimizing direct contributions to global warming.</p> <p style="text-align: right;">1 points</p>  |  |
| <b>EA CREDIT 5: Measurement and Verification</b><br><p>It is intended as a credit in the stage of design to assure ongoing accountability and optimizing of building energy and water consumption performance over time, by implementing strategies that will predict savings of water and energy and designing the building with equipment to measure energy and water performance.</p> <p style="text-align: right;">1 points</p>                           |  | <b>EA CREDIT 3: Performance Measurement: Building Automation System, System Level Metering</b><br><p>It is intended as a credit in the stage of building's operation to provide information to support energy management and the ongoing accountability and optimization of building energy performance and to identify opportunities for additional energy-saving investment and improvements.</p> <p style="text-align: right;">1-3 points</p>   |  |
| <b>EA CREDIT 6: Green Power</b><br><p>It is intended as a credit in the stage of design and planning to engage in a green power contract of local utilities, for the development and use of grid-source energy technologies on a net zero pollution basis.</p> <p style="text-align: right;">1 points</p>   |  |  |  |
|   |  | <b>EA CREDIT 6: Emission Reduction Reporting</b><br><p>It is intended as a credit in the stage of building operation to document the emissions reduction benefit of building efficiency measures, by identifying parameters that reduce conventional energy use and emissions, quantify those reductions and report them to a formal tracking program.</p> <p style="text-align: right;">1 points</p>  |  |
| <b>Possible Points:</b>   |  | <b>30</b>  |  |
| <b>Environmental Section Weighting</b>  |  | <b>33,3%</b>   |  |
|   |  | <b>17</b>  |  |
|   |  | <b>24,6%</b>   |  |

### 3.2 Comparison between BREEAM for New Buildings and BREEAM In Use

BREEAM for New Buildings evaluates the same environmental issues as BREEAM In Use: 1) Management, 2) Health and Wellbeing, 3) Energy, 4) Transport, 5) Water, 6) Materials, 7) Waste, 8) Land Use and Ecology, 9) Pollution and 10) Innovation. But, as mentioned before, they are each destined to evaluate the building in a different stage of its life cycle; therefore even though the issues are the same, they are in some cases, approached in a different way.

As well as in LEED, a comparative table has been made for each one of the environmental issues, describing briefly the main purpose of all criteria, and identifying the different approaches made in each one. Again, it is important to remember the stages of a building's life cycle in order to understand the intention of each assessment tool and what each one is evaluating. BREEAM for New Buildings is aimed for the buildings first stages of preparation, design and construction, the criteria evaluate basically the building's physical performance and are presented as cautious and preventing strategies to achieve the certification. BREEAM In Use also evaluates the building's physical condition as an asset, but in addition to this, it evaluates the management, procedures and organisational practice of the occupants in relationship with the operation of the building during a performance period, and the impact these have in the environment.

The methodology of associating the criteria for BREEAM was different from the one used for LEED, since the assessment for existing buildings is different. As mentioned before, BREEAM In Use divides the evaluation in three parts, a) Asset Performance, b) Building Management Performance and c) Organisational Effectiveness. This modifies the comparative table leaving it with two major columns; the first one for New Buildings and the second one which is for 'In Use' buildings is divided into three sub columns, one for each assessment part. Both major columns are under the same environmental issue, this way the list of criteria of each tool is presented side by side so that they can be compared.

| ENVIRONMENTAL ISSUE      |                  |                       |                            |                       |
|--------------------------|------------------|-----------------------|----------------------------|-----------------------|
| BREEAM for New Buildings |                  | BREEAM In Use         |                            |                       |
|                          |                  | ASSET RATING          | BUILDING MANAGEMENT RATING | ORGANISATIONAL RATING |
| Credit #:                | Criterion        | Criterion             | Criterion                  | Criterion             |
| Criterion description.   |                  | Criterion description | Criterion description      | Criterion description |
| Minimum Standards:       | Available points | Available points      | Available points           | Available points      |

Fig. 11: Model of comparative table for BREEAM Assessment Tools.

As well as in the analysis made for LEED, a series of comparative cases came up during its development. Fig. 12 is an example the first case where two criteria with the same topic are approached in a different way in each case. Reduction of CO2 Emissions in a new building, is considered as a preventive strategy in the stage of design, whereas for an existing building

BREEAM makes sure that the levels of CO2 emissions and operational energy demand are kept as low as possible, and that there is a permanent plan that involves management personnel and occupants to maintain these low levels.

| ENERGY  |  |   |   |
|---|--|---|---|
| BREEAM for New Buildings  | BREEAM In Use  |   |   |
|   | ASSET RATING   | BUILDING MANAGEMENT RATING  | ORGANISATIONAL RATING   |
| <b>Ene 01: Reduction of CO2 Emissions</b><br>It is intended as a credit in the design stage to recognize and encourage building is designed to minimize operational energy demand, consumption and CO2 emissions, by designing to improve the Energy Performance Ratio (EPR) and minimizing carbon dioxide emissions. | <b>Level of CO2 Emissions:</b><br>It is intended as a credit in the stage of building operation to evaluate the building's inherent performance when it comes to operational energy demand, consumption and CO2 emissions. | <b>Level of CO2 Emissions:</b><br>It is intended as a credit in the stage of building operation to maintain operating strategies that minimize operational energy demand, consumption and CO2 emission. | <b>Carbon Footprint:</b><br>It is intended as a credit in the stage of building operation to ensure operating strategies that minimize operational and occupants' energy demand, consumption and CO2 emission are maintained. |
| <b>Minimum Standards:</b><br>Yes  | 1 - 15 points  | 1 - 7 points  | 1 - 3,5 points  |

Fig. 12: Comparative table between the CO2 Emissions criteria on the Energy Environmental Issue.

The same as in LEED, another case brought up during the analysis is that of the criteria that are applicable in one stage of the building but not in another, even though they are assessed under the same environmental issue. Fig. 13 shows an example of this case. Site Selection is an important issue for a non-existing building and a criterion that should be dealt with in the stage of preparation of the building. Obviously for an existing building it is not an applicable criterion since the building is already located on a site.

| LAND USES & ECOLOGY  |                 |                            |                       |
|--|-----------------|----------------------------|-----------------------|
| BREEAM for New Buildings   | BREEAM In Use   |                            |                       |
|  | ASSET RATING    | BUILDING MANAGEMENT RATING | ORGANISATIONAL RATING |
| <b>LE 01: Site Selection</b><br>It is intended as a credit in the design stage to encourage the use of previously developed and/or contaminated land and avoid land which has not been previously disturbed. | Not applicable. | Not applicable.            | Not applicable.       |
| <b>Minimum Standards:</b><br>No  | 1-2 points      |                            |                       |

Fig. 13: Comparative table between the Site Selection criteria on the Land Use and Ecology Environmental Issue.

The same thing happens the other way around. Certain criterions are not applicable to a non-existing building, usually the once that are related to management, measurement and monitoring. Fig. 14 shows how the criterions Energy Audit and Energy Policies are intended to keep track of the building's energy consumption and performance over time; this is obviously not applicable to a non-existing building.

| ENERGY                   |               |   |   |
|--------------------------|---------------|---|---|
| BREEAM for New Buildings | BREEAM In Use |   |   |
|                          | ASSET RATING  | BUILDING MANAGEMENT RATING  | ORGANISATIONAL RATING   |
|                          |               | <b>Energy Audit</b><br>Maintain a permanent evaluation of the building's energy performance and compliance with policies. | <b>Energy Policies</b><br>Ensure the understanding and implementation of energy efficiency policies of the buildings occupants. |
|                          |               | 1 - 5,5 points  | 1 - 3,5 points  |

Fig. 14: Comparative table between: Energy Audit and Energy Policies under the Energy Environmental Issue.

BREEAM also has criterions that could be taken into account in both cases but are only applied in one tool. Fig. 15 shows the criterions of *Security* only under the BREEAM In Use column. It is being approached as a management issue, one that should be taken into account during the operation stage of the building. Though, in a way it could also be an important aspect of the building that could be planned during the preparation of the project and carried out during the construction to ensure the security of the personnel working onsite. However it isn't mentioned in the BREEAM for New Buildings tool. In this case the criterion box in this column remains blank.

| MATERIALS                |  |   |   |
|--------------------------|--|---|---|
| BREEAM for New Buildings | BREEAM In Use  |   |   |
|                          | ASSET RATING   | BUILDING MANAGEMENT RATING  | ORGANISATIONAL RATING   |
|                          | <b>Security</b><br>Recognize and encourage the quality and maintenance status of the building's components and security systems. | <b>Security Survey</b><br>Examine and ensure the quality and status of the security systems, covering building and site arrangement facilities. | <b>Security</b><br>Ensure that the occupants and maintenance personnel understand and implement the security plans and systems. |
|                          | 1 - 2,5 points   | 1 - 2 points  | 0,75 points   |

Fig. 15: Comparative table between the Security criteria on the Materials Environmental Issue.

Fig. 16 shows a different case where one criterion can be divided into different criterions when it is applied to another stage of the building. The Indoor Air Quality criterion for a New Buildings has one purpose (one criterion); to make sure that the building is design with the appropriate ventilation equipment and finishes. However, in an Existing Buildings, the IAQ criterion has the same purposes but divided in different parts; three criterions, one for each relevant element that could jeopardize the building's IAQ during its operation and occupancy. This is another good example of how, in some cases, a criterion can be evaluated differently in

each tool. It also shows the importance that management and organization have since the beginning of the building’s life cycle, and how complex this can become in the stage of operation and occupancy.

| HEALTH & WELLBEING   |  |  |                       |
|--|--|--|-----------------------|
| BREEAM for New Buildings   | BREEAM In Use  |  |                       |
|  | ASSET RATING   | BUILDING MANAGEMENT RATING   | ORGANISATIONAL RATING |
| <b>Hea 02: Indoor Air Quality</b><br>It is intended as a credit in the design stage to recognize and encourage a healthy internal environment through the specification and installation of appropriate ventilation, equipment and finishes. | <b>Indoor Air Quality</b><br>Ensure that the building provides a healthy internal environment through appropriate ventilation. | <b>Volatile Organic Compounds</b><br>Reduce the quantity of indoor air contaminants that are odorous or potentially irritating to provide installer and occupant health and comfort, by meeting VOC limits for adhesive, sealants, paints, composite wood products and carpet systems. |                       |
|  | 1 - 2,5 points   | 1 - 3 points   |                       |
|  |  | <b>Cleaning Policies</b><br>Reduce the exposure of occupants and maintenance personnel to potentially hazardous chemicals, biological, and particulate contaminants.   | 1 - 3 points          |
|  |  | <b>Refurbishment Policies</b><br>Prevent indoor air quality problems resulting from any construction or renovation projects and thus help sustain the comfort and wellbeing of construction workers and building occupants.  | 1 - 3 points          |
| <b>Minimum Standards:</b><br>No  | 1 - 6 points   |  |                       |

Fig. 16: Comparative table between the Indoor air Quality criteria on the Health & Wellbeing Issue.

The following tables show an example of the comparative analyses made for the Energy and Atmosphere. The rest of the environmental issues can be found in Appendix 2:

| ENERGY  |  |   |  |
|---|--|---|--|
| BREEAM for New Buildings  | BREEAM In Use  |   |  |
|   | ASSET RATING   | BUILDING MANAGEMENT RATING  | ORGANISATIONAL RATING  |
| <p><b>Ene 01: Reduction of CO2 Emissions</b><br/>It is intended as a credit in the design stage to recognize and encourage buildings designed to minimize operational energy demand, consumption and CO2 emissions, by designing to improve the Energy Performance Ratio (EPR) and minimizing carbon dioxide emissions.</p> <p>Minimum Standards: Yes 1 - 15 points</p> | <p><b>Level of CO2 Emissions:</b><br/>It is intended as a credit in the stage of building operation to evaluate the building's inherent performance when it comes to operational energy demand, consumption and CO2 emissions.</p> | <p><b>Level of CO2 Emissions:</b><br/>It is intended as a credit in the stage of building operation to maintain operating strategies that minimize operational energy demand, consumption and CO2 emission.</p> | <p><b>Carbon Footprint:</b><br/>It is intended as a credit in the stage of building operation to ensure that operating strategies that minimize operational and occupants' energy demand, consumption and CO2 emission are maintained.</p> |
| <p><b>Ene 07: Energy Efficient Laboratory Systems</b><br/>It is intended as a credit in the design stage to recognize and encourage laboratory areas that are designed to minimize the CO2 emissions associated with their operational energy consumption, using efficient fume cupboards in the areas needed.</p> <p>Minimum Standards: No 1 - 5 points</p>            |  |   |  |
| <p><b>Ene 02: Energy Monitoring</b><br/>It is intended as a credit in the design stage to recognize and encourage the installation of energy sub-metering that facilitates the monitoring of operational energy consumption.</p> <p>Minimum Standards: Yes 1 - 2 points</p>   | <p><b>Sub-metering of Substantial Energy Uses</b><br/>It is intended as a credit in the stage of building operation to evaluate the building's major energy using system.</p>  | <p><b>Energy/CO2 monitoring, targeting &amp; reduction</b><br/>Implement a constant monitoring to address changes in major energy using systems to make them more efficient.</p>                                | <p><b>Targeting and Monitoring</b><br/>Ensure that periodic adjustments and reviews of building's monitoring of target operating systems are made to maintain an optimal energy efficiency.</p>  |
|   | <p><b>Sub-metering of Areas/Tenancy</b><br/>Facilitate the monitoring of operational energy consumption of the different building areas and tenants.</p>   | <p><b>Energy Reporting/ Information</b><br/>Maintain an energy management and ongoing accountability of building energy performance.</p>  | <p><b>Measuring and Recording</b><br/>Ensure that periodic reviews of building's monitoring and mesurings of building energy performance are made.</p>   |
|   | 1 - 6,5 points   | 1 - 5 points  | 1 - 3 points   |
| <p><b>Ene 04: Low and Zero Carbon Technologies</b><br/>It is intended as a credit in the design stage to reduce carbon emissions and atmospheric pollution by encouraging local energy generation from renewable and low or zero carbon technologies sources to supply a significant proportion of the energy demand.</p> <p>Minimum Standards: Yes 1 - 5 points</p>    | <p><b>Renewable and Low Emission Energy (built in)</b><br/>Encourage and recognize the use of on-site and off-site renewable energies that reduce environmental impacts associated with fossil fuel energy use.</p>                |   |  |
|   | 1 - 6,5 points   |   |  |
|   |  | <p><b>Energy Management</b><br/>Promote continuity of information and management to ensure that energy-efficient operating strategies are maintained.</p>   | <p><b>Energy Management Training</b><br/>Provide a foundation for training and system analysis, to improve energy management.</p>  |
|   |  | 1 - 5 points  | 1 - 3,5 points   |



| BREEAM for New Buildings  |  | BREEAM In Use |   |   |              |
|---|--|---------------|---|---|--------------|
|   |  | ASSET RATING  | BUILDING MANAGEMENT RATING  | ORGANISATIONAL RATING   |              |
|   |  |               | <b>Energy Audit</b><br>Maintain a permanent evaluation of the building's energy performance and compliance with policies.<br>1 - 5,5 points                                 | <b>Energy Policies</b><br>Ensure the understanding and implementation of energy efficiency policies of the buildings occupants.<br>1 - 3,5 points                               |              |
|   |  |               | <b>Maintenance Regimen / Schedules</b><br>Design regimen and schedules to maintain an organized development of the building's energy efficiency management.<br>1 - 5 points |   |              |
| <b>Ene 05: Energy Efficient Cold Storage</b><br>It is intended as a credit in the design stage to recognize and encourage the installation of energy efficient refrigeration systems, therefore reducing operational greenhouse gas emissions resulting from the system's energy use.<br>Minimum Standards: No 1 - 2 points                                   |  |               |   | <b>Energy and Equipment Purchasing Policies</b><br>Ensure a sustainable purchasing of equipment acquired for use in the operations and maintenance of building.<br>1 - 3 points |              |
| <b>Ene 06: Energy Efficient Transportation Systems</b><br>It is intended as a credit in the design stage to recognize and encourage the specification of energy-efficient transportation systems, by analyzing transportation demand, usage and energy consumption and efficiency of lifts, escalators or moving walks.<br>Minimum Standards: No 1 - 2 points |  |               |   |   |              |
| <b>Ene 08: Energy Efficient Equipment</b><br>It is intended as a credit in the design stage to recognize and encourage procurement of energy-efficient equipment to ensure optimum performance and energy savings in operation.<br>Minimum Standards: No 1 - 2 points   |  |               |   |   |              |
| <b>Ene 03: External Lighting</b><br>It is intended as a credit in the design stage to recognize and encourage the specification of energy-efficient light fittings for external areas of the development.<br>Minimum Standards: No 1 point  |  |               |   |   |              |
| <b>Ene 09: Drying Spaces</b><br>It is intended as a credit in the design stage to produce a reduced energy means of drying clothes, by designing an adequate internal or external space for this use.<br>Minimum Standards: No 1 point  |  |               |   |   |              |
| <b>Possible Points:</b>   |  | <b>35</b>     | <b>26,5</b>   | <b>31,5</b>   | <b>19,5</b>  |
| <b>Environmental Section Weighting</b>  |  | <b>19,0%</b>  | <b>26,5%</b>  | <b>31,5%</b>  | <b>19,5%</b> |

### 3.3 Results of the First Comparative Analysis

It is important to mention that in order to make the previous comparative tables, a profound analysis of each one of the criteria had to be made. This means examining each one carefully and acknowledging what each one's purpose is, how it is applied and what it wants to evaluate. Each criterion has a number of credits that can be earned, it is also important to understand how these credits are to be approached and accomplished.

As a result of doing this study and at all times thinking how these tools can be applied in the development of the rehabilitation profile, three important aspects of the tools have been shown in this phase which will give us a starting point for the next step of this work.

1. LEED for Existing Buildings is a tool that evaluates the operation and management of the building; it focuses mainly in the general practices, plans and monitoring of a building in use. On the other hand, BREEAM In Use also evaluates the performance of a building in use, but within three different sections; 1) Asset Rating, which measure the building's inherent performance characteristics based on its built form, construction and services; 2) Building Management Rating, which measures management policies, practices, consumptions and impacts; and 3) Organizational Rating, which evaluates the quality of understanding and implementation of the management systems of the building. By analyzing both tools and combining the criteria studied in each case, we can understand all the factors that are involved in maintaining a real sustainability within a building's in use. In the end it is a combination of building – user and how well they handle each other.
2. LEED for New Constructions and Major Renovations and BREEAM for New Constructions are tools that focus on the physical performance of the building. The criteria shown in these tools establish guidelines for a design team to follow when they are in the stage of preparation and design. They provide strategies, technologies, keys to reach sustainability within the building, and therefore establish what the ideal performance of the future building should be once it starts being used. For this reason, it is important to acknowledge that these criteria can also be used for evaluating the performance of an existing building.
3. These assessment tools evaluate the performance of either a building that is still in paper and in process of construction or a building that is already being used. None of them evaluate the improvement an existing building could actually have if it tries to improve its performance by following the criteria as a guideline.

These aspects have helped to understand that when rehabilitating an existing building, the process of achieving a sustainable certification should be done differently. They also help us establish the procedure that the rehabilitation profile should follow. The next chapter explains in detail this procedure (the steps to follow for certifying a rehabilitated building), and how the profile will be developed. By means of the results of having made the comparative analysis, a list of criteria will be made by merging the four tools and developing a new one that can be applied for the assessment for sustainable rehabilitation.

## 4. INFERENCES BASED ON ANALYSIS

It was mentioned before that the comparative analysis has given this work a wider view of how a rehabilitation process should be. By understanding this, the guidelines can be established to start the development of the rehabilitation profile to be proposed in this work.

### 4.1 Rehabilitation Profile

The first step is to ask ourselves: What are the assessment tools evaluating? A design project, a building the operation and maintenance of a building. And, what should a rehabilitation assessment tool evaluate?

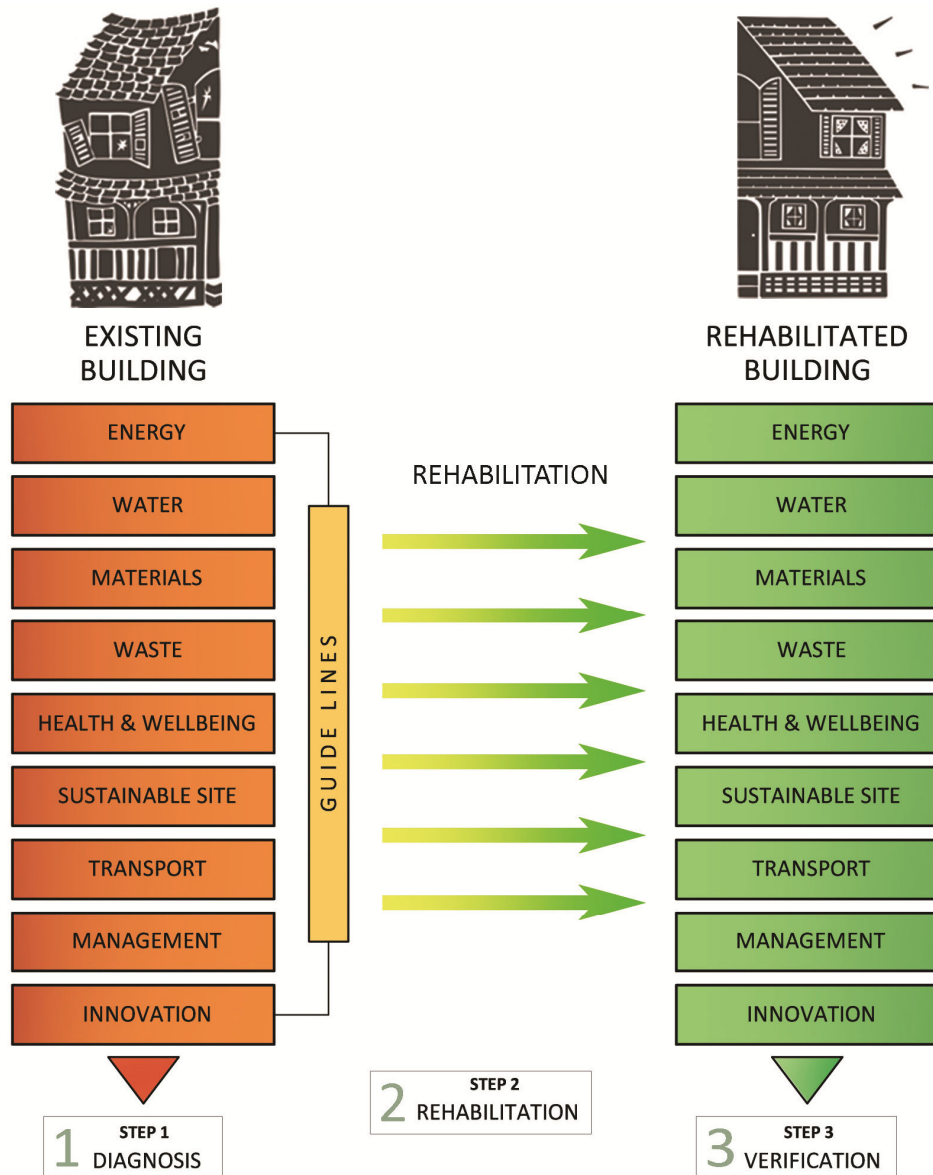
First of all it is important to establish that in order to rehabilitate a building with environmental goals, it is necessary to know its existing performance. This means an initial evaluation should be made in order to see how the building must improve in every environmental issue. After having made this evaluation, the rehabilitation may begin.

This acknowledgement will lead to determine an important aspect; in order to achieve a more extensive evaluation, the assessment tool of the rehabilitation profile will follow a similar methodology as the one used by BREEAM In Use assessment tool, this means it will divide the evaluation in three section.

- d) **Physical Performance of the Building:** a section that will provide a quality measure of the building's inherent performance characteristics based on its built form, construction and services.
- e) **Building Management Performance:** this will provide a qualitative measure of; management policies, procedures and practices related to the operation of the building; consumption of key resources such as energy, water and other consumables; and the environmental impacts.
- f) **Organizational Performance:** this should provide a framework for the assessment and evaluation of management policies, procedures and practices related to the activities that an organization is carrying out in the building. It evaluates the quality of understanding and implementation of these management systems at the building or site level. This section is independent form the inherent environmental quality of the building itself.

Having defined this, and in order to understand the rehabilitation profile as a whole, we can divide the process in three steps. Fig. 17 is a diagram that shows a step by step process which explains how the rehabilitation of a building should be developed when pursuing a sustainable certification.

## REHABILITATION PROFILE



**Figure 17:** the process of rehabilitation is divided into three steps. The first one is a diagnosis of the building which will provide the guidelines to be followed by the second step which is the rehabilitation of the building. Once the rehabilitation is complete the building should go through a second evaluation which will verify the how much the building has improved.

### Step 1: Diagnosis

The purpose of step one is to make a diagnosis of the building's existing performance. As it was mentioned before, in order to know where and what the building needs to improve in order to chase the environmental goals, it is necessary to make a scan that will provide an initial evaluating score to see where the building is positioned in the scale of the certifying tool's rating benchmark. For example, in the case of LEED the score will position the building in a Certified, Silver, Gold or Platinum rating. And in the case of BREEAM the score will position it in an Unclassified, Pass, Good, Very Good, Excellent or Outstanding rating. For this

rehabilitation profile the scores will also be measured by points awarded for accomplished credits, and the rating benchmark will remain the same as the BREEAM benchmark with the seven main ratings mentioned before.

Using the BREEAM rating benchmark as a scheme to follow helps to have a wider range of ratings and a better prospect for an existing building to improve its initial evaluation from one rating to another since the score margins are shorter. On the other hand it gives the option of rating a building as Unclassified. This benefits the first step of the rehabilitation profile since the building will not require Prerequisites to be obligatory to achieve a score for the diagnosis, this part will simply give the present situation of the building regardless how bad its performance could be.

As it was mentioned before, the new assessment tool will be divided in three sections. Since it is an existing building the three aspect can be evaluated; building's physical performance, building's management performance and organizational performance. To make the diagnosis of the first step a new list a criterions has been developed after making a comparative analysis between the tools that have already been examined. This time the analysis includes the four tools all together and side by side to develop a detailed list which combines both systems (LEED and BREEAM) into a more thorough one that adapts to the building according to its necessities in order to be rehabilitated with environmental goals.

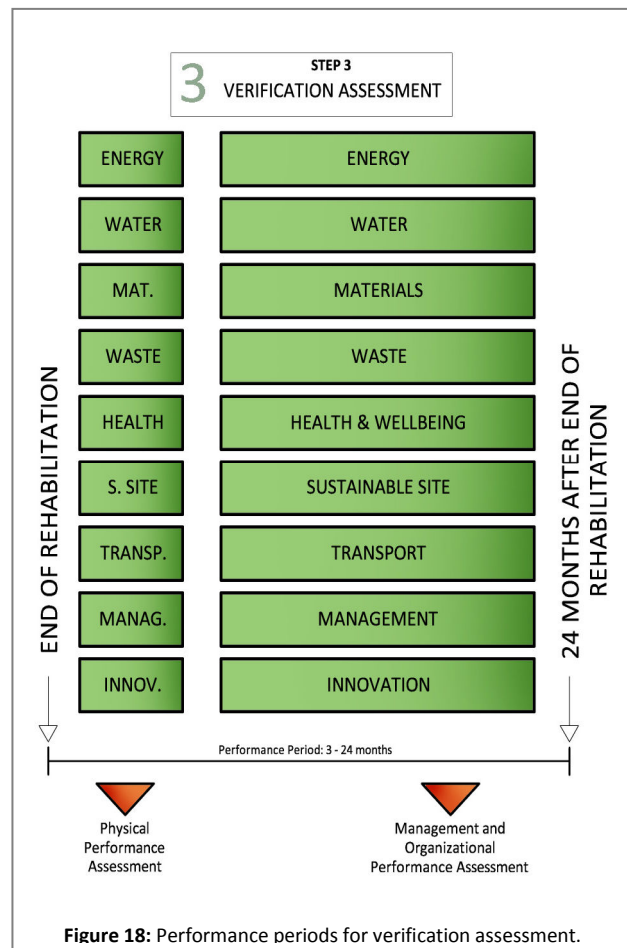
### Step 2: Rehabilitation

The initial evaluation will give rise to the second step of the process; it will provide the guide lines that need to be followed in order to improve the building. When making the evaluation the building will show which criterions are achieved and which aren't, the credits obtained in each criterion demonstrate this. If the score obtained in an environmental issue is low, the same criterion will provide the strategies to achieve a higher score after rehabilitation. The team in charge of the rehabilitation should establish the criterions that plan to achieve, this will be defined as attempted credits that will later be reviewed and verified in the third step of the profile.

The rehabilitation will also be made following the three sections that the new tool is divided in. Either case the rehabilitation can be carried out independently or simultaneously. In some cases there might be a time lapse between each one because of the difference of their objectives. For instance, rehabilitations based on construction and built form that are destined to improve the physical performance of the building are different and may take longer than the rehabilitation and changes made on the management plans made for the future rehabilitated building. When a building is going through a major physical renovation, management plans and changes can be made but they can't be implemented until the building is ready to operate again. The same thing happens with the organizational performance, although trainings and emergency drills can be taught and policies can be implemented, it will probably take some time to get acquainted with the new changes, plus the results will have to be shown some time after the building starts operating.

### Step 3: Verification

After the rehabilitation in the second step is over, the verification procedure begins. This verification can also be carried independently and in most cases it is most likely to. Since each section of the assessment tool has a different objective, each one can be verified separately. For this same reason they will also be required to be evaluated in different times. As it was mentioned before, the rehabilitation made to the building's form to improve its physical performance can be assessed within a short period after the rehabilitation is over. However, the verification of improvement of the operation and maintenance of the building would have to be made after a reasonable period of time. This period of time can be determined as the Performance Period and should be a minimum of three months and a maximum of twenty four months. The evaluation for the physical performance assessment verification can be done after the construction involved in the rehabilitation is over.



Regarding the evaluation, the same list of criteria in the initial assessment tools will be used for the third step, in order to verify which of the criteria that were established as attempted credits in the first step have been achieved. However, some of the criteria might have a different approach; this will be explained with more detail when the Rehabilitation Assessment Tool is presented below. As for the rating of the final score, the same benchmark as in Step 1 will be used, but the UNCLASSIFIED rating will be eliminated since Prerequisites will then be obligatory.

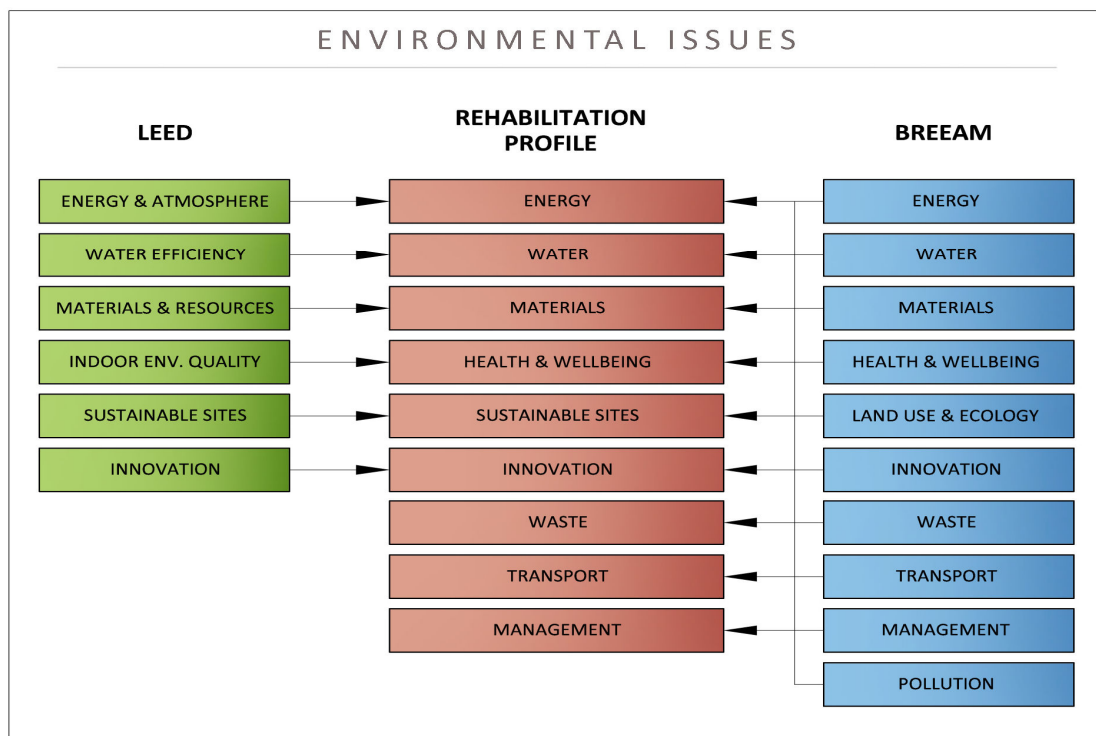
#### 4.2 Development of Assessment Tool for Rehabilitation Profile

A second comparative analysis has been made in order to develop the assessment tools for the rehabilitation profile. The comparison is similar to the one done between new constructions and existing buildings for both LEED and BREEAM, but in this case the four tools have been put together side by side to have a wider perspective of the relationship and differences between the criteria of each tool.

The rehabilitation profile demands an assessment tool for the diagnosis and verification, so one tool has been developed that will be used for both of these steps (1 and 3) of the process. The

same list of criterion will be evaluated in both steps, with the difference that in one case the list will give a diagnosis of the existing building and in the other it will work as a verifying tool to evaluate the improvement there has been between the initial stage of the existing building and the final stage when the building has already been rehabilitated.

Both LEED and BREEAM deal with the same environmental issues, but in the case of BREEAM four more issues are included the list. After making the comparative analysis and examining each criterion, a final list of environmental issues was developed by merging the criterions of both LEED and BREEAM tools when they are dealing with the same topics, combining the ones that are similar and including the ones within the environmental issues that are not addressed in LEED. This dynamic of merging, combining and including provides a more thorough list that is suitable to be applied in the rehabilitation assessment tool.



**Figure 19:** List of environmental issues for LEED, BREEAM and the final proposal for the Rehabilitation Profile.

Fig. 19 shows the list of both LEED and BREEAM environmental issues and the final one developed for the rehabilitation profile. It is shown that all the environmental issues that are common for both LEED and BREEAM are included in the final list, in addition to these issues the list also includes Waste, Transport and Management which belong to BREEAM and are not covered in LEED. The Pollution issue is eliminated and the criterions covered here have been distributed along the rest of the issues depending on the relationship. Once again by putting the criterions together and side by side in each one of the issues, a clearer perspective of the differences can be seen. The criterion are in some case approached in a different way depending on the section they are being evaluated.

The methodology of associating the criteria was done by creating two main tables for each environmental issue, one comparing both assessment tools (LEED and BREEAM) for New Constructions and the other again comparing both tools but for Existing Buildings: Operations and Maintenance. Fig. 20 shows the model of TABLE 1, this will analyse the tools for new constructions and will provide the final list of criteria that will be followed to evaluate the physical performance of the building. This table is divided into three columns, the first two comparing the respective LEED and BREEAM list and the third column with the list proposed, as part of the rehabilitation profile, to evaluate the physical performance of the building. The assessment tool proposed is made by analysing the criterions carefully and merging the ones that are the same, combining the ones that are similar and including the ones that are taken into account in one tool but not in the other.

TABLE 1

| ENVIROMENTAL ISSUE       |   |   |
|--------------------------|---|---|
| BREEAM for New Buildings | LEED FOR New Construction and Major Renovations | REHABILITATION: Assessment Profile for Physical Performance |
| Credit #: Criterion      | Credit #: Criterion                             | Credit #: Criterion   |
| Criterion Description    | Criterion Description                           | Criterion Description                                       |
| Available Points         | Available Point                                 | Available Point   |

Figure 20: Model of TABLE 1 for LEED and BREEAM comparison for New Constructions, and the proposed list to evaluate the physical performance in the rehabilitation profile.

TABLE 2 follows a different pattern, this will analyze the tools for existing buildings, operations and maintenance and will provide the final list of criteria that will be followed to evaluate the operation, management and organization performance of the building. This table is also divided into three columns; the first two columns compare the respective LEED and BREEAM list, though in this case the column under BREEAM In Use will at the same time be divided into three sub columns. These will present the sections in which BREEAM In Use is divided; Asset Rating, Building Management Rating and Organizational Rating. The third column presents the list proposed, as part of the rehabilitation profile; this will also be divided into two sub-columns to evaluate in one the management performance and in the other the organizational performance of the building. Once again the assessment tool proposed is made by analyzing the criterions carefully and merging the ones that are the same, combining the ones that are similar and including the ones that are taken into account in one tool but not in the other. Fig. 21 shows the model of the second comparative table.



TABLE 2

| ENVIRONMENTAL ISSUE   |                            |                       |  |  |                       |
|-----------------------|----------------------------|-----------------------|--|--|-----------------------|
| BREEAM In Use         |                            |                       | LEED Existing Buildings: Operation & Maintenance | REHABILITATION: Assessment Profile for Operation and Maintenance |                       |
| ASSET RATING          | BUILDING MANAGEMENT RATING | ORGANISATIONAL RATING |  | BUILDING MANAGEMENT RATING                                       | ORGANISATIONAL RATING |
| Criterion             | Criterion                  | Criterion             | #: Criterion                                     | Criterion  | Criterion             |
| Criterion Description | Criterion Description      | Criterion Description | Criterion Description                            | Criterion Description  | Criterion Description |
| Available points      | Available points           | Available points      | Available points                                 | Available points   | Available points      |

Figure 21: Model of TABLE 2 for LEED and BREEAM comparison for Existing Buildings and the proposed list to evaluate the Management and Organizational performance in the rehabilitation profile.

Each criterion has been analyzed side by side with the criterion of the other tool in order to produce the final one that will be part of the final list. This analysis brought up different comparative cases.

Cases in TABLE 1

1. Criteria that Merge

The first case is where the criteria of both the tools are the same and so they simply merge. Fig. X shows the example of the two identical criteria of Thermal Comfort that are then merged into one with the same name and with the same evaluation objective.

| HEALTH & WELLBEING  |  |   |
|---|--|---|
| BREEAM for New Buildings  | LEED FOR New Construction and Major Renovations  | REHABILITATION: Assessment Profile for Building   |
| <p><b>Hea 03: Thermal Comfort</b><br/>It is intended as a credit in the design stage to ensure that appropriate comfort levels are achieved through design, and controls are selected to maintain a thermally comfortable environment for occupants within the building.</p> <p style="text-align: right;">1 - 2 points</p> | <p><b>EQ CREDIT 7: Thermal Comfort</b><br/>It is intended as a credit in the stage of design to create a thermally comfortable environment that supports the productive and healthy performance of the building occupant, by designing the building envelope and HVAC system to maintain good comfort ranges.</p> <p style="text-align: right;">1-2 points</p> | <p><b>HW 05: Thermal Comfort</b><br/>Recognize and encourage a thermally comfortable environment that supports the productive and healthy performance of the building occupant, by designing the building envelope and HVAC system to optimize air change effectiveness, in order to provide an effective delivery and mixing of fresh air to support the health, safety, and comfort of building occupants.</p> <p style="text-align: right;">1-2 points</p> |

Figure 22: Comparative table of the Thermal Comfort criteria of LEED and BREEAM and final result.

## 2. Criteria that are Combined

The second case is the one with similar criteria that deal with related issues and are combined to produce one single criterion which includes both similar ones. This is the most common case in the comparative analysis, since as being designed by different organizations the criteria are, in many cases, approached slightly different even though they are dealing with the same topic. When this happens, the criterion in the final list is elaborated to include everything that is evaluated in both criteria. This means that if a LEED criterion has 3 credits (which means one point per credit achieved) and the similar criterion in BREEAM has only two credits (one point per credit achieved), then the extra credit covered in LEED will be added in the criterion of the final list in order to obtain a more thorough result. In some cases one criterion from BREEAM can be combined with two criteria from LEED and vice versa.

| ENERGY & ATMOSPHERE  |   |   |
|--|---|---|
| BREEAM for New Buildings   | LEED FOR New Construction and Major Renovations   | REHABILITATION: Assessment Profile for Building   |
| <p><b>Ene 02: Energy Monitoring</b></p> <p>It is intended as a credit in the design stage to recognize and encourage the installation of energy sub-metering that facilitates the monitoring of operational energy consumption.</p> <p style="text-align: right;">1 - 2 points</p> | <p><b>EA CREDIT 5: Measurement and Verification</b></p> <p>It is intended as a credit in the stage of design to assure ongoing accountability and optimizing of building energy and water consumption performance over time, by implementing strategies that will predict savings of water and energy and designing the building with equipment to measure energy and water performance.</p> <p style="text-align: right;">1 points</p> | <p><b>EA 03: Energy Monitoring: Measurement and Verification</b></p> <p>Recognize and encourage the installation of energy sub-metering that facilitates the monitoring of operational energy consumption and assures ongoing accountability and optimizing of building energy consumption performance over time</p> <p style="text-align: right;">1 - 2 points</p> |

**Figure 23:** Comparative table of Energy Monitoring and Measurement and Verification criteria of LEED and BREEAM and final result.

## 3. Criteria that are Included

Criteria that are found in only one list but not in the other are included in the final list, in this way one tool complements the other in certain topics that are not being taken into account. The criterion included in the final list will maintain the same amount of credits it originally had. Fig. 24 demonstrates two examples of this case in the Water Efficiency issue. The first criterion Water Efficient Equipment is part of the BREEAM tool but it is not included in the LEED tool. The same thing happens with the Water Efficient Landscaping criterion which is part of the LEED tool but not the BREEAM. Both criteria are included individually into the final list, this way they are both evaluated.

| WATER EFFICIENCY  |   |   |
|---|---|---|
| BREEAM for New Buildings  | LEED FOR New Construction and Major Renovations   | REHABILITATION: Assessment Profile for Building   |
| <p><b>Wat 04: Water Efficient Equipment</b></p> <p>It is intended as a credit in the design stage to reduce unregulated water consumption by encouraging specification of water efficient equipment.</p> <p style="text-align: right;">1 points</p> |   | <p><b>WE 04: Water Efficient Equipment</b></p> <p>Ensure reduced unregulated water consumption by encouraging specification of water efficient equipment.</p> <p style="text-align: right;">1 points</p>  |
|   | <p><b>WE CREDIT 1: Water Efficient Landscaping</b></p> <p>It is intended as a credit in the stage of design to develop strategies that will limit or eliminate the use of potable water for landscape irrigation, by implementing technologies, recycling site water, soil analysis and rain water collection.</p> <p style="text-align: right;">1-2 points</p> | <p><b>WE 05: Water Efficient Landscaping</b></p> <p>Recognize and encourage the development of strategies that will limit or eliminate the use of potable water for landscape irrigation, by implementing technologies, recycling site water, soil analysis and rain water collection.</p> <p style="text-align: right;">1-2 points</p> |

**Figure 24:** Comparative table of the Water Efficient Equipment and Landscaping criterions of LEED and BREEAM and final result.

4. Criterions from TABLE 2

Another peculiar case came from combining the first sub-column of the BREEAM In Use column of the second table. As mentioned before, the first section of this tool measures the asset performance, in other words the physical state of a building in use. Because of being addressed to new constructions the LEED and BREEAM tools of TABLE 1 don't include relevant criterions that evaluate the physical state of an existing building but should be included at the time of the evaluation. Fig. 25 shows an example of this, as Quality of Asset is a criterion that is not included in the LEED and BREEAM tools for new constructions but is included in the Asset Rating section of the BREEAM In Use because it is considered important to evaluate quality of the building's materials when it has been in use for certain time.

| TABLE 1                  |   |   | TABLE 2   |  |
|--------------------------|---|---|---|--|
| WATER EFFICIENCY         |   |   | WATER EFFICIENCY  |  |
| BREEAM for New Buildings | LEED New Construction & Major Renovations | REHABILITATION: Assessment Profile for Building   | BREEAM In Use   |  |
|                          |   |   | ASSET RATING  |  |
|                          |   | <p><b>MR 02: Quality of Asset</b></p> <p>Evaluate and recognize a good physical state and quality of the building's materials.</p> <p style="text-align: right;">1 - 2 points</p> | <p><b>Quality of asset</b></p> <p>Evaluate the physical state and quality of the building's materials.</p> <p style="text-align: right;">1 - 2 points</p> |  |

**Figure 25:** Comparative table of the Quality Asset criterion of the Asset Rating section of BREEAM In Use and the final result.

## Cases in TABLE 2

The cases in TABLE 2 are basically the same as the ones found in TABLE 1. But it is important to remember that one of the main columns (the one with the BREEAM In Use tool) is divided into sub-columns which means it adds more criteria to be analyzed at once in the same row. So in this table the case of merging and combining criteria are basically the same, since in some cases the criteria are similar but not the same. This will be the most common case in TABLE 2, many associated similar criteria.

### 1. Criteria that Merge and Combine

As mentioned above this is the most common case in the comparative analysis for TABLE 2. Basically all the final criteria will be a product of merging and combining the LEED and BREEAM criteria that have similarities. In some cases there are many criteria to be analyzed per row since each column is evaluating something different, the criteria tend to be approached in a different way. The purpose of associating them is precisely to see these differences side by side in order to then create the final criteria that will enclose all important matters covered in the LEED and BREEAM criteria. The credits are also accumulative; they are collected from the LEED and BREEAM criteria and added in the final criteria.

Fig. 26 shows the example of the general topic of measuring and monitoring water consumption of the building. As it can be seen all the criteria are approaching the matter, each one depending on its own benefit and according to its objective of assessment. The final criterion for the Management Rating column is a product of merging or/and combining the criterion from this same column under BREEAM In Use and the criterion from the LEED for Existing Building column. The same thing happens with the criteria from the Organizational Rating Column.

| WATER EFFICIENCY   |   |   |   |   |   |
|--|---|---|---|---|---|
| BREEAM In Use  |   |   | LEED Existing Buildings: Operation and Management   | REHABILITATION: Assessment Profile for Operation and Maintenance  |   |
| ASSET RATING   | BUILDING MANAGEMENT RATING  | ORG. RATING   |   | BUILDING MANAGEMENT RATING  | ORG. RATING   |
| <b>Water Consumption</b><br><br>Evaluate the efficiency of the building's water consumption performance. | <b>Water Consumption Monitoring</b><br><br>Implement a monitoring system that will allow measuring the water consumption of the building. | <b>Targeting and Monitoring</b><br><br>Ensure that there is a follow up of the water consumption monitoring system to identify major water consuming systems. | <b>WE CREDIT 1: Water Performance Measurement</b><br><br>It is intended as a credit in the stage of building operation to implement water metering systems to measure and track potable water consumption and performance over time, in order to understand consumption patterns and identify opportunities for additional water savings. | <b>WE 01: Water Performance Measurement</b><br><br>Assure water metering systems to measure and track potable water consumption and performance over time, in order to understand consumption patterns and identify opportunities for additional water savings. | <b>Targeting and Monitoring</b><br><br>Ensure that there is a follow up of the water consumption monitoring system to identify major water consuming systems. |
| 1-2 points   | 1-2,5 points  | 0,75 points   | 1-2 points  | 1-2,5 points  | 0,75 points   |

**Figure 26:** Comparative table of Measurement and Monitoring of Water Consumption criteria and the final result for the Rehabilitation Profile.

## 2. Criteria that are Included

Criteria that are found in only one of the tools, or even, only in one of the columns within the BREEAM In Use tool, are included in the final list, in this way one tool complements the other in certain topics that are not being taken into account. The criterion included in the final list will maintain the same amount of credits it originally had. Fig. 27 demonstrates an example of this case with one of the Green Cleaning criteria. This is a good example to illustrate how one of the tools can leave important issues outside of the assessment. LEED for Existing Buildings has four criteria derived from the Green Cleaning policies, whereas BREEAM In Use doesn't cover it in any of his criteria, at least not in a direct way. In the end the final list will include all four criteria since they are considered important issues to be taken into account for the health and wellbeing of the building's occupants. The complete table showing this example can be consulted in APPENDIX 3 under the Health & Wellbeing environmental issue.

The other criterion shown in the example is Stakeholder Engagement, and it is important to see that apart from being absent in the LEED tool it is also absent from the other two sections of the BREEAM In Use tool. This also demonstrates that the criterion is not an issue that concerns either the physical performance of the building or the management. It is obvious that the engagement of the stakeholder is an organizational concern, and so it will be evaluated under this column in the final assessment tool.

| HEALTH & WELLBEING |               |  |   |   |  |
|--------------------|---------------|--|---|---|--|
| BREEAM In Use      |               |  | LEED Existing Buildings: Operation and Management   | REHABILITATION: Assessment Profile for Operation and Maintenance  |  |
| ASSET RATING       | MANAG. RATING | ORG. RATING  |   | BUILDING MANAGEMENT RATING  | ORG. RATING  |
|                    |               |  | <b>EQ CRE DIT 3.4-3.6: Green Cleaning: Purchase of Sustainable Cleaning Products and Materials</b><br>It is intended as a credit in the stage of building's operation to reduce the environmental impacts of cleaning, disposable janitorial paper products and trash bags, by making sure that when purchasing materials or supplies, specify that they meet one or more of the sustainability criteria. | <b>Green Cleaning: Purchase of Sustainable Cleaning Products and Materials</b><br>Reduce the environmental impacts of cleaning, disposable janitorial paper products and trash bags, by making sure that when purchasing materials or supplies, specify that they meet the sustainability criteria. |  |
|                    |               |  | 1-3 points  | 1 - 3 points  |  |
|                    |               | <b>Stakeholder Engagement</b><br>To promote the participation of stakeholder in the decisions and action taken to improve environmental quality of the building. |   |   | <b>Stakeholder Engagement</b><br>To promote the participation of stakeholder in the decisions and action taken to improve environmental quality of the building. |
|                    |               | 1 - 3 points   |   |   | 1 - 3 points   |

Figure 27: Example of two criterions covered only in one tool and included in the final list.

In the end it is important to understand that the final lists of criterions for both TABLE 1 and 2 are products of a mixing dynamic (combining, merging, including and adding) of the criterions in the four tools in order to have a complete final one that will include the most important issues and criterions that need to be taken into account in the steps of the Rehabilitation Profile. The final product is one assessment tool that will be used two times during the process of rehabilitation, in the first step for the initial diagnosis of the existing building and in step 3 for the final verification and review of the attempted credits. During the actual rehabilitation of the building the tool can also be used as a guideline to follow in order to know which of the criterions are attempted to be achieved in the final assessment. In the end the tool should also provide the means to reach sustainability within the building.

Below is the final list of criterions developed for the Rehabilitation Profile under the Materials & Resources environmental issue:

| MATERIALS & RESOURCES  |  |   |
|--|--|---|
| REHABILITATION: Assessment Profile for Building  | Assessment Profile for Operation and Maintenance   |   |
| PHYSICAL PERFORMANCE RATING  | BUILDING MANAGEMENT RATING   | ORGANISATIONAL RATING   |
| <p><b>MR 01: Robustness</b></p> <p>Recognize and encourage adequate protection of exposed elements of the building and landscape, therefore minimizing the frequency of replacement and maximizing materials optimization.</p> <p style="text-align: right;">1 point</p>   |  |   |
| <p><b>MR 02: Quality of Asset</b></p> <p>Evaluate and recognize a good physical state and quality of the building's materials.</p> <p style="text-align: right;">1 - 2 points</p>  |  |   |
|  | <p><b>Security System &amp; Survey</b></p> <p>Maintenance of a monitoring systems to detect emergency situations and prevent the risk of occupants and building, and implement permanent surveys to evaluate the quality and status of the security systems, covering building and site arrangement facilities.</p> <p style="text-align: right;">1-2 points</p> | <p><b>Security</b></p> <p>Ensure that the occupants and maintenance personnel understand and implement the security plans and systems, and have constant training and emergency drills.</p> <p style="text-align: right;">0,75 points</p>                                 |
| <p><b>MR 03: Security and Fire Protection</b></p> <p>Recognize and encourage the quality and maintenance status of the building's components and remotely monitored security systems to prevent the risk of fires and other emergencies and protect occupants and building.</p> <p style="text-align: right;">1 - 2 points</p> | <p><b>Fire Protection / Resilience</b></p> <p>Implement emergency plans that prevent the risk of fires and protect occupants and building.</p> <p style="text-align: right;">1-2 points</p>  | <p><b>Fire Protection / Resilience</b></p> <p>Ensure that occupants and maintenance personnel understand and implement the emergency plans that prevent the risk of fires and protect occupants and building.</p> <p style="text-align: right;">0,75 points</p>           |
|  | <p><b>Hazardous Materials</b></p> <p>Reduce exposure of building occupants and maintenance personnel to potentially hazardous particulate contaminants coming from the building materials.</p> <p style="text-align: right;">1-2 points</p>  | <p><b>Hazardous Materials</b></p> <p>Ensure that occupants and maintenance personnel understand and implement strategies to prevent potentially hazardous particulate contamination coming from the building materials.</p> <p style="text-align: right;">0,50 points</p> |
|  |  | <p><b>Measuring and Recording</b></p> <p>Ensure a permanent measurement and recording of the material that go in and out of the building, and are used for its operation and maintenance.</p> <p style="text-align: right;">0,75 points</p>                               |

| REHABILITATION: Assessment Profile for Building   |  |
|---|--|
| PHYSICAL PERFORMANCE RATING   |  |
|   |  |
| <b>MR 04:</b>   | <b>Building Reuse*</b>                                   |
| Recognize and encourage the reuse of large portions of existing structures during renovations or redevelopment projects.  |  |
| 1 - 3 points  |  |
| <b>MR 05:</b>   | <b>Resource Reuse</b>                                    |
| Identify the incorporation of salvage or refurbished materials or elements into the building for upgrades or maintenance, in order to reduce environmental impacts related to materials manufacturing and transport.  |  |
| 1-3 points  |  |
| <b>MR 06:</b>   | <b>Hard Landscaping and Boundary Protection</b>          |
| Recognize and encourage the specification of materials for boundary protection and external hard surfaces that have a low environmental impact, taking account of the full life cycle of materials used.  |  |
| 1 point   |  |
| <b>MR 07:</b>   | <b>Responsible Sourcing: Local/Regional Materials</b>    |
| Recognize and encourage the use of a minimum of 20% of building materials that are manufactured regionally, in order to increase demand for building products that are manufactured locally, thereby reducing the environmental impacts resulting from their transportation and supporting the local economy. |  |
| 1-3 points  |  |
| <b>MR 08:</b>   | <b>Responsible Sourcing: Rapidly Renewable Materials</b> |
| Recognize and encourage the use of rapidly renewable material for 5% of total building materials, in order to replace and reduce the use and depletion of finite raw, and long-cycle renewable materials.   |  |
| 1 points  |  |

| Assessment Profile for Operation and Maintenance  |   |
|---|---|
| BUILDING MANAGEMENT RATING  | ORGANISATIONAL RATING   |
|   | <b>Targeting and Monitoring</b><br>Identify high impact materials that go in and out of the building and implement strategies to reduce their use in the operation and maintenance of the building.<br>0,50 points                                  |
|   | <b>Environmental Policies</b><br>Ensure the compliance of policies that reduce environmental impact caused by materials that go in for operation, maintenance and upgrade of the building, and materials that go out as solid waste.<br>0,75 points |
|   |   |
|   |   |
| <b>PREREQ 1: Sustainable Purchasing Policy</b>  |   |
| Minimum requirement in the stage of building's operation to have in place a sustainable purchasing policy in order to reduce the environmental impacts of materials acquired for use in the operations, maintenance, and upgrades of buildings. |   |
|   |   |
| <b>Sustainable Purchasing: Facility Alteration and Additions</b>  | <b>Environmental Purchasing Policies</b>  |
| Maintain a reduced environmental and air quality impacts of the materials acquired for use in the upgrade of buildings.   | Ensure the compliance of policies that reduce environmental impact of materials acquired for use in the operations, maintenance and upgrades of buildings.  |
| 1 point   | 0,75 points   |



| REHABILITATION: Assessment Profile for Building   |              |
|---|--------------|
| PHYSICAL PERFORMANCE RATING   |              |
| <b>MR 09:</b> <b>Responsible Sourcing: Certified Wood</b><br>Recognize and encourage the use of a minimum of 50% certified wood-based material to encourage environmentally responsible forest management.                        | 1 points     |
| <b>MR 10:</b> <b>Responsible Sourcing: Insulation</b><br>Recognize and encourage the use of thermal insulation which has a low embodied environmental impact relative to its thermal properties and has been responsible sourced. | 1 - 2 points |
|   |              |
|   |              |
|   |              |
| <b>Possible Points:</b>   | <b>16</b>    |
| <b>Environmental Section Weighting</b>  | <b>9,0%</b>  |

| Assessment Profile for Operation and Maintenance  |                       |
|---|-----------------------|
| BUILDING MANAGEMENT RATING  | ORGANISATIONAL RATING |
| <b>Sustainable Purchasing: Reduced Mercury in Lamps</b><br>Maintain a toxic material source reduction program to reduce the amount of mercury brought onto the building site through purchases of lamps.                |                       |
| 1 point   |                       |
| <b>Sustainable Purchasing: Ongoing Consumables</b><br>Maintain a sustainable purchasing program to reduce environmental and air quality impacts of ongoing consumables used for operations and maintenance of building. |                       |
| 1-3 points  |                       |
| <b>Sustainable Purchasing: Durable Goods</b><br>Maintain a sustainable purchasing program to reduce environmental and air quality impacts of durable goods purchased for operations and maintenance of building.        |                       |
| 1-2 points  |                       |
| <b>Sustainable Purchasing: Food</b><br>Maintain a sustainable purchasing program to reduce the environmental and transportation impacts associated with food production and distribution.                               |                       |
| 1 point   |                       |
| <b>14</b>   | <b>4,5</b>            |
| <b>9,0%</b>   | <b>5,0%</b>           |

\*Criterion evaluated in Step 1 (addressed to the potential of building reuse) and in Step 3 (addressed to rehabilitation result).

\*Criteria evaluated in Step 1 (addressed to the original construction) and in Step 3 (addressed to the rehabilitation).

### 4.3 Inferences Based Assessment Tool

The final analysis of the Rehabilitation Assessment tool has led to detect several important aspects. First of all, the tool contains criteria that could be considered as critical when they are evaluated within the rehabilitation context. These criteria are likely to meet problems when seeking to be improved during the rehabilitation of the building; they will also be expected to more likely be in the Physical Performance section of the assessment tool. The previous table presents some of these cases.

The Materials & Resources environmental issue has been selected to be used as an example for a several reason. It is an issue that is closely related to the physical part of the building and there for in many ways not easy to transform. As it can be seen one of the criteria is marked in red and four are marked in orange, this is to illustrate some of the criteria that required a little more thought. On the other hand, a Prerequisite acquired from the LEED for Existing Buildings tool is found under the two columns for management and organizational performance assessment.

Let's start with the criterion **Building Reuse** marked in red, this is a criterion that is clearly addressed to a new project, it recognizes the reuse of large portions of existing structures during renovations or redevelopment, and credits are achieved by maintaining from 75% to 95% of existing walls, floors and roof or maintaining 50% of interior non-structural elements. In the case of evaluating the existing building for the initial diagnosis this criterion wouldn't be applicable as a recognizing criterion but rather as an encouraging one. This means that during Step 1 the Building Reuse criterion will not be used to evaluate how much of the existing building has been reused but rather evaluate how much of it CAN be reused in its future rehabilitation. This means credits will be earned by reaching a potential 75 to 95% of strong, reusable structure and at least 50% of interior non-structural elements. For Step 3 the criterion will have its original purpose which is evaluate how much of the building has been reused after the rehabilitation has ended.

The criteria under **Responsible Sourcing** marked in orange are under a similar situation, they will assess differently in each case. In Step 1 they will evaluate the materials that were used originally for the construction of the building. In Step two they will evaluate again the same, but this time the improvement or responsible use of materials during the rehabilitation.

Both these cases give way to analyze an important issue within the Rehabilitation Profile. In some of the criterion (meaning in the whole assessment tool), the improvement might not be great, in fact sometimes might not even be possible. For instance, when evaluating 'Responsible Sourcing: Insulation', if the insulating material used originally for the existing building is not a low impact material it will probably not achieve the available credits in the diagnosis and the natural thing to consider would be to change the flaw during the stage of rehabilitation, so when the verification is done for Step 3 the credits can be achieved and more points can be added to the final rating. But there is an important aspect that needs to be considered and this is that by changing the existing insulating material a new impact will be created plus more waste will be generated, so an analysis should be made to evaluate the better options. If in the end it is better

to keep the existing insulating material then there won't be a change of credits in the verification assessment.

**It is important to emphasize this situation since it may repeat itself several times during the process of rehabilitation and it determines an important statement of how rehabilitation should be rated. For this reason, the rehabilitation profile aims to give value to the INTENTION of achieving credits even when they are difficult to achieve.**

Under this argument, it is proposed through the Profile to develop an alternative way of rating rehabilitation. It has been set out that the final Assessment Tool should evaluate the initial stage of the existing building and the final result after the rehabilitation is over. But, what happens if in the end the difference between the two ratings isn't much, even if a great effort has been put into improving the performance of the building and achieving the credits necessary to gain a good certification? And, what if the built form of the building CAN'T have a greater improvement?

To give an answer to this problem, it is established that the Rehabilitation Profile will provide three evaluations, one for the Diagnosis, one for the Verification and a final one as a result of the improvement between the first two; this will basically evaluate the quality of the rehabilitation.

| CRITERION             |   | AVAILABLE POINTS |
|-----------------------|---|------------------|
| <b>MR 07:</b>         | <b>Responsible Sourcing: Local/Regional Materials</b>   | 2                |
| Credit 7.1 (1 point)  | A minimum of 20% of building materials that are manufactured regionally within a radius of 500 miles.   |                  |
| Credit 7.2 (1 point)  | Of these regional materials, specify a minimum of 50% that are extracted, harvested, or recovered within 500 miles.   |                  |
| <b>MR 08:</b>         | <b>Responsible Sourcing: Rapidly Renewable Materials</b>  | 1                |
| Credit 8.1 (1 point)  | Specify rapidly renewable building materials for 5% of total building materials.  |                  |
| <b>MR 09:</b>         | <b>Responsible Sourcing: Certified Wood</b>   | 1                |
| Credit 9.1 (1 point)  | A minimum of 50% of certified wood-based materials for wood building components like structural framing and general dimensioning framing, flooring, finishes etc. |                  |
| <b>MR 10:</b>         | <b>Responsible Sourcing: Insulation</b>   | 2                |
| Credit 10.1 (1 point) | Determine the embodied impact of the insulation material by giving it a Green Guide rating.   |                  |
| Credit 10.2 (1 point) | At least 80% by volume of the thermal insulation used in the building elements identified in Item 1 must be responsibly sourced.                                  |                  |
|                       |   | <b>6</b>         |

Some of the critical criteria will be used to explain how the final evaluation will be made. The table above shows the list of these criteria belonging to Responsible Sourcing, under the

Materials & Resources environmental issue and the requirement for each one of the credits available. A fictitious evaluation will be done to illustrate the difficulties a building might have to achieve this credits during rehabilitation. Made-up scores will be given to each credit in steps 1 and 2. The final score should be given depending on the analysis made for a possible improvement.

| STEP 1    | STEP 2         |  | STEP 3       |
|-----------|----------------|--|--------------|
| DIAGNOSIS | REHABILITATION | → POINTS ACHIEVED  | VERIFICATION |
|           | <b>MR 07:</b>  | <b>Responsible Sourcing: Local/Regional Materials</b>  |              |
| 1         | 1 point        | 40% of building materials USED IN THE REHABILITATION is manufactured regionally within a radius of 500 miles.  | 1            |
| 0         | 1 point        | Of these regional materials USED IN THE REHABILITATION, 60% have been extracted, harvested, or recovered within 500 miles from the building.   | 0            |
|           | <b>MR 08:</b>  | <b>Responsible Sourcing: Rapidly Renewable Materials</b>   |              |
| 0         | 1 point        | Specify rapidly renewable building materials for 5% of total building materials.   | 1            |
|           | <b>MR 09:</b>  | <b>Responsible Sourcing: Certified Wood</b>  |              |
| 0         | 1 point        | Of the total wood-based material components of the building, only 20% needed to be replaced. The other 80% is in good condition and has been kept. The 20% replaced comes all from certified wood suppliers. | 1*           |
|           | <b>MR 10:</b>  | <b>Responsible Sourcing: Insulation</b>  |              |
| 0         | 1 point        | The existing insulation material does not achieve a Green Guide rating.  | 0            |
| 0         | 1 point        | 100% of the insulation material has been maintained.   | 0            |
| 1         |                |  | 2            |
|           |                |  | 5            |

\*Point achieved for best criterion approach.

The table above shows a description of the final result of the rehabilitation in each criterion compared to the initial requirement in the table above. It also gives a final score achieved for the attempt of rehabilitation quality. The first two are similar cases; this means they will be addressed differently in the second step (rehabilitation stage). Local/Regional Materials requires in steps 1 and 2 a minimum of 20% of the total building materials used to be regionally manufactured, but as it was mentioned before, in the second step the evaluation will be done to the materials used FOR THE REHABILITATION. In this case a 40% of result even exceeds the original requirement of the criterion so the point will be granted as it already was in Diagnosis and Verification. The other credit is also achieved when the evaluation of materials that have been extracted, harvested, or recovered within 500 miles from the building, is done over the material used in the rehabilitation. The Rapidly Renewable Materials can be achieved

by integrating this kind of materials in the ones that will be demanded in the rehabilitation, so the credit will be achieved here as well as in the Verification stage.

The other two cases work different and must be addressed carefully. Let's start with the Certified Wood criterion. The tool requires that a minimum of 50% of the wood-based materials is certified, which apparently does not happen in this case since it hasn't achieved the points in either of step 1 and 3. But, what happens in STEP 2? The table describes that from the total wood-based material components of the building, only 20% needed to be replaced in the rehabilitation. The other 80% is in good condition and has been kept. There for this is a criterion that would be impossible to achieve during the Verification stage if it didn't achieve it in the first place for the Diagnosis. But when analyzing it carefully, it can be inferred that it wouldn't be wise to try to achieve the credit if this meant replacing all of the existing wood with new certified wood. That would just generate more impact and more waste. So instead, the wood based material components are analyzed to see which need replacement; in this case the result is a 20% which all comes from certified wood suppliers.

This can be considered the best decision and a good attempt to do the maximum possible with the lowest impact. For this reason the Rehabilitation Profile contemplates the effort of the project team of examining the possibilities and of making the best decision that will in the end create less impact. For this effort, the credit is achieved in the step of rehabilitation and is granted the point it's worth. The same thing happens with the criterion of Insulation, even if the existing insulation material isn't granted a Green Guide rating, it will although achieve the second credit for being kept in the building in order to avoid the impact of a new material and the waste of the existing one.

A small scale rating has been made for these few criterions to understand how this should work. In the end the final scores for the Rehabilitation Process of the building are:

| STEPS          | SCORES | RATINGS            |
|----------------|--------|--------------------|
| Diagnosis      | 1      | Unclassified       |
| Verification   | 2      | Pass               |
| ↓              |        | ↓                  |
| Rehabilitation | 5      | <b>*Excellent*</b> |

This means that if the final certification would have to be a result of the final verification then the rehabilitated building wouldn't do so well. If we use 1 point for each one of the ratings established before by the Assessment Tool (Unclassified, Pass, Good, Very Good, Excellent and Outstanding), then the diagnosis would have an Unclassified and the final Verification would get a Pass, which means the improvement would be noticeable. But if the quality of the Rehabilitation is scored too, an EXCELLENT rating could be achieved to recognize the effort for a good rehabilitation work.

Other criterions such as Building Reuse and Construction Waste Management also need a special attention when being evaluated in the stage of rehabilitation. Concerning the rest of the criterions in the Assessment Tool, they should not be as critical as the ones mentioned above, but will also be evaluated in the same way. Always the initial evaluation of the building in the

Diagnosis, the final evaluation of the building in the Verification, addressed to the state of the building in the moment of the evaluation. When it comes to the state of rehabilitation, the evaluation will be addressed differently. Meaning, the percentages, measurements and quantities will be made over the rehabilitation's work.

The criterions that are considered to be **PREREQUISITES** will also be included and will have an important role in the Rehabilitation Profile; they will just work differently in each step. In Step 1 they will be included in the list but they will not be PREREQUISITES, since it is an evaluation of the state of the existing building (Diagnosis), it is not required to be an obligatory criterion. In Step 3 though, once the rehabilitation is over, **the PREREQUISITE criterions will be considered obligatory**. This means that in Step 2, the project team must find a way of achieving in order to obtain a PASS rating, which is the lowest to get in order to be granted the Certification. The same goes for the rating done for Step 2 for Rehabilitation.

#### 4.4 Rating Benchmark

After merging and combining all four tools into one single that should be suitable for the rehabilitation process of a building, the number of credits have accumulated and have sum up to the following:

|                       | PHYSICAL PERFORMANCE | %  | MANAGEMENT PERFORMANCE | %  | ORGANIZATIONAL PERFORMANCE | %           |
|-----------------------|----------------------|----|------------------------|----|----------------------------|-------------|
| Energy & Atmosphere   | 50                   | 27 | 56,5                   | 36 | 25,5                       | 26          |
| Water Efficiency      | 12                   | 6  | 10,5                   | 7  | 3,5                        | 4           |
| Materials & Resources | 16                   | 9  | 14                     | 9  | 4,5                        | 5           |
| Waste                 | 8                    | 4  | 5                      | 3  | 9                          | 9           |
| Health & Wellbeing    | 26                   | 14 | 20                     | 13 | 15                         | 15          |
| Sustainable Site      | 25                   | 13 | 23,5                   | 15 | 9,5                        | 10          |
| Transport             | 16                   | 9  | 3                      | 2  | 18,5                       | 19          |
| Management            | 22                   | 12 | 15                     | 10 | 12                         | 12          |
| Innovation            | 11                   | 6  | 7                      | 5  | 0                          | 0           |
|                       | <b>186</b>           |    | <b>154,5</b>           |    | <b>97,5</b>                | <b>438</b>  |
|                       | <b>42%</b>           |    | <b>35%</b>             |    | <b>22%</b>                 | <b>100%</b> |

It can be seen by the results of the scores that Physical Performance is the section that weights the most within the Rehabilitation Profile, followed by Management Performance and last Organizational Performance. Since each section of the Assessment Tool has its own score weighting they are evaluations that can be done independent from one another. Meaning each section can have its own independent rating. This means that while Physical Performance can have a VERY GOOD rating in the end, Management Performance and Organizational Performance might reach the EXCELLENT rating.

In the end it doesn't matter if the evaluation is being done independently for each section or for the whole Assessment Tool, the rating will be calculated the same way. The final rating benchmarks for the Rehabilitation Profile's Assessment Tool are as follow:

| Assessment Tool Rating | % Score |
|------------------------|---------|
| OUTSTANDING            | ≥85     |
| EXCELLENT              | ≥70     |
| VERY GOOD              | ≥55     |
| GOOD                   | ≥45     |
| PASS                   | ≥30     |
| UNCLASSIFIED*          | <30     |

\*the UNCLASSIFIED rating is only available in the initial Diagnosis evaluation.

As it was mentioned before, the ratings have been adopted from the BREEAM rating system. It is important to remember that the UNCLASSIFIED rating will only be available in the Diagnosis step of the Rehabilitation Profile. For Step 2 (rehabilitation) and Step 3 (verification) this will be eliminated and the minimum rating available will be PASS, which will only be achieved if all the PREREQUISITES have been accomplished and the score is over 30% of the total point per section or the whole Assessment Tool.

Finally, since the whole purpose of the Rehabilitation Profile is to encourage rehabilitation itself and to facilitate an understanding of the process, it is proposed that within the three ratings obtained from each one of the steps of the Profile, that the **Rehabilitation** rating should be the final and most important. This way owners and buildings project teams are encouraged to enroll in the process of certifying the building they are rehabilitating and most important to do it with environmental objectives in order to achieve a noticeable reduction of the building's life cycle impacts.

## 5. FINAL INFERENCES

- Rehabilitation is complex; it involves dealing with old buildings, worn out elements, design mistakes, inefficient management and sometimes occupant's bad habits. It is also, in many cases almost impossible to achieve because of the difficulty of fixing all these elements. Naturally, wanting to rehabilitate a building with environmental objectives, in order to obtain a sustainable building certification, makes the job even harder to achieve. We also many times think of rehabilitation as a physical thing, when actually it should involve everything that make the building alive; physical, operational and organizational. For this reason rehabilitation should be seen as process that needs to be done step by step and taking the necessary time to digest all the factors that make it so complex. The **Rehabilitation Profile** projected in this work presents an opportunity to simplify this process and to encourage the pursued of a certification with the purpose of reducing environmental impacts generated by the existing building. It is to be carried out in three main step:

1. Step 1: Diagnosis
2. Step 2: Rehabilitation
3. Step 3: Verification

An **Assessment Tool** has been developed as a product of a comparative analysis made of the existing Certification Tools (LEED and BREEAM) and to support the Rehabilitation Profile in each of the three steps it's composed by. The tool should be used to:

- Provide an initial Diagnosis of the existing building's performance, indicating the physical state, the quality of its management and the organizational support.
- Provide a guideline to be followed during the rehabilitation of the building with the examination and results of the initial diagnosis.
- Evaluate the final result after rehabilitation is over and verify the improvement of the attempted criterions.

Finally, the Assessment Tool should also provide a rating for each one of the steps of the Rehabilitation Profile and provide a new evaluation method to recognize the quality of a good rehabilitation procedure. This should be achieved by giving the Rehabilitation Step (2) the most important and final rating of the whole process.

- When pursuing a Sustainable Building Certification for a rehabilitated building, the objective of the tool should NOT be to evaluate if the building achieves the highest rating to gain a 'Green Building' label after the rehabilitation, but to evaluate the actual attempted improvement operation and therefore evaluating the quality of the Rehabilitation itself. The Rehabilitation Profile offers the possibility of rewarding this effort and making it worth the striving by providing the opportunity of achieving a **Sustainable Rehabilitation Certification**.

In some cases, the incentive to pursue a sustainable certification for a rehabilitated building might not be present when an owner and project team know the building doesn't have a



chance of reaching the physical standards of a sustainable building. On the other hand, if a certification of Rehabilitation Quality is offered by the organizations, more projects would enroll in the challenge of achieving the best performance the building can offer and by this achieving a 'Green Building' label.

- The existing assessment tools evaluated in this work (LEED and BREEAM) have provided a good guidance to follow in the development of the Assessment Tool for the Rehabilitation Profile. The combination of both systems has resulted in a very complete one that includes all the issues necessary to assess the performance of a building. However, these tools are not design to evaluate the real process and effort of rehabilitation since they only evaluate the final building performance and not the considerations made by the project team for the good of the building and the environment. These considerations might not lead the building to win a certification but they can actually reduce or prevent an unnecessary impact created when trying to achieve one or more criterions. The existing assessment tools are not able to see this kind of considerations, yet they are what the Rehabilitation Profile is trying to recognize.
- In the same way, it is emphasized that within the Assessment Tool developed for this work, a series of criterions have been revealed to be somewhat critical and need a careful attention during the assessment development. This is because in the desire of achieving these criterions a bad decision can be made, which instead of reducing the impact it will double it and what is worse get rewarded for it. It is important to highlight that for this reason the presence of an accredited professional should be considered an essential part of the Rehabilitation process, in order to assist and commission the analysis and decisions made for the **Critical Criterions**.
- Finally, it is inferred that organizations such as LEED and BREEAM that provide Sustainable Building Certifications and are so strongly positioned around the world as 'Green Building' labels, should give more importance to Rehabilitation. They should provide criterions and evaluation methods that will facilitate the process and make it easier. Also, they should acknowledge a way of transforming the Sustainable Rehabilitation Certification into one of the most important certifications. If in the end the final objective of these tools is to encourage sustainability and reduce environmental impact, then the rehabilitation of existing buildings should always be considered a better option than the construction of new ones.

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USGBC – LEED for New Constructions and Major Renovations 2005

USGBC – LEED for Existing Buildings: Operation and Maintenance 2008

## APPENDIX 1

### LEED for New Constructions and Major Renovations

# Project Checklist

| <b>Sustainable Sites</b>         |  | <b>14 Possible Points</b> |
|----------------------------------|--|---------------------------|
| Prereq 1                         | <b>Construction Activity Pollution Prevention</b>                          | Required                  |
| Credit 1                         | <b>Site Selection</b>  | 1                         |
| Credit 2                         | <b>Development Density &amp; Community Connectivity</b>                    | 1                         |
| Credit 3                         | <b>Brownfield Redevelopment</b>  | 1                         |
| Credit 4.1                       | <b>Alternative Transportation</b> , Public Transportation Access           | 1                         |
| Credit 4.2                       | <b>Alternative Transportation</b> , Bicycle Storage & Changing Rooms       | 1                         |
| Credit 4.3                       | <b>Alternative Transportation</b> , Low Emitting & Fuel Efficient Vehicles | 1                         |
| Credit 4.4                       | <b>Alternative Transportation</b> , Parking Capacity                       | 1                         |
| Credit 5.1                       | <b>Site Development</b> , Protect or Restore Habitat                       | 1                         |
| Credit 5.2                       | <b>Site Development</b> , Maximize Open Space                              | 1                         |
| Credit 6.1                       | <b>Stormwater Design</b> , Quantity Control                                | 1                         |
| Credit 6.2                       | <b>Stormwater Design</b> , Quality Control                                 | 1                         |
| Credit 7.1                       | <b>Heat Island Effect</b> , Non-Roof                                       | 1                         |
| Credit 7.2                       | <b>Heat Island Effect</b> , Roof   | 1                         |
| Credit 8                         | <b>Light Pollution Reduction</b>   | 1                         |
| <b>Water Efficiency</b>          |  | <b>5 Possible Points</b>  |
| Credit 1.1                       | <b>Water Efficient Landscaping</b> , Reduce by 50%                         | 1                         |
| Credit 1.2                       | <b>Water Efficient Landscaping</b> , No Potable Use or No Irrigation       | 1                         |
| Credit 2                         | <b>Innovative Wastewater Technologies</b>                                  | 1                         |
| Credit 3.1                       | <b>Water Use Reduction</b> , 20% Reduction                                 | 1                         |
| Credit 3.2                       | <b>Water Use Reduction</b> , 30% Reduction                                 | 1                         |
| <b>Energy &amp; Atmosphere</b>   |  | <b>17 Possible Points</b> |
| Prereq 1                         | <b>Fundamental Commissioning of the Building Energy Systems</b>            | Required                  |
| Prereq 2                         | <b>Minimum Energy Performance</b>  | Required                  |
| Prereq 3                         | <b>Fundamental Refrigerant Management</b>                                  | Required                  |
| Credit 1                         | <b>Optimize Energy Performance</b>   | 1–10                      |
| Credit 2                         | <b>On-Site Renewable Energy</b>  | 1–3                       |
| Credit 3                         | <b>Enhanced Commissioning</b>  | 1                         |
| Credit 4                         | <b>Enhanced Refrigerant Management</b>                                     | 1                         |
| Credit 5                         | <b>Measurement &amp; Verification</b>                                      | 1                         |
| Credit 6                         | <b>Green Power</b>   | 1                         |
| <b>Materials &amp; Resources</b> |  | <b>13 Possible Points</b> |
| Prereq 1                         | <b>Storage &amp; Collection of Recyclables</b>                             | Required                  |
| Credit 1.1                       | <b>Building Reuse</b> , Maintain 75% of Existing Walls, Floors & Roof      | 1                         |
| Credit 1.2                       | <b>Building Reuse</b> , Maintain 95% of Existing Walls, Floors & Roof      | 1                         |
| Credit 1.3                       | <b>Building Reuse</b> , Maintain 50% of Interior Non-Structural Elements   | 1                         |
| Credit 2.1                       | <b>Construction Waste Management</b> , Divert 50% from Disposal            | 1                         |

LEED for New Construction Rating System v2.2

|            |  |   |
|------------|--|---|
| Credit 2.2 | <b>Construction Waste Management</b> , Divert 75% from Disposal                | 1 |
| Credit 3.1 | <b>Materials Reuse</b> , 5%  | 1 |
| Credit 3.2 | <b>Materials Reuse</b> , 10%   | 1 |
| Credit 4.1 | <b>Recycled Content</b> , 10% (post-consumer + 1/2 pre-consumer)               | 1 |
| Credit 4.2 | <b>Recycled Content</b> , 20% (post-consumer + 1/2 pre-consumer)               | 1 |
| Credit 5.1 | <b>Regional Materials</b> , 10% Extracted, Processed & Manufactured Regionally | 1 |
| Credit 5.2 | <b>Regional Materials</b> , 20% Extracted, Processed & Manufactured Regionally | 1 |
| Credit 6   | <b>Rapidly Renewable Materials</b>   | 1 |
| Credit 7   | <b>Certified Wood</b>  | 1 |

### **Indoor Environmental Quality** **15 Possible Points**

|            |   |          |
|------------|---|----------|
| Prereq 1   | <b>Minimum IAQ Performance</b>                                      | Required |
| Prereq 2   | <b>Environmental Tobacco Smoke (ETS) Control</b>                    | Required |
| Credit 1   | <b>Outdoor Air Delivery Monitoring</b>                              | 1        |
| Credit 2   | <b>Increased Ventilation</b>  | 1        |
| Credit 3.1 | <b>Construction IAQ Management Plan</b> , During Construction       | 1        |
| Credit 3.2 | <b>Construction IAQ Management Plan</b> , Before Occupancy          | 1        |
| Credit 4.1 | <b>Low-Emitting Materials</b> , Adhesives & Sealants                | 1        |
| Credit 4.2 | <b>Low-Emitting Materials</b> , Paints & Coatings                   | 1        |
| Credit 4.3 | <b>Low-Emitting Materials</b> , Carpet Systems                      | 1        |
| Credit 4.4 | <b>Low-Emitting Materials</b> , Composite Wood & Agrifiber Products | 1        |
| Credit 5   | <b>Indoor Chemical &amp; Pollutant Source Control</b>               | 1        |
| Credit 6.1 | <b>Controllability of Systems</b> , Lighting                        | 1        |
| Credit 6.2 | <b>Controllability of Systems</b> , Thermal Comfort                 | 1        |
| Credit 7.1 | <b>Thermal Comfort</b> , Design                                     | 1        |
| Credit 7.2 | <b>Thermal Comfort</b> , Verification                               | 1        |
| Credit 8.1 | <b>Daylight &amp; Views</b> , Daylight 75% of Spaces                | 1        |
| Credit 8.2 | <b>Daylight &amp; Views</b> , Views for 90% of Spaces               | 1        |

### **Innovation & Design Process** **5 Possible Points**

|            |                                     |   |
|------------|-------------------------------------|---|
| Credit 1.1 | <b>Innovation in Design</b>         | 1 |
| Credit 1.2 | <b>Innovation in Design</b>         | 1 |
| Credit 1.3 | <b>Innovation in Design</b>         | 1 |
| Credit 1.4 | <b>Innovation in Design</b>         | 1 |
| Credit 2   | <b>LEED Accredited Professional</b> | 1 |

### **Project Totals** **69 Possible Points**

**Certified** 26–32 points ■ **Silver** 33–38 points ■ **Gold** 39–51 points ■ **Platinum** 52–69 points

# Project Checklist

|   |                                |
|---|--------------------------------|
| <b>Sustainable Sites</b>  | <b>9 Possible Points</b>       |
| Credit 1: LEED Certified Design and Construction  | 1                              |
| Credit 2: Building Exterior and Hardscape Management Plan   | 1                              |
| Credit 3: Integrated Pest Management, Erosion Control, and Landscape Management Plan                            | 1                              |
| Credit 4.1 - 4.4: Alternative Commuting Transportation  | 1                              |
| Credit 5: Reduced Site Disturbance: Protect or Restore Open Space   | 1                              |
| Credit 6: Stormwater Management   | 1                              |
| Credit 7.1: Heat Island Reduction: Nonroof  | 1                              |
| Credit 7.2: Heat Island Reduction: Roof   | 1                              |
| Credit 8: Light Pollution Reduction   | 1                              |
| <b>Water Efficiency</b>   | <b>4 - 10 Possible Points</b>  |
| Prerequisite 1: Minimum Indoor Plumbing Fixture and Fitting Efficiency  | Required                       |
| Credit 1.1 and 1.2: Water Performance Measurement   | 1 - 2                          |
| Credit 2.1 - 2.3: Additional Indoor Plumbing Fixture and Fitting Efficiency                                     | 1 - 3                          |
| Credit 3.1 - 3.3: Water Efficient Landscaping   | 1 - 3                          |
| Credit 4.1 - 4.2: Cooling Tower Water Management  | 1 - 2                          |
| <b>Energy &amp; Atmosphere</b>  | <b>13 - 30 Possible Points</b> |
| Prerequisite 1: Energy Efficiency Best Management Practices: Planning, Documentation and Opportunity Assessment | Required                       |
| Prerequisite 2: Minimum Energy Efficiency Performance   | Required                       |
| Prerequisite 3: Refrigerant Management: Ozone Protection  | Required                       |
| Credit 1: Optimize Energy Efficiency Performance  | 2-15, 2 point mandatory        |
| Credit 2.1: Existing Building Commissioning: Investigation and Analysis   | 2                              |
| Credit 2.2: Existing Building Commissioning: Implementation   | 2                              |
| Credit 2.3: Existing Building Commissioning: Ongoing Commissioning  | 2                              |
| Credit 3.1: Performance Measurement: Building Automation System   | 1                              |
| Credit 3.2 and 3.3: Performance Measurement: System-Level Metering  | 1 - 2                          |
| Credit 4.1 - 4.4: On-Site and Off-Site Renewable Energy   | 1 - 4                          |
| Credit 5: Refrigerant Management  | 1                              |
| Credit 6: Emissions Reduction Reporting   | 1                              |
| <b>Materials &amp; Resources</b>  | <b>9 - 14 Possible Point</b>   |
| Prerequisite 1: Sustainable Purchasing Policy   | Required                       |
| Prerequisite 2: Solid Waste Management Policy   | Required                       |
| Credit 1.1 - 1.3: Sustainable Purchasing: Ongoing Consumables   | 1 - 3                          |
| Credit 2.1 and 2.2: Sustainable Purchasing: Durable Goods   | 1 - 2                          |

|  |       |
|--|-------|
| Credit 3: Sustainable Purchasing: Facility Alterations & Additions | 1     |
| Credit 4: Sustainable Purchasing: Reduced Mercury in Lamps         | 1 - 2 |
| Credit 5: Sustainable Purchasing: Food                             | 1     |
| Credit 6: Solid Waste Management: Waste Stream Audit               | 1     |
| Credit 7.1 and 7.2: Solid Waste Management: Ongoing Consumables    | 1 - 2 |
| Credit 8: Solid Waste Management: Durable Goods                    | 1     |
| Credit 9: Solid Waste Management: Facility Alterations & Additions | 1     |

### **Indoor Environmental Quality**

**16 - 20 Possible Points**

|   |          |
|---|----------|
| Prerequisite 1: Outdoor Air Introduction & Exhaust Systems  | Required |
| Prerequisite 2: Environmental Tobacco Smoke (ETS) Control   | Required |
| Prerequisite 3: Green Cleaning Policy   | Required |
| Credit 1.1: IAQ Best Management Practices: IAQ Management Program                                   | 1        |
| Credit 1.2: IAQ Best Management Practices: Outdoor Air Delivery Monitoring                          | 1        |
| Credit 1.3: IAQ Best Management Practices: Increased Ventilation                                    | 1        |
| Credit 1.4: IAQ Best Management Practices: Reduce Particulates in Air Distribution                  | 1        |
| Credit 1.5: IAQ Best Management Practices: IAQ Management for<br>Facility Alterations and Additions | 1        |
| Credit 2.1: Occupant Comfort: Occupant Survey   | 1        |
| Credit 2.2: Occupant Comfort: Occupant-Controlled Lighting  | 1        |
| Credit 2.3: Occupant Comfort: Thermal Comfort Monitoring  | 2        |
| Credit 2.4 and 2.5: Occupant Comfort: Daylight and Views  | 1 - 2    |
| Credit 3.1: Green Cleaning: High-Performance Cleaning Program                                       | 1        |
| Credit 3.2 - 3.3: Green Cleaning: Custodial Effectiveness Assessment                                | 1 - 2    |
| Credit 3.4 - 3.6: Green Cleaning: Purchase of Sustainable Cleaning Products and Materials           | 1 - 3    |
| Credit 3.7: Green Cleaning: Sustainable Cleaning Equipment  | 1        |
| Credit 3.8: Green Cleaning: Entryway Systems  | 1        |
| Credit 3.9: Green Cleaning: Indoor Integrated Pest Management                                       | 1        |

### **Innovation In Operations**

**4 - 7 Possible Points**

|   |       |
|---|-------|
| Credit 1.1 - 1.4: Innovation in Operations              | 1 - 4 |
| Credit 2: LEED® Accredited Professional                 | 1     |
| Credit 3: Documenting Sustainable Building Cost Impacts | 2     |

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### **Project Totals**

**85 possible base points plus 7 for IO**

|                                    |              |
|------------------------------------|--------------|
| <input type="checkbox"/> Certified | 34–42 points |
| <input type="checkbox"/> Silver    | 43–50 points |
| <input type="checkbox"/> Gold      | 51–67 points |
| <input type="checkbox"/> Platinum  | 68–92 points |

## BREEAM for New Buildings

| <b>BREEAM section and assessment issue</b> |  | <b>Available credits<sup>3</sup></b> |
|--|--|--------------------------------------|
| <b>Management</b>                          |  |                                      |
| Man01                                      | Sustainable procurement                | 8                                    |
| Man02                                      | Responsible construction practices     | 2                                    |
| Man03                                      | Construction site impacts              | 5                                    |
| Man04                                      | Stakeholder participation              | 4                                    |
| Man05                                      | Service life planning and costing      | 3                                    |
| Environmental section weighting            |  | 12%                                  |
| <b>Health and Wellbeing</b>                |  |                                      |
| Hea01                                      | Visual comfort                         | 3-5                                  |
| Hea02                                      | Indoor air quality                     | 6                                    |
| Hea03                                      | Thermal comfort                        | 2                                    |
| Hea04                                      | Water quality                          | 1                                    |
| Hea05                                      | Acoustic performance                   | 2-4                                  |
| Hea06                                      | Safety and security                    | 2                                    |
| Environmental section weighting            |  | 15%                                  |
| <b>Energy</b>                              |  |                                      |
| Ene01                                      | Reduction of CO <sub>2</sub> emissions | 15                                   |
| Ene02                                      | Energy monitoring                      | 1-2                                  |
| Ene03                                      | Low or zero carbon technologies        | 5                                    |
| Ene04                                      | Energy efficient external lighting     | 1                                    |
| <b>Transport</b>                           |  |                                      |
| Tra01                                      | Public transport accessibility         | 2-6                                  |
| Tra02                                      | Proximity to amenities                 | 0-1                                  |
| Tra03                                      | Cyclist facilities                     | 1-2                                  |
| Tra04                                      | Maximum car parking capacity           | 0-2                                  |
| Tra05                                      | Travel Plan                            | 1                                    |
| Environmental section weighting            |  | 8%                                   |
| <b>Water</b>                               |  |                                      |
| Wat01                                      | Water consumption                      | 5                                    |
| Wat02                                      | Water monitoring                       | 1                                    |
| Wat03                                      | Water leak detection and prevention    | 2                                    |

| <b>BREEAM section and assessment issue</b> |  | <b>Available credits<sup>3</sup></b> |
|--|--|--------------------------------------|
| Wat04                                      | Water efficient equipment (process)                            | 1                                    |
| Environmental section weighting            |  | 6%                                   |
| <b>Materials</b>                           |  |                                      |
| Mat01                                      | Life Cycle Impacts   | 2-6                                  |
| Mat02                                      | Hard landscaping and boundary protection                       | 1                                    |
| Mat03                                      | Responsible sourcing of materials                              | 3                                    |
| Mat04                                      | Insulation   | 2                                    |
| Mat05                                      | Designing for robustness                                       | 1                                    |
| Environmental section weighting            |  | 12.5%                                |
| <b>Waste</b>                               |  |                                      |
| Wst01                                      | Construction waste management                                  | 4                                    |
| Wst02                                      | Recycled aggregates  | 1                                    |
| Wst03                                      | Operational waste  | 1                                    |
| Wst04                                      | Speculative floor and ceiling finishes                         | 0-1                                  |
| Environmental section weighting            |  | 7.5%                                 |
| <b>Land Use and Ecology</b>                |  |                                      |
| LE01                                       | Site Selection   | 2                                    |
| LE02                                       | Ecological value of site and protection of ecological features | 1                                    |
| LE03                                       | Mitigating ecological impact                                   | 2                                    |
| LE04                                       | Enhancing site ecology   | 2-3                                  |
| LE05                                       | Long term impact on biodiversity                               | 2                                    |
| Environmental section weighting            |  | 10%                                  |
| <b>Pollution</b>                           |  |                                      |
| Pol01                                      | Refrigerants   | 3                                    |
| Pol02                                      | NO <sub>x</sub> emissions from heating source                  | 2-3                                  |
| Pol03                                      | Surface water run-off  | 5                                    |
| Pol04                                      | Reduction of night time light pollution                        | 1                                    |
| Pol05                                      | Noise attenuation  | 1                                    |
| Environmental section weighting            |  | 10%                                  |
| <b>Innovation</b>                          |  |                                      |
| Inn 01                                     | Innovation   | 10 (max)                             |



|                          |                      |                     |
|--------------------------|----------------------|---------------------|
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## Part 1 – Asset Rating

### The standards

Part 1 of this Standard provides a quality measure of a building's inherent performance characteristics based on its built form, construction and services.

A Part 1 assessment can be carried out independently of any assessment against Parts 2 or 3 of this standard.

Table 1 sets out the core scope of the Standard against which all Part 1 assessments will be carried out. It is not necessary to meet all of these criteria to achieve a rating against the Standard. Building type specific performance standards are set for these issues within the Scheme Documents.

| <b>Table 1 – Core Asset Rating Scope</b>  |                          |
|---|--------------------------|
| <b>Assessment criteria</b>  | <b>Section weighting</b> |
| <b>ENERGY</b>   | <b>26.5%</b>             |
| Level of CO <sub>2</sub> emissions*   |                          |
| Sub-metering of substantial energy uses   |                          |
| Sub-metering of areas/tenancy   |                          |
| Renewable and low emission energy (built in)  |                          |
| <b>WATER</b>  | <b>8.0%</b>              |
| Water consumption   |                          |
| Water meter   |                          |
| Leak detection systems  |                          |
| Water recycling (use of rainwater / greywater (recycled water))                     |                          |
| <b>MATERIALS</b>  | <b>8.5%</b>              |
| Robustness (Impact protection / Durability/designing for longevity)                 |                          |
| Quality of asset (i.e. how well it has been maintained)                             |                          |
| Security (quality and maintenance status of systems)                                |                          |
| Fire protection (Remotely monitored fire alarms systems)                            |                          |
| <b>WASTE</b>  | <b>5%</b>                |
| Storage of recyclable waste   |                          |
| <b>HEALTH &amp; WELLBEING</b>   | <b>17.0%</b>             |
| Daylighting (provision and control)   |                          |
| Artificial lighting design (quality; levels; control)                               |                          |
| Indoor air quality (ventilation rates; indoor air quality; microbial contamination) |                          |
| Thermal control   |                          |
| Acoustic performance  |                          |
| Drinking water provision (plumbed in water coolers)                                 |                          |

|                          |                      |                     |
|--------------------------|----------------------|---------------------|
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| <b>Table 1 – Core Asset Rating Scope</b>                              |                          |
|---|--------------------------|
| <b>Assessment criteria</b>  | <b>Section weighting</b> |
| Outdoor space   |                          |
| <b>POLLUTION</b>  | <b>14.0%</b>             |
| Ground/water pollution control measures                               |                          |
| Flood risk  |                          |
| Flood management facilities (incl. Sustainable Urban Drainage (SUDs)) |                          |
| Refrigerant type and leakage detection/control                        |                          |
| Emissions to air (incl. NOx)  |                          |
| Land contamination  |                          |
| <b>TRANSPORT</b>  | <b>11.5%</b>             |
| Proximity of amenities  |                          |
| Cyclist facilities  |                          |
| Accessibility/availability of public transport                        |                          |
| Pedestrian/cyclist safety   |                          |
| <b>LAND USE &amp; ECOLOGY (Biodiversity)</b>                          | <b>9.5%</b>              |
| Ecological value (including enhancement)                              |                          |

\*Note (Not a part of this standard): The level of CO<sub>2</sub> emissions can be demonstrated by input of the EPC rating or an alternative method where a full EPC is not available

|                          |                      |                     |
|--------------------------|----------------------|---------------------|
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## Part 2 – Building Management Rating

### The standards

Part 2 of this standard provides a qualitative measure of:

- management policies, procedures and practices related to the operation of a building;
- consumption of key resources such as energy, water and other consumables; and
- the environmental impacts of carbon and waste.

It is independent of the inherent environmental quality of the building itself. Such management policies may be applied at a building, estate level or corporate level but are assessed in terms of their implementation within the building.

A Part 2 assessment can be carried out independently of any assessment against Parts 1 or 3 of this standard.

Table 2 sets out the core scope of the Standard against which all Part 2 assessments will be carried out. It is not necessary to meet all of these criteria in order to achieve a rating against the Standard. Building type specific performance standards are set for these issues within the Scheme Documents.

| <b>Table 2 – Building Management Rating Scope</b>                    |                          |              |
|--|--------------------------|--------------|
| <b>Assessment criteria</b>   | <b>Section weighting</b> |              |
| <b>ENERGY</b>  | <b>31.5%</b>             |              |
| Level of CO <sub>2</sub> emissions*                                  |                          |              |
| Maintenance regime / schedules                                       |                          |              |
| Energy audit   |                          |              |
| Energy / CO <sub>2</sub> monitoring, targeting & reduction           |                          |              |
| Energy reporting/information   |                          |              |
| Energy management  |                          |              |
| <b>WATER</b>   | <b>5.5%</b>              |              |
| Maintenance of sanitary fittings and controls                        |                          |              |
| Water consumption monitoring   |                          |              |
| <b>MATERIALS</b>   | <b>7.5%</b>              |              |
| Hazardous materials  |                          |              |
| Security survey (covering building and site arrangements facilities) |                          |              |
| Security system remote monitoring                                    |                          |              |
| Fire protection / resilience (Fire risk; emergency plan)             |                          |              |
| <b>HEALTH &amp; WELLBEING</b>  |                          | <b>15.0%</b> |
| Refurbishment policies   |                          |              |
| Volatile organic compound policies                                   |                          |              |

|                          |                      |                      |
|--------------------------|----------------------|----------------------|
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| <b>Table 2 – Building Management Rating Scope</b>   |                          |
|---|--------------------------|
| <b>Assessment criteria</b>  | <b>Section weighting</b> |
| <b>Cleaning policies</b>  |                          |
| <b>Occupant satisfaction surveys</b>  |                          |
| <b>Maintenance of lighting levels</b>   |                          |
| <b>LAND USE &amp; ECOLOGY</b>   | <b>12.5%</b>             |
| <b>Biodiversity action plan</b>   |                          |
| <b>Ecological survey</b>  |                          |
| <b>POLLUTION</b>  | <b>13.0%</b>             |
| <b>Management/maintenance of ground/water pollution control measures (incl. hazardous chemicals)</b>  |                          |
| <b>Flood risk management plan and procedures (incl. Sustainable Drainage Systems)</b>   |                          |
| <b>Maintenance procedures/plans</b>   |                          |
| <b>Refrigerant leakage monitoring</b>   |                          |
| <b>Control of emissions to air</b>  |                          |
| <b>Land contamination</b>   |                          |
| <b>Light pollution control</b>  |                          |
| <b>MANAGEMENT (systems relating to the building(s) covered)</b><br>Note: These may be corporate level systems but must be implemented in practice at the building level | <b>15%</b>               |
| <b>Building user guide</b>  |                          |
| <b>Operating manuals</b>  |                          |
| <b>Local environmental responsibility (staff designated) **</b>   |                          |
| <b>Building user liaison mechanisms and education programme</b>   |                          |
| <b>Environmental policy implementation (covering building level issues) **</b>  |                          |
| <b>Environmental purchasing policy implementation (covering building level issues) **</b>   |                          |
| <b>Environmental management system (covering building level issues)</b>   |                          |
| <b>Condition survey</b>   |                          |
| <b>Planned maintenance policy/plan</b>  |                          |
| <b>Refurbishment policy (covering improvement to building fabric and systems)</b>   |                          |

\*Note (Not a part of this Standard): The level of CO<sub>2</sub> emissions can be demonstrated by input of the DEC rating or an alternative method where a full DEC is not available.

\*\* Note: The scope of the assessment covers the local implementation of issues. Policies and procedures marked with a double asterisk relate to the operation and maintenance of the building. They include, but are not limited to, the following aspects of environmental management and responsibility:

- Occupant satisfaction surveys, feedback and targets
- Transport impact measurement and planning

|                          |                      |                      |
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- Biodiversity impact assessment and local partnerships
- Measurement, reporting and targeting of building performance

|                          |                      |                      |
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## Part 3 – Organisational Rating

### The Standards

Part 3 of this standard provides a framework for the assessment and evaluation of management policies, procedures and practices related to the activities that an organisation is carrying out in the building being assessed. It evaluates the quality of understanding and implementation of these management systems at the building or site level. Part 3 is independent of the inherent environmental quality of the building itself.

A Part 3 assessment can be carried out independently of any assessment against Parts 1 or 2 of this standard. Many of the issues covered in Part 3 are also covered in Part 2 in relation to the specific management and operation of the building and its services.

Table 3 sets out the scope of the standard against which all Part 3 assessments will be carried out. The specific application of these criteria to a building/site will be dependent on the nature of the organisation and its activities. These criteria will be applied as set out in the relevant Scheme Documents and the issues and scores listed in Table 3 are indicative.

| <b>Table 3 – Organisational Rating Scope</b>   |   |
|--|---|
| <b>Assessment criteria</b>   | <b>Indicative Section weighting</b><br><small>(based on office activities or similar)</small> |
| <b>MANAGEMENT (holistic management systems)</b><br><small>Note: These may be corporate level systems but must be implemented in practice at the building level</small> | <b>12.0%</b>  |
| <b>Building user liaison mechanisms and education programmes</b>   |   |
| <b>Environmental management system</b>   |   |
| <b>Local environmental responsibility (staff designated)</b>   |   |
| <b>Environmental policy</b>  |   |
| <b>Environmental purchasing policy implementation</b>  |   |
| <b>Environmental management system</b>   |   |
| <b>Business continuity plans (emergency)</b>   |   |
| <b>ENERGY</b>  | <b>19.5%</b>  |
| <b>Energy policies</b>   |   |
| <b>Energy and equipment purchasing policies</b>  |   |
| <b>Measuring and recording</b>   |   |
| <b>Targeting and monitoring</b>  |   |
| <b>Energy management training</b>  |   |
| <b>Carbon footprinting</b>   |   |
| <b>WATER</b>   | <b>3.5%</b>   |
| <b>Environmental policies</b>  |   |

|                          |                      |                      |
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| <b>Table 3 – Organisational Rating Scope</b>                           |   |
|--|---|
| <b>Assessment criteria</b>   | <b>Indicative Section weighting</b><br><small>(based on office activities or similar)</small> |
| <b>Purchasing policies</b>   |   |
| <b>Measuring and recording</b>   |   |
| <b>Targeting and monitoring</b>  |   |
| <b>Water management training</b>                                       |   |
| <b>MATERIALS</b>   | <b>4.5%</b>   |
| <b>Environmental policies</b>  |   |
| <b>Environmental purchasing policies</b>                               |   |
| <b>Measuring and recording</b> (materials/resources and waste)         |   |
| <b>Targeting and monitoring</b> (materials/resources and waste)        |   |
| <b>Hazardous materials</b>   |   |
| <b>Security</b>  |   |
| <b>Fire protection / resilience</b>                                    | <b>11.5%</b>  |
| <b>WASTE</b>   |   |
| <b>Environmental policies</b>  |   |
| <b>Measuring and recording</b> (materials/resources and waste)         |   |
| <b>Targeting and monitoring</b> (materials/resources and waste)        |   |
| <b>Waste management plan</b>   |   |
| <b>Waste management training</b>                                       | <b>15.0%</b>  |
| <b>HEALTH &amp; WELLBEING (Staff)</b>                                  |   |
| <b>Stakeholder engagement</b>  |   |
| <b>Staff development</b>   |   |
| <b>Staff feedback mechanisms</b>                                       |   |
| <b>Targeting and monitoring</b>  |   |
| <b>Management training</b>   | <b>18.5%</b>  |
| <b>TRANSPORT</b>   |   |
| <b>Green travel plans/initiatives to reduce impacts of travelling</b>  |   |
| <b>Measuring and recording travel impacts</b> (i.e. transport surveys) |   |
| <b>Business travel policies and procedures</b>                         |   |
| <b>Car sharing/staff travel schemes</b>                                |   |
| <b>Delivery management</b>   | <b>5.0%</b>   |
| <b>Accessibility/availability of public transport</b>                  |   |
| <b>LAND USE &amp; ECOLOGY (Biodiversity)</b>                           |   |
| <b>Biodiversity survey of site</b>                                     |   |
| <b>Biodiversity action plan</b>  |   |

|                          |                      |                      |
|--------------------------|----------------------|----------------------|
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| <b>Table 3 – Organisational Rating Scope</b>                             |   |
|--|---|
| <b>Assessment criteria</b>   | <b>Indicative Section weighting</b><br><small>(based on office activities or similar)</small> |
| <b>Enhancement of ecological value</b>                                   |   |
| <b>POLLUTION</b>   | <b>10.5%</b>  |
| <b>Management/maintenance of ground/water pollution control measures</b> |   |
| <b>Flood risk management plan and procedures</b>                         |   |
| <b>Control of emissions to air</b>                                       |   |
| <b>Land contamination</b>  |   |
| <b>Control of hazardous chemicals etc</b>                                |   |

Notes:

1. Policies and procedures should cover steps taken to appropriately reduce, reuse, recycle, and train in relation to the organisations business activities.
2. Assessment takes account of the degree of implementation of such policies and
3. Procedures and incentives will be assessed at the building level.



# ENERGY AND ATMOSPHERE

## LEED FOR New Construction and Major Renovations

## LEED Existing Buildings: Operation and Maintenance

**EA PREREQ 1: Fundamental Building System Commissioning**

Minimum requirement in the design and development stage to verify and ensure that fundamental building elements and systems are designed, installed and calibrated to operate as intended, by implementing fundamental best practice commissioning procedures.

**EA PREREQ1: Energy Efficiency Best Management Practices: Planning, Documentation and Opportunity Assessment**

Minimum requirement in the stage of building's operation to promote continuity of information to ensure that energy-efficient operating strategies are maintained and provide a foundation for training and system analysis, by implementing building operation plans and preventive maintenance programs to regularly monitor and optimize the performance.

**EA PREREQ 2: Minimum Energy Performance**

Minimum requirement in the design stage to establish the minimum level efficiency for the base building and systems, by using design tools and computer simulation models to assess and maximize the energy performance of the building.

**EA PREREQ 2: Minimum Energy Efficiency Performance**

Minimum requirement in the stage of building's operation to establish the minimum level of operating energy efficiency performance for the building and system, by implementing building commissioning and using energy-saving operational and management practices. It is required to earn at least two points under Energy & Atmosphere Credit 1.

**EA PREREQ 3: CFC Reduction in HVAC&R Equipment**

Minimum requirement in the design and development stage to reduce ozone depletion by preventing the use of CFC-based refrigerants in HVAC&R base building systems.

**EA PREREQ 3: Refrigerant Management: Ozone Protection**

Minimum requirement in the stage of building's operation to reduce stratospheric ozone depletion by eliminating the use of CFC-based refrigerants in HVAC&R base building systems if economically feasible or developed a phase-out plan that identifies a schedule for future replacement.

**EA CREDIT 1: Optimize Energy Performance**

It is intended as a credit in the stage of design to achieve increasing levels of energy performance above the prerequisite standard to reduce environmental impacts associated with excessive energy use, through a functional design of the building's envelope and building's system.

1-10 points

**EA CREDIT 1: Optimize Energy Efficiency Performance**

It is intended as a credit in the stage of building's operation to achieve an increased level of operating energy efficiency performance relative to typical building of similar type to reduce environmental impacts associated with excessive energy use, by achieving an EPA rating or demonstrating energy efficiency percentiles.

(2 mandatory points) 1-15 points

**EA CREDIT 2: Renewable Energy**

It is intended as a credit in the stage of design to encourage and recognize increasing levels of self-supply through renewable technologies to reduce environmental impacts associated with fossil fuel energy use, by reaching higher than 5% rate in the use of renewable energies.

1-3 points

**EA CREDIT 4: On-Site and Off-Site Renewable Energy**

It is intended as a credit in the stage of building's operation to encourage and recognize increasing levels of on-site and off-site renewable energies to reduce environmental impacts associated with fossil fuel energy use.

1-4 points

**EA CREDIT 3: Additional Commissioning**

It is intended as a credit in the stage of design and development to verify and ensure that the entire building is designed, constructed and calibrated to operate as intended, by implementing additional commissioning to the Fundamental Building Commissioning Prerequisite 1 that will last since the early design phase till the end of construction.

1 points

**EA CREDIT 2: Existing Building Commissioning: Investigation and Analysis, Implementation, Ongoing Commissioning**

Three intended credits in the stage of building's operation:

- 1) To develop an understanding of the operation of the building's major energy-using system;
- 2) To implement minor improvements and identify planned capital projects to ensure that the building's major energy-using systems are repaired, operated and maintained;
- 3) To implement commissioning to address changes in facility occupancy, usage, maintenance, and repair. Make periodic adjustments and reviews of building operating systems and procedures essential for optimal energy efficiency and service provision;

all three with the purpose of optimizing energy performance.

1-6 points

| LEED FOR New Construction and Major Renovations   |  | LEED Existing Buildings: Operation and Maintenance  |              |
|---|--|---|--------------|
| <b>EA CREDIT 4: Ozone Depletion</b><br>It is intended as a credit in the stage of design to prevent the use of HCFC's or Halon in HVAC&R equipment, in order to reduce ozone depletion and support early compliance with the Montreal Protocol.   |  | <b>EA CREDIT 5: Refrigerant Management</b><br>It is intended as a credit in the stage of building's operation to eliminate the use of refrigerants in base building HVAC&R systems or try to operate the facility without mechanical cooling and refrigeration equipment, with the purpose of reducing ozone depletion and support early compliance with the Montreal Protocol while minimizing direct contributions to global warming. |              |
| 1 points  |  | 1 points  |              |
| <b>EA CREDIT 5: Measurement and Verification</b><br>It is intended as a credit in the stage of design to assure ongoing accountability and optimizing of building energy and water consumption performance over time, by implementing strategies that will predict savings of water and energy and designing the building with equipment to measure energy and water performance. |  | <b>EA CREDIT 3: Performance Measurement: Building Automation System, System Level Metering</b><br>It is intended as a credit in the stage of building's operation to provide information to support energy management and the ongoing accountability and optimization of building energy performance and to identify opportunities for additional energy-saving investment and improvements.  |              |
| 1 points  |  | 1-3 points  |              |
| <b>EA CREDIT 6: Green Power</b><br>It is intended as a credit in the stage of design and planning to engage in a green power contract of local utilities, for the development and use of grid-source energy technologies on a net zero pollution basis.   |  |   |              |
| 1 points  |  |   |              |
|   |  | <b>EA CREDIT 6: Emission Reduction Reporting</b><br>It is intended as a credit in the stage of building operation to document the emissions reduction benefit of building efficiency measures, by identifying parameters that reduce conventional energy use and emissions, quantify those reductions and report them to a formal tracking program.   |              |
|   |  | 1 points  |              |
| <b>Possible Points:</b>   |  | <b>17</b>   | <b>30</b>    |
| <b>Environmental Section Weighting</b>  |  | <b>24,6%</b>  | <b>33,3%</b> |

# SUSTAINABLE SITES

## LEED FOR New Construction and Major Renovations

## LEED Existing Buildings: Operation and Maintenance

|   |   |
|---|---|
| <p><b>SS PREREQ 1: Erosion and Sedimentation Control</b></p> <p>Required as a prerequisite during the stage of construction to prevent storm water run-off and/or wind erosion, sedimentation or air pollution with dust and particles on site.</p>   |   |
| <p>To gain a LEED Certified and Construction is the main objective.</p>   | <p><b>SS CREDIT 1: LEED Certified Design and Construction</b></p> <p>It is intended as a credit to reward buildings that were certified during their stage of design and construction.</p> <p style="text-align: right; background-color: #cccccc; padding: 2px;">1 point</p>   |
|   | <p><b>SS CREDIT 2: Building Exterior and Hardscape Management Plan</b></p> <p>It is intended as a credit during the building's operation stage to encourage environmentally sensitive building exterior and hardscape management practices that provide a clean, well-maintained and safe building exterior while supporting high-performance building operations.</p> <p style="text-align: right; background-color: #cccccc; padding: 2px;">1 point</p> |
|   | <p><b>SS CREDIT 3: Integrated Pest Management, Erosion Control and Landscape Management Plan.</b></p> <p>It is intended as a credit during the building's operation stage to improve management practices that provide a clean well maintained exterior and preserve the surrounding environment.</p> <p style="text-align: right; background-color: #cccccc; padding: 2px;">1 point</p>  |
| <p><b>SS CREDIT 1: Site Selection</b></p> <p>It is intended as a credit in the stage of preparation to pursuit an appropriate site selection for the project development, in this way reducing environmental impact from the building's location.</p> <p style="text-align: right; background-color: #cccccc; padding: 2px;">1 point</p>  | <p>Not applicable to an existing building.</p>  |
| <p><b>SS CREDIT 2: Urban Redevelopment</b></p> <p>Intended as a credit in stage of preparation or pre-design to encourage the selection of the site to be in urban areas with existing infrastructure, in order to protect greenfield and preserve habitat and natural recourses.</p> <p style="text-align: right; background-color: #cccccc; padding: 2px;">1 point</p>  | <p>Not applicable to an existing building.</p>  |
| <p><b>SS CREDIT 3: Brownfield Redevelopment</b></p> <p>Intended as a credit in stage of preparation or pre-design (site selection) to encourage damage site rehabilitation and reduce the pressure of undeveloped land.</p> <p style="text-align: right; background-color: #cccccc; padding: 2px;">1 point</p>  | <p>Not applicable to an existing building.</p>  |
| <p><b>SS CREDIT 4: Alternative Transportation</b></p> <p>Intended as a credit in stage of preparation(site selection) and design to encourage ideas and strategies that will prevent and/or reduce pollution and land development impacts from automobile use.</p> <p style="text-align: right; background-color: #cccccc; padding: 2px;">1-4 points</p>  | <p><b>SS CREDIT 4: Alternative Transportation</b></p> <p>Intended as a credit in stage of buildings operation in order to implement strategies to encourage the use of alternative transportation for commuting trips in order to reduce pollution and land development impacts from conventional automobile use.</p> <p style="text-align: right; background-color: #cccccc; padding: 2px;">1-4 points</p>   |
| <p><b>SS CREDIT 5: Reduced Site Disturbance</b></p> <p>Intended credit in the stage of design and planning in order to limit site disturbance and reduce the development footprint, during and after the construction, with the purpose of conserving natural areas and restore damage areas to provide habitat and promote biodiversity.</p> <p style="text-align: right; background-color: #cccccc; padding: 2px;">1-2 points</p> | <p><b>SS CREDIT 5: Reduced Site Disturbance: Protect or Restore Open Space</b></p> <p>Intended credit in the stage of building's operation to develop management plans that will restore damage site areas and conserve existing natural site areas to provide habitat and promote biodiversity.</p> <p style="text-align: right; background-color: #cccccc; padding: 2px;">1 points</p>  |

| LEED FOR New Construction and Major Renovations   |              | LEED Existing Buildings: Operation and Maintenance  |              |
|---|--------------|---|--------------|
| <b>SS CREDIT 6: Storm Water Management</b><br>Intended credit in the stage of design to create strategies for the future operating building, that will maintain natural stormwater flows by promoting infiltration, minimizing water runoff and reducing contaminants.    | 1-2 points   | <b>SS CREDIT 6: Storm Water Management</b><br>Intended credit in the stage building's operation to limit the disruption of natural hydrology by the building and ground, by implementing management plans for stormwater, annual inspections to ensure performance and execute required maintenance .   | 1 points     |
| <b>SS CREDIT 7: Landscape and Exterior Design to Reduce Heat Islands</b><br>Intended credit in the stage of design to create external areas that will reduce and prevent heat islands, in order to minimize impacts on microclimate and human and wild life habitat.      | 1-2 points   | <b>SS CREDIT 7: Heat Islands Reduction</b><br>Intended credit for the stage of building's operation to employ strategies, materials and landscaping technics that reduce heat absorption of external existing materials, in order to minimize impacts on microclimate and human and wild life habitat.  | 1-2 points   |
| <b>SS CREDIT 8: Light Pollution Reduction</b><br>Intended credit in the stage of design to implement site lightning criteria that will eliminate light trespass from the building site, improve night sky access, and reduce development impact on nocturnal environment. | 1 points     | <b>SS CREDIT 8: Light Pollution Reduction</b><br>Intended credit in the stage of building's operation to implement programs to ensure lightning control systems and/or implement site lightning criteria that will eliminate light trespass from the building site, improve night sky access, and reduce development impact on nocturnal environment. | 1 points     |
| <b>Possible Points:</b>   | 14           |   | 9            |
| <b>Environmental Section Weighting</b>  | <b>20,3%</b> |   | <b>10,0%</b> |

# MATERIALS AND RESOURCES

## LEED FOR New Construction and Major Renovations

## LEED Existing Buildings: Operation and Maintenance

### MR PREREQ1: Storage and Collection of Recyclables

Minimum requirement in the design stage to designate an area of the project for recyclable collection and storage that serves the entire building, in order to reduce waste generated by buildings occupants that is hauled to and disposed of in landfills.

### MR PREREQ 2: Solid Waste Management

Minimum requirement in the stage of building's operation to have in place a solid waste management policy for the building and site, in order to reduce the amount of waste and toxins that are hauled to and disposed of in landfills or incineration facilities.

### MR PREREQ 1: Sustainable Purchasing Policy

Minimum requirement in the stage of building's operation to have in place a sustainable purchasing policy in order to reduce the environmental impacts of materials acquired for use in the operations, maintenance, and upgrades of buildings.

### MR CREDIT 1: Building Reuse

It is intended as a credit in the stage of design to extend the life cycle of existing building stock, conserve resources, retain cultural resources, reduce environmental impacts of new buildings as they relate to materials manufacturing and transport, all this by reusing large portions of existing structures during renovations or redevelopment projects.

1-3 points

Not applicable to an existing building.

### MR CREDIT 2: Construction Waste Management

It is intended as a credit in the construction stage to implement a waste management plan to achieve recycle and/or salvage of construction, demolition and land clearing waste, in order to divert these debris from landfill disposal and redirect recyclable material back to the manufacturing process.

### MR CREDIT 9: Solid Waste Management: Facility Alterations and Ad

It is intended as a credit in the stage of building's operation to divert construction and demolition waste from disposal to landfills and incineration facilities and redirect recyclable recovered resources to the manufacturing process and redirect reusable material to appropriate sites. Divert at least 70% of waste.

1 points

### MR CREDIT 6: Solid Waste Management: Waste Stream Audit

It is intended as a credit in the stage of building's operation to facilitate the reduction of ongoing waste and toxins generated by building occupant and building operation that are hauled to and disposed of in landfills or incineration facilities All this by conducting waste management stream audits of the building's ongoing consumable waste stream.

1 points

### MR CREDIT 7: Solid Waste Management: Ongoing Consumable

It is intended as a credit in the stage of building's operation to facilitate the reduction of ongoing waste and toxins generated from the use of ongoing consumables products by building occupant and building operation that are hauled to and disposed of in landfills or incineration facilities. All this by reusing, recycling or composting 50% or more of the ongoing consumables waste stream.

1-2 points

### MR CREDIT 8: Solid Waste Management: Durable Goods

It is intended as a credit in the stage of building's operation to facilitate the reduction of ongoing waste and toxins generated from the use of durable goods by building occupant and building operation that are hauled to and disposed of in landfills or incineration facilities. All this by maintaining a waste reduction, reuse and recycling program that addresses durable goods that are replaced infrequently.

1-2 points

1 points

| LEED FOR New Construction and Major Renovations   |              | LEED Existing Buildings: Operation and Maintenance  |              |
|---|--------------|---|--------------|
| <p><b>MR CREDIT 3: Resource Reuse</b></p> <p>It is intended as a credit in the stage of design to identify opportunities to incorporate salvage or refurbished materials into the building in order to reduce environmental impacts related to materials manufacturing and transport.</p> <p style="text-align: right;">1-3 points</p>  |              | <p><b>MR CREDIT 3: Sustainable Purchasing: Facility Alteration and Additions</b></p> <p>It is intended as a credit in the stage of building's operation to reduce the environmental and air quality impacts of the materials acquired for use in the upgrade of buildings, by maintaining a sustainable purchasing program that achieves at least 50% of total purchase for facility alterations and additions..</p> <p style="text-align: right;">1 points</p>             |              |
| <p><b>MR CREDIT 4: Recycled Content</b></p> <p>It is intended as a credit in the stage of design to increase demand for building products that incorporate recycled content materials, by establishing percentile goals and therefore reducing the impact resulting from the extraction of new material.</p> <p style="text-align: right;">1-2 points</p>   |              | <p><b>MR CREDIT 4: Sustainable Purchasing: Reduced Mercury in Lamps</b></p> <p>It is intended as a credit in the stage of building's operation to reestablish and maintain a toxic material source reduction program to reduce the amount of mercury brought onto the building site through purchases of lamps, developing a lighting purchasing plan that specifies maximum levels of mercury permitted in lamps purchased.</p> <p style="text-align: right;">1 points</p> |              |
|   |              | <p><b>MR CREDIT 1: Sustainable Purchasing: Ongoing Consumables</b></p> <p>It is intended as a credit in the stage of building's operation to reduce the environmental and air quality impacts of the materials acquired for use in the operations and maintenance of building, by maintaining a sustainable purchasing program that achieves at least 40% of total purchase of ongoing consumables.</p> <p style="text-align: right;">1-3 points</p>                        |              |
|   |              | <p><b>MR CREDIT 2: Sustainable Purchasing: Durable Goods</b></p> <p>It is intended as a credit in the stage of building's operation to reduce the environmental and air quality impacts of the materials acquired for use in the operations and maintenance of building. Points are awarded when achieving sustainable purchases of at least of total purchase of electric-powered equipment and furniture.</p> <p style="text-align: right;">1-2 points</p>                |              |
|   |              | <p><b>MR CREDIT 5: Sustainable Purchasing: Food</b></p> <p>It is intended as a credit in the stage of building's operation to reduce the environmental and transportation impacts associated with food production and distribution, by achieving a sustainable purchase of at least 25% of total combined food and beverage purchases.</p> <p style="text-align: right;">1 points</p>   |              |
| <p><b>MR CREDIT 5: Local/Regional Materials</b></p> <p>It is intended as a credit in the stage of design to use a minimum of 20% of building materials that are manufactured regionally, in order to increase demand for building products that are manufactured locally, thereby reducing the environmental impacts resulting from their transportation and supporting the local economy.</p> <p style="text-align: right;">1-2 points</p> |              |   |              |
| <p><b>MR CREDIT 6: Rapidly Renewable Materials</b></p> <p>It is intended as a credit in the stage of design to use rapidly renewable material for 5% of total building materials, in order to replace and reduce the use and depletion of finite raw, and long-cycle renewable materials.</p> <p style="text-align: right;">1 points</p>  |              |   |              |
| <p><b>MR CREDIT 7: Certified Wood</b></p> <p>It is intended as a credit in the stage of design to use a minimum of 50% certified wood-based material to encourage environmentally responsible forest management.</p> <p style="text-align: right;">1 points</p>   |              |   |              |
| <b>Possible Points:</b>   | <b>13</b>    |   | <b>14</b>    |
| <b>Environmental Section Weighting</b>  | <b>18,9%</b> |   | <b>15,6%</b> |

# INDOOR ENVIRONMENTAL QUALITY

## LEED FOR New Construction and Major Renovations

## LEED Existing Buildings: Operation and Maintenance

**EQ PREREQ 1: Minimum IAQ Performance**

Minimum requirement in the design stage to meet with the minimum ventilation requirements in order to establish minimum indoor air quality (IAQ) performance to prevent the development of indoor air quality problems in buildings, maintaining the health and well being of the occupants.

**EQ PREREQ 2: Environmental Tobacco Smoke (ETS) Control**

Minimum requirement in the design and development stage to prevent the exposure of nonsmokers to ETS by prohibiting smoking in the building, OR, designating separate smoking rooms with isolated ventilation systems.

**EQ CREDIT 1: Carbon Dioxide (CO2) Monitoring**

It is intended as a credit in the design stage to provide capacity for indoor air quality (IAQ) monitoring to sustain long-term occupant health and comfort, by installing a permanent CO2 monitoring system that provides feedback on ventilation performance.

1 points

**EQ CREDIT 2: Increase Ventilation Effectiveness**

It is intended as a credit in the design stage to design the HVAC system and building envelope to optimize air change effectiveness, in order to provide an effective delivery and mixing of fresh air to support the health, safety, and comfort of building occupants.

1 points

**EQ CREDIT 5: Indoor Chemical & Pollutant Source Control**

It is intended as a credit in the design stage to minimize cross-contamination of regularly occupied occupancy by chemical pollutants, in order to avoid exposure of building occupants to potentially hazardous chemicals that adversely impact air quality.

1-2 points

**EQ PREREQ 1: Outdoor Air Introduction and Exhaust Systems**

Minimum requirement in the stage of building's operation to conduct constant air flow monitoring to maintain the minimum required ventilation, in order to establish a minimum indoor air quality (IAQ) performance to enhance indoor air quality in building, thus contributing to the health and well-being of the occupants.

**EQ PREREQ 2: Environmental Tobacco Smoke (ETS) Control**

Minimum requirement in the stage of building's operation to prevent the exposure of nonsmokers to ETS by prohibiting smoking in the building, OR, providing separate smoking rooms with isolated ventilation systems.

**EQ PREREQ 3: Green Cleaning Policy**

Minimum requirement in the stage of building's operation to follow a green cleaning policy to reduce the exposure of building occupants and maintenance personnel to potentially hazardous chemicals, biological, and particulate contaminants, which affect air quality, human health, building finishes, building systems and the environment.

**EQ CREDIT 1.1: IAQ Best Management Practices: IAQ Management Program**

It is intended as a credit in the stage of building's operation to developed an ongoing IAQ management program to enhance indoor air quality (IAQ) by optimizing practices to prevent the development of indoor air quality problems in buildings, correcting them when they occur, and maintaining the well being of all occupants.

1 points

**EQ CREDIT 1.2: IAQ Best Management Practices: Outdoor Air Delivery Monitoring**

It is intended as a credit in the stage of building's operation to have continuous monitoring systems that provide feedback on ventilation system performance to help sustain occupants comfort and well being.

1 points

**EQ CREDIT 1.3: IAQ Best Management Practices: Increased Ventilation**

It is intended as a credit in the stage of building's operation to increase outdoor mechanical and natural air ventilation rates above minimum requirements in order to improve indoor air quality for occupants' comfort, well-being, and productivity.

1 points

**EQ CREDIT 1.4: IAQ Best Management Practices: Reduce Particulates in Air**

It is intended as a credit in the stage of building's operation to maintain filtration media with potentially hazardous particulate contaminant removal effectiveness, that allows to reduce exposure of building occupants and maintenance personnel.

1 points

| LEED FOR New Construction and Major Renovations  | LEED Existing Buildings: Operation and Maintenance   |
|--|--|
| <p><b>EQ CREDIT 3: Construction IAQ Management Plan</b></p> <p>It is intended as a credit in the stage of design and development to create and implement an IAQ management plan for the construction/renovation and preoccupancy phases of the building, to prevent IAQ problems, in order to sustain long term installer and occupant health and comfort.</p> <p style="text-align: right;">1-2 points</p>                                | <p><b>EQ CREDIT 1.5: IAQ Best Management Practices: Management for Facility Alterations and additions</b></p> <p>It is intended as a credit in the stage of building's operation to developed and implement an IAQ management plan for the construction and occupancy phases to prevent indoor air quality problems resulting form any construction or renovation projects and thus help sustain the comfort and well being of construction workers and building occupants.</p> <p style="text-align: right;">1 points</p>         |
| <p><b>EQ CREDIT 4: Low-Emitting Materials</b></p> <p>It is intended as a credit in the stage of design and construction to reduce the quantity of indoor air contaminants that are odorous or potentially irritating to provide installer and occupant health and comfort, by meeting or exceeding VOC limits for adhesive, sealants, paints, composite wood products and carpet systems.</p> <p style="text-align: right;">1-4 points</p> |  |
|  | <p><b>EQ CREDIT 2.1: Occupant Comfort: Occupant Survey</b></p> <p>It is intended as a credit in the stage of building's operation to provide for the assessment of building occupants' comfort , acoustic, indoor air quality, lighting levels, building cleanliness and any other comfort issues, by conducting occupant surveys for identifying and addressing these issues.</p> <p style="text-align: right;">1 points</p>  |
|  | <p><b>EQ CREDIT 2.2: Occupant Comfort: Occupant-Controlled Lighting</b></p> <p>It is intended as a credit in the stage of building's operation to implement system and occupant control of ambient and task lighting to suit individual preferences and the needs of specific tasks, to promote the productivity, comfort and well-being of building occupants.</p> <p style="text-align: right;">1 points</p>   |
| <p><b>EQ CREDIT 6: Controllability of Systems</b></p> <p>It is intended as a credit in the stage of design to provide a high level of individual occupant control of thermal, ventilation and lighting system support optimum health, productivity and comfort conditions, by designing the building with occupant control for airflow, temperature and lightning.</p> <p style="text-align: right;">1-2 points</p>                        | <p><b>EQ CREDIT 2.3: Occupant Comfort: Thermal Comfort Monitoring</b></p> <p>It is intended as a credit in the stage of building's operation to have a permanent monitoring system that supports the appropriate operations and maintenance of buildings and building systems so that they continue to meet target building performance goals over the long term and provide a comfortable thermal environment that supports the productivity and well-being of building occupants.</p> <p style="text-align: right;">1 points</p> |
| <p><b>EQ CREDIT 7: Thermal Comfort</b></p> <p>It is intended as a credit in the stage of design to create a thermally comfortable environment that supports the productive and healthy performance of the building occupant, by designing the building envelope and HVAC system to maintain good comfort ranges.</p> <p style="text-align: right;">1-2 points</p>  |  |
| <p><b>EQ CREDIT 8: Day Light and Views</b></p> <p>It is intended as a credit in the stage of design to provide connection between indoor spaces and outdoor environment through the introduction of sunlight and views into the occupied areas of the building, by designing the building to maximize daylight and view opportunities.</p> <p style="text-align: right;">1-2 points</p>  | <p><b>EQ CREDIT 2.4-2.5: Occupant Comfort: Daylight and Views</b></p> <p>It is intended as a credit in the stage of building's operation to provide a connection between indoor spaces and the outdoor environment through the use of daylight and views in the occupied areas of the building by achieving minimum daylight factors in spaces occupied for visual tasks.</p> <p style="text-align: right;">1-2 points</p>   |
|  | <p><b>EQ CREDIT 3.1: Green Cleaning: High-Performance Cleaning</b></p> <p>It is intended as a credit in the stage of building's operation to reduce the exposure of occupants and maintenance personnel to potentially hazardous chemical, biological and particulate contaminants, which adversely affect air quality, human health, building finishes, building systems and the environment, by having a high-performance cleaning program, supported by a green cleaning policy.</p> <p style="text-align: right;">1 points</p> |
|  |  |



| LEED FOR New Construction and Major Renovations |              | LEED Existing Buildings: Operation and Maintenance   |              |
|---|--------------|--|--------------|
|   |              | <p><b>EQ CREDIT 3.2-3.3: Green Cleaning: Custodial Effectiveness Assessment</b></p> <p>It is intended as a credit in the stage of building's operation to reduce the exposure of occupants and maintenance personnel to potentially hazardous chemical, biological and particulate contaminants, which adversely affect air quality, human health, building finishes, building systems and the environment, by implementing managing and additive cleaning procedures and inspection process.</p>  | 1-2 points   |
|   |              | <p><b>EQ CREDIT 3.4-3.6: Green Cleaning: Purchase of Sustainable Cleaning Products and Materials</b></p> <p>It is intended as a credit in the stage of building's operation to reduce the environmental impacts of cleaning, disposable janitorial paper products and trash bags, by making sure that when purchasing materials or supplies, specify that they meet one or more of the sustainability criteria.</p>  | 1-3 points   |
|   |              | <p><b>EQ CREDIT 3.7: Green Cleaning: Sustainable Cleaning Equipment</b></p> <p>It is intended as a credit in the stage of building's operation to reduce the exposure of occupants and maintenance personnel to potentially hazardous chemical, biological and particulate contaminants, which adversely affect air quality, human health, building finishes, building systems and the environment, from powered cleaning equipment, by developing, implementing and maintaining a policy for the use of low-impact powered cleaning equipment.</p>  | 1 points     |
|   |              | <p><b>EQ CREDIT 3.8: Green Cleaning: Entryway System</b></p> <p>It is intended as a credit in the stage of building's operation to reduce the exposure of occupants and maintenance personnel to potentially hazardous chemical, biological and particulate contaminants, which adversely affect air quality, human health, building finishes, building systems and the environment, by using entryway systems (grilles, grates, mats) to reduce the amount of dirt, dust, pollen and other particles entering the building at all public entryways.</p>   | 1 points     |
|   |              | <p><b>EQ CREDIT 3.9: Green Cleaning: Indoor Integrated Pest Management</b></p> <p>It is intended as a credit in the stage of building's operation to reduce the exposure of occupants and maintenance personnel to potentially hazardous chemical, biological and particulate contaminants, which adversely affect air quality, human health, building finishes, building systems and the environment, by developing, implementing and maintaining an indoor integrated pest management (IPM) plan, to manage indoor pests in a way that protects human health and surrounding environments.</p> | 1 points     |
| <b>Possible Points:</b>                         | 15           |  | 20           |
| <b>Environmental Section Weighting</b>          | <b>21,8%</b> |  | <b>22,2%</b> |

# INNOVATION AND DESIGN PROCESS

## LEED FOR New Construction and Major Renovations

## LEED Existing Buildings: Operation and Maintenance

|   |   |  |             |
|---|---|--|-------------|
| <p><b>ID CREDIT 1: Innovation in Design</b></p> <p>It is intended as a credit in the design stage to provide design teams and projects the opportunity to be awarded points for exceptional performance above requirements set by LEED Green Building Rating Systems and/or innovative performance in Green Building categories not specifically addresses by the LEED Green Rating System. Up to 4 points can be awarded for each innovation credit.</p> <p style="text-align: right; background-color: #cccccc; padding: 2px;">1-4 points</p> | <p><b>ID CREDIT 1.1 - 1.4: Innovation in Operations</b></p> <p>It is intended as a credit in the stage of building's operation to provide building operations, maintenance and upgrade teams with the opportunity to earn points for environmental benefits achieved beyond those already addressed by the LEED for Existing Buildings: O &amp; M Rating System. Up to 4 points can be awarded by implementing and maintaining actions that provide added environmental benefits.</p> <p style="text-align: right; background-color: #cccccc; padding: 2px;">1-4 points</p> |  |             |
| <p><b>ID CREDIT 2: LEED Accredited Professional</b></p> <p>It is intended as a credit in the design stage to support and encourage the design integration required by a LEED Green Building project and to streamline the application and certification process, by having LEED Accredited Professionals participating in the project team.</p> <p style="text-align: right; background-color: #cccccc; padding: 2px;">1 points</p>   | <p><b>ID CREDIT 2: LEED Accredited Professional</b></p> <p>It is intended as a credit in the stage of building's operation to support and encourage the operations, maintenance, upgrade and project team integration required for LEED for Existing Buildings: O &amp; M implementation and to streamline the application and certification process, by having LEED Accredited Professionals participating in the project team.</p> <p style="text-align: right; background-color: #cccccc; padding: 2px;">1 points</p>  |  |             |
|   | <p><b>ID CREDIT 3: Documenting Sustainable Building Cost Impacts</b></p> <p>It is intended as a credit in the stage of building's operation to document sustainable building cost impacts, by tracking building operation cost to identify any positive impacts related to the sustainable performance improvements to the building and its operations.</p> <p style="text-align: right; background-color: #cccccc; padding: 2px;">2 points</p>   |  |             |
| <b>Possible Points:</b>   | <b>5</b>  |  | <b>7</b>    |
| <b>Environmental Section Weighting</b>  | <b>7,3%</b>   |  | <b>7,8%</b> |

# WATER EFFICIENCY

## LEED FOR New Construction and Major Renovations

## LEED Existing Buildings: Operation and Maintenance

|  |  |              |
|--|--|--------------|
|  | <p><b>WE PREREQ 1: Minimum Indoor Plumbing Fixture and Fitting Efficiency</b></p> <p>Minimum requirement during the building's operation stage to implement water control systems that will reduce indoor plumbing fixture and fitting potable water usage.</p>  |              |
|  | <p><b>WE CREDIT 1: Water Performance Measurement</b></p> <p>It is intended as a credit in the stage of building operation to implement water metering systems to measure and track potable water consumption and performance over time, in order to understand consumption patterns and identify opportunities for additional water savings.</p> <p style="text-align: right; background-color: #cccccc;">1-2 points</p>   |              |
|  | <p><b>WE CREDIT 2: Additional Indoor Plumbing Fixture and Fitting Efficiency</b></p> <p>Intended as a credit during the building's operation stage to produce an aggregate reduction of potable water usage from the calculated in WE Prerequisite 1, by maximizing water control systems that will improve indoor plumbing fixture and fitting efficiency.</p> <p style="text-align: right; background-color: #cccccc;">1-3 points</p>                            |              |
| <p><b>WE CREDIT 1: Water Efficient Landscaping</b></p> <p>It is intended as a credit in the stage of design to develop strategies that will limit or eliminate the use of potable water for landscape irrigation, by implementing technologies, recycling site water, soil analysis and rain water collection.</p> <p style="text-align: right; background-color: #cccccc;">1-2 points</p> | <p><b>WE CREDIT 3: Water Efficient Landscaping</b></p> <p>It is intended as a credit in the stage of building's operation to implement strategies that will limit or eliminate the use of potable water or any other natural resources available for landscape irrigation, by using high efficient irrigation technologies, recycling site water and accomplish rain water collection.</p> <p style="text-align: right; background-color: #cccccc;">1-3 points</p> |              |
|  | <p><b>WE CREDIT 4: Cooling Tower Water Management</b></p> <p>It is intended as a credit in the stage of building's operation to implement strategies that will reduce water consumption for cooling tower equipment through effective water management and /or use of nonpotable make up water.</p> <p style="text-align: right; background-color: #cccccc;">1-2 points</p>  |              |
| <p><b>WE CREDIT 2: Innovative Waste Water Reduction</b></p> <p>It is intended as a credit in the stage of design to develop and apply technologies that will reduce the generation of wastewater and potable water demand, while increasing the local aquifer recharge.</p> <p style="text-align: right; background-color: #cccccc;">1 points</p>  |  |              |
| <p><b>WE CREDIT 3: Water Use Reduction</b></p> <p>It is intended as a credit in the stage of design to assure and maximize water efficiency within the building to reduce the burden on municipal water supply and wastewater systems.</p> <p style="text-align: right; background-color: #cccccc;">1-2 points</p>   |  |              |
| <b>Possible Points:</b>  | <b>5</b>   | <b>10</b>    |
| <b>Environmental Section Weighting</b>   | <b>7,3%</b>  | <b>11,1%</b> |

## ENERGY

| BREEAM for New Buildings   | BREEAM In Use  |   |  |
|--|--|---|--|
|  | ASSET RATING   | BUILDING MANAGEMENT RATING  | ORGANISATIONAL RATING  |
| <p><b>Ene 01: Reduction of CO2 Emissions</b><br/>It is intended as a credit in the design stage to recognize and encourage buildings designed to minimize operational energy demand, consumption and CO2 emissions, by designing to improve the Energy Performance Ratio (EPR) and minimizing carbon dioxide emissions.</p> <p style="background-color: #d3d3d3;"><b>Minimum Standards: Yes</b>      1 - 15 points</p> | <p><b>Level of CO2 Emissions:</b><br/>It is intended as a credit in the stage of building operation to evaluate the building's inherent performance when it comes to operational energy demand, consumption and CO2 emissions.</p>   | <p><b>Level of CO2 Emissions:</b><br/>It is intended as a credit in the stage of building operation to maintain operating strategies that minimize operational energy demand, consumption and CO2 emission.</p>   | <p><b>Carbon Footprint:</b><br/>It is intended as a credit in the stage of building operation to ensure that operating strategies that minimize operational and occupants' energy demand, consumption and CO2 emission are maintained.</p>                                 |
| <p><b>Ene 07: Energy Efficient Laboratory Systems</b><br/>It is intended as a credit in the design stage to recognize and encourage laboratory areas that are designed to minimize the CO2 emissions associated with their operational energy consumption, using efficient fume cupboards in the areas needed.</p> <p style="background-color: #d3d3d3;"><b>Minimum Standards: No</b>      1 - 5 points</p>            |  |   |  |
| <p><b>Ene 02: Energy Monitoring</b><br/>It is intended as a credit in the design stage to recognize and encourage the installation of energy sub-metering that facilitates the monitoring of operational energy consumption.</p> <p style="background-color: #d3d3d3;"><b>Minimum Standards: Yes</b>      1 - 2 points</p>   | <p><b>Sub-metering of Substantial Energy Uses</b><br/>It is intended as a credit in the stage of building operation to evaluate the building's major energy using system.</p> <p style="background-color: #d3d3d3; text-align: center;">1 - 6,5 points</p>                                       | <p><b>Energy/CO2 monitoring, targeting &amp; reduction</b><br/>Implement a constant monitoring to address changes in major energy using systems to make them more efficient.</p> <p style="background-color: #d3d3d3; text-align: center;">1 - 5,5 points</p> | <p><b>Targeting and Monitoring</b><br/>Ensure that periodic adjustments and reviews of building's monitoring of target operating systems are made to maintain an optimal energy efficiency.</p> <p style="background-color: #d3d3d3; text-align: center;">1 - 3 points</p> |
|  | <p><b>Sub-metering of Areas/Tenancy</b><br/>Facilitate the monitoring of operational energy consumption of the different building areas and tenants.</p> <p style="background-color: #d3d3d3; text-align: center;">1 - 6,5 points</p>  | <p><b>Energy Reporting/ Information</b><br/>Maintain an energy management and ongoing accountability of building energy performance.</p> <p style="background-color: #d3d3d3; text-align: center;">1 - 5 points</p>   | <p><b>Measuring and Recording</b><br/>Ensure that periodic reviews of building's monitoring and measurements of building energy performance are made.</p> <p style="background-color: #d3d3d3; text-align: center;">1 - 3 points</p>                                       |
| <p><b>Ene 04: Low and Zero Carbon Technologies</b><br/>It is intended as a credit in the design stage to reduce carbon emissions and atmospheric pollution by encouraging local energy generation from renewable and low or zero carbon technologies sources to supply a significant proportion of the energy demand.</p> <p style="background-color: #d3d3d3;"><b>Minimum Standards: Yes</b>      1 - 5 points</p>    | <p><b>Renewable and Low Emission Energy (built in)</b><br/>Encourage and recognize the use of on-site and off-site renewable energies that reduce environmental impacts associated with fossil fuel energy use.</p> <p style="background-color: #d3d3d3; text-align: center;">1 - 6,5 points</p> |   |  |
|  |  | <p><b>Energy Management</b><br/>Promote continuity of information and management to ensure that energy-efficient operating strategies are maintained.</p> <p style="background-color: #d3d3d3; text-align: center;">1 - 5 points</p>                          | <p><b>Energy Management Training</b><br/>Provide a foundation for training and system analysis, to improve energy management.</p> <p style="background-color: #d3d3d3; text-align: center;">1 - 3,5 points</p>   |
|  |  | <p><b>Energy Audit</b><br/>Maintain a permanent evaluation of the building's energy performance and compliance with policies.</p> <p style="background-color: #d3d3d3; text-align: center;">1 - 5,5 points</p>  | <p><b>Energy Policies</b><br/>Ensure the understanding and implementation of energy efficiency policies of the buildings occupants.</p> <p style="background-color: #d3d3d3; text-align: center;">1 - 3,5 points</p>   |

| BREEAM for New Buildings   |           | BREEAM In Use |   |   |
|--|-----------|---------------|---|---|
|  |           | ASSET RATING  | BUILDING MANAGEMENT RATING  | ORGANISATIONAL RATING   |
|  |           |               | <b>Maintenance Regimen / Schedules</b><br>Design regimen and schedules to maintain an organized development of the building's energy efficiency management. |   |
|  |           |               | 1 - 5 points  |   |
| <b>Ene 05: Energy Efficient Cold Storage</b><br>It is intended as a credit in the design stage to recognize and encourage the installation of energy efficient refrigeration systems, therefore reducing operational greenhouse gas emissions resulting from the system's energy use.<br><b>Minimum Standards: No</b> 1 - 2 points                                   |           |               |   | <b>Energy and Equipment Purchasing Policies</b><br>Ensure a sustainable purchasing of equipment acquired for use in the operations and maintenance of building. |
| <b>Ene 06: Energy Efficient Transportation Systems</b><br>It is intended as a credit in the design stage to recognize and encourage the specification of energy-efficient transportation systems, by analyzing transportation demand, usage and energy consumption and efficiency of lifts, escalators or moving walks.<br><b>Minimum Standards: No</b> 1 - 2 points |           |               |   |   |
| <b>Ene 08: Energy Efficient Equipment</b><br>It is intended as a credit in the design stage to recognize and encourage procurement of energy-efficient equipment to ensure optimum performance and energy savings in operation.<br><b>Minimum Standards: No</b> 1 - 2 points   |           |               |   |   |
| <b>Ene 03: External Lighting</b><br>It is intended as a credit in the design stage to recognize and encourage the specification of energy-efficient light fittings for external areas of the development.<br><b>Minimum Standards: No</b> 1 point  |           |               |   | 1 - 3 points  |
| <b>Ene 09: Drying Spaces</b><br>It is intended as a credit in the design stage to produce a reduced energy means of drying clothes, by designing an adequate internal or external space for this use.<br><b>Minimum Standards: No</b> 1 point  |           |               |   |   |
|  |           |               |   |   |
| <b>Possible Points:</b>  | <b>35</b> | <b>26,5</b>   | <b>31,5</b>   | <b>19,5</b>   |
| <b>Environmental Section Weighting</b>   | 19,0%     | 26,5%         | 31,5%   | 19,5%   |

# WATER

| BREEAM for New Buildings  |   | BREEAM In Use  |   |                       |
|---|---|--|---|-----------------------|
|   |   | ASSET RATING   | BUILDING MANAGEMENT RATING  | ORGANISATIONAL RATING |
| <b>Wat 01: Water Consumption</b><br>It is intended as a credit in the design stage to reduce the consumption of water for sanitary use in new buildings from all sources through the use of water efficient components and water recycling systems. | <b>Water Consumption</b><br>Evaluate the efficiency of the building's water consumption performance.  | <b>Water Consumption Monitoring</b><br>Implement a monitoring system that will allow to measure the water consumption of the building.   | <b>Targeting and Monitoring</b><br>Ensure that there is a follow up of the water consumption monitoring system to identify major water consuming systems. |                       |
| Minimum Standards: Yes  | 1 - 5 points  | 1- 2 points  | 1- 2,5 points   | 0,75 points           |
| <b>Wat 02: Water Monitoring</b><br>It is intended as a credit in the design stage to ensure water consumption can be monitored and managed and therefore encourage reductions in water consumption.   | <b>Water Meter</b><br>Implement water metering systems to measure and track potable water consumption and performance over time, in order to understand consumption patterns and identify opportunities for additional water savings. |  | <b>Measuring and recording</b><br>Ensure that occupants understand and implement the metering systems to measure and track potable water consumption.     |                       |
| Minimum Standards: Yes  | 1 point   | 1- 2 points  |   | 0,5 points            |
| <b>Wat 03: Water Leak Detection and Prevention</b><br>It is intended as a credit in the design stage to reduce the impact of water leaks that may otherwise go undetected.  | <b>Leak Detection Systems</b><br>Implement a leak detection system that prevent the impact of water leaks in the building.  | <b>Maintenance of Sanitary Fittings and Controls</b><br>Implement water control systems that will reduce indoor plumbing fixture and fitting potable water usage and prevent water waste form leaks. | <b>Water Management Training</b><br>Ensure that the personnel of maintenance are well trained to understand and implement an efficient water management.  |                       |
| Minimum Standards: No   | 2 points  | 1- 2 points  | 1- 3 points   | 0,75 points           |
|   | <b>Water Recycling</b><br>Implement water recycling technologies that make use of rainwater, greywater and/or on-site treated wastewater.   |  | <b>Environmental Policies</b><br>Ensure that there is no impact produced to the environment caused by water consumption or water waste.                   |                       |
|   | 1- 2 points   |  | 0,75 points   |                       |
| <b>Wat 04: Water Efficient Equipment</b><br>It is intended as a credit in the design stage to reduce unregulated water consumption by encouraging specification of water efficient equipment.   |   |  | <b>Purchasing Policies</b><br>Ensure the maintenance of a sustainable purchasing policy of water efficient equipment.                                     |                       |
| Minimum Standards: No   | 1 points  |  | 0,75 points   |                       |
| <b>Possible Points:</b>   | <b>9</b>  | <b>8</b>   | <b>5,5</b>  | <b>3,5</b>            |
| <b>Environmental Section Weighting</b>  | <b>6,0%</b>   | <b>8,0%</b>  | <b>5,5%</b>   | <b>3,5%</b>           |

# MATERIALS

| BREEAM for New Buildings  | BREEAM In Use  |   |   |
|---|--|---|---|
|   | ASSET RATING   | BUILDING MANAGEMENT RATING  | ORGANISATIONAL RATING   |
| <p><b>Mat 01: Designing for Robustness</b></p> <p>It is intended as a credit in the design stage to recognise and encourage adequate protection of exposed elements of the building and landscape, therefore minimizing the frequency of replacement and maximizing materials optimization.</p> <p><b>Minimum Standards: No</b></p> | <p><b>Robustness</b></p> <p>Evaluate the impact protection, durability of the material and the building's design for longevity.</p> <p style="text-align: right;">1 - 2 points</p>           |   |   |
|   | <p><b>Quality of asset</b></p> <p>Evaluate the physical state and quality of the building's materials.</p> <p style="text-align: right;">1 - 2 points</p>                                    |   |   |
|   | <p><b>Security</b></p> <p>Recognize and encourage the quality and maintenance status of the building's components and security systems.</p> <p style="text-align: right;">1 - 2,5 points</p> | <p><b>Security Survey</b></p> <p>Examine and ensure the quality and status of the security systems, covering building and site arrangement facilities.</p> <p style="text-align: right;">1 - 2 points</p> <p><b>Security System Remote Monitoring</b></p> <p>Implement and maintain monitoring systems to detect emergency situations and prevent the risk occupants and building.</p> <p style="text-align: right;">1 - 1,5 points</p> | <p><b>Security</b></p> <p>Ensure that the occupants and maintenance personnel understand and implement the security plans and systems.</p> <p style="text-align: right;">0,75 points</p>  |
|   | <p><b>Fire Protection</b></p> <p>Evaluate the existence of remotely monitored fire alarms and fire protection system.</p> <p style="text-align: right;">1 - 2 points</p>                     | <p><b>Fire Protection / Resilience</b></p> <p>Implement emergency plans that prevent the risk of fires and protect occupants and building.</p> <p style="text-align: right;">1 - 2 points</p>   | <p><b>Fire Protection / Resilience</b></p> <p>Ensure that occupants and maintenance personnel understand and implement the emergency plans that prevent the risk of fires and protect occupants and building.</p> <p style="text-align: right;">0,75 points</p>           |
|   |  | <p><b>Hazardous Materials</b></p> <p>Reduce exposure of building occupants and maintenance personnel to potentially hazardous particulate contaminants coming from the building materials.</p> <p style="text-align: right;">1 - 2 points</p>   | <p><b>Hazardous Materials</b></p> <p>Ensure that occupants and maintenance personnel understand and implement strategies to prevent potentially hazardous particulate contamination coming from the building materials.</p> <p style="text-align: right;">0,75 points</p> |
|   |  |   | <p><b>Measuring and Recording</b></p> <p>Ensure a permanent measurement and recording of the materials that go in and out of the building, and are used for its operation and maintenance.</p> <p style="text-align: right;">0,75 points</p>                              |

| BREEAM for New Buildings   |            | BREEAM In Use |                            |   |
|--|------------|---------------|----------------------------|---|
|  |            | ASSET RATING  | BUILDING MANAGEMENT RATING | ORGANISATIONAL RATING   |
|  |            |               |                            | <b>Targeting and Monitoring</b><br>Identify high impact materials that go in and out of the building and implement strategies to reduce their use in the operation and maintenance of the building.<br>0,75 points                                  |
| <b>Mat 01: Life Cycle Impacts</b><br>It is intended as a credit in the design stage to recognise and encourage the use of construction materials with a low environmental impact (including embodied carbon) over the full life cycle of the building.<br>Minimum Standards: No 1 - 6 points   |            |               |                            | <b>Environmental Policies</b><br>Ensure the compliance of policies that reduce environmental impact caused by materials that go in for operation, maintenance and upgrade of the building, and materials that go out as solid waste.<br>0,75 points |
| <b>Mat 02: Hard Landscaping and Boundary Protection</b><br>It is intended as a credit in the design stage to recognise and encourage the specification of materials for boundary protection and external hard surfaces that have a low environmental impact, taking account of the full life cycle of materials used.<br>Minimum Standards: No 1 point |            |               |                            |   |
| <b>Mat 03: Responsible Sourcing of Materials</b><br>It is intended as a credit in the design stage to recognise and encourage the specification of responsible sourced materials for key building elements.<br>Minimum Standards: Yes 3 points   |            |               |                            |   |
| <b>Mat 04: Insulation</b><br>It is intended as a credit in the design stage to recognise and encourage the use of thermal insulation which has a low embodied environmental impact relative to its thermal properties and has been responsible sourced.<br>Minimum Standards: No 2 points  |            |               |                            |   |
|  |            |               |                            | <b>Environmental Purchasing Policies</b><br>Ensure the compliance of policies that reduce environmental impact of materials acquired for use in the operations, maintenance and upgrades of buildings.<br>0,75 points                               |
| <b>Possible Points:</b>  | <b>13</b>  | <b>8,5</b>    | <b>7,5</b>                 | <b>4,5</b>  |
| <b>Environmental Section Weighting</b>   | <b>###</b> | <b>8,0%</b>   | <b>7,5%</b>                | <b>4,5%</b>   |



| WASTE   |          |   |                            |  |
|---|----------|---|----------------------------|--|
| BREEAM for New Buildings  |          | BREEAM In Use   |                            |  |
|   |          | ASSET RATING  | BUILDING MANAGEMENT RATING | ORGANISATIONAL RATING  |
| <b>Wst 01: Construction Waste Management</b><br>It is intended as a credit in the design stage to promote resource efficiency via the effective management and reduction of construction waste.<br><br><b>Minimum Standards: Yes</b>  | 4 points |   |                            | <b>Waste Management Plan</b><br>Ensure that occupants and maintenance personnel understand and implement the solid waste management plans and policies.<br><br>1 - 2,5 points  |
|   |          |   |                            | <b>Waste Management Training</b><br>Ensure that the maintenance personnel understand and implement the solid waste management plan, and carry out a permanent training for it.<br><br>1 - 2,5 points   |
| <b>Wst 02: Recycled Aggregates</b><br>It is intended as a credit in the design stage to promote recognize and encourage the use of recycled and secondary aggregates, thereby reducing the demand for virgin material and optimizing material efficiency in construction.<br><br><b>Minimum Standards: No</b>                       | 1 point  | Storage of Recyclable Waste<br>Recognize and encourage the use of designate an area of the project for recyclable collection and storage that serves the entire building, in order to reduce waste generated by buildings occupants that is hauled to and disposed of in landfills. | 1 - 5 points               | <b>Environmental Policies</b><br>Ensure the compliance of environmental policies that reduce environmental impact caused by materials that go in for operation, maintenance and upgrade of the building, and materials that go out as solid waste.<br><br>1 - 2,5 points |
| <b>Wst 03: Operational Waste</b><br>It is intended as a credit in the design stage to promote recognize and encourage the provision of dedicated storage facilities for a buildings' operational related recyclable waste streams, so that this waste is divert form landfill or incineration.<br><br><b>Minimum Standards: Yes</b> | 1 point  |   |                            |  |
|   |          |   |                            | <b>Measuring and Recording</b><br>Ensure a permanent measurement and recording of the waste produced on the operation and maintenance of the building.<br><br>1 - 2 points   |
| <b>Wst 04: Speculative Floor and Ceiling Finishes</b><br>It is intended as a credit in the design stage to encourage the specification and fitting of floor and ceiling finishes selected by the building occupant and therefore avoid unnecessary waste of materials.<br><br><b>Minimum Standards: Yes</b>                         | 1 point  |   |                            | <b>Targeting and Monitoring</b><br>Use recordings to identify solid waste with high impact produced in the operation and maintenance of the building, and implement strategies to reduce this impact.<br><br>1 - 2 points  |
| <b>Possible Points:</b>   | 7        | 5   | 0                          | 11,5   |
| <b>Environmental Section Weighting</b>  | 7,5%     | 5,0%  | 0,0%                       | 11,5%  |

## HEALTH AND WELLBEING

| BREEAM for New Buildings  | BREEAM In Use   |  |                       |  |
|---|---|--|-----------------------|--|
|   | ASSET RATING  | BUILDING MANAGEMENT RATING   | ORGANISATIONAL RATING |  |
| <b>Hea 01: Visual Comfort</b><br>It is intended as a credit in the design stage to ensure daylight, artificial lighting and occupant controls are considered for best practice visual performance and comfort for building occupants.<br><b>Prerequisite:</b> All fluorescent and compact fluorescent lamps are fitted with high frequency ballast. | <b>Daylighting</b><br>Ensure that the building achieves minimum daylight factors in spaces occupied for visual tasks.   | <b>Maintenance of Lighting Levels</b><br>Implement systems and occupant controls of natural and artificial lighting to suit individual preferences and the needs of specific tasks, to promote the productivity, comfort and well-being of building occupants.                         |                       |  |
|   | 1 - 2,5 points  | 1 - 3 points   |                       |  |
|   | <b>Artificial Lighting Design</b><br>Ensure that the building achieves minimum artificial light factors in spaces occupied for visual tasks, when there is not enough daylight. |  |                       |  |
|   | 1 - 5 points  | 1 - 2,5 points   |                       |  |
| <b>Hea 02: Indoor Air Quality</b><br>It is intended as a credit in the design stage to recognize and encourage a healthy internal environment through the specification and installation of appropriate ventilation, equipment and finishes.  | <b>Indoor Air Quality</b><br>Ensure that the building provides a healthy internal environment through appropriate ventilation.  | <b>Volatile Organic Compounds</b><br>Reduce the quantity of indoor air contaminants that are odorous or potentially irritating to provide installer and occupant health and comfort, by meeting VOC limits for adhesive, sealants, paints, composite wood products and carpet systems. |                       |  |
|   | 1 - 2,5 points  | 1 - 3 points   |                       |  |
|   |   | <b>Cleaning Policies</b><br>Reduce the exposure of occupants and maintenance personnel to potentially hazardous chemicals, biological, and particulate contaminants.   |                       |  |
|   |   | 1 - 3 points   |                       |  |
|   |   | <b>Refurbishment Policies</b><br>Prevent indoor air quality problems resulting from any construction or renovation projects and thus help sustain the comfort and well being of construction workers and building occupants.   |                       |  |
| 1 - 6 points  |   | 1 - 3 points   |                       |  |
| <b>Minimum Standards: No</b>  |   |  |                       |  |
| <b>Hea 03: Thermal Comfort</b><br>It is intended as a credit in the design stage to ensure that appropriate comfort levels are achieved through design, and controls are selected to maintain a thermally comfortable environment for occupants within the building.  | <b>Thermal Control</b><br>Ensure that the building achieves a thermally comfortable environment for its occupants.  |  |                       |  |
|   | 1 - 2 points  | 1 - 2,5 points   |                       |  |
| <b>Minimum Standards: No</b>  |   |  |                       |  |

| BREEAM for New Buildings   |              | BREEAM In Use   |  |   |
|--|--------------|---|--|---|
|  |              | ASSET RATING  | BUILDING MANAGEMENT RATING   | ORGANISATIONAL RATING   |
| <b>Hea 05: Acoustic Performance</b>  |              | <b>Acoustic Performance</b>   |  |   |
| It is intended as a credit in the design stage to ensure the buildings' acoustic performance including sound insulation meet the appropriate standard for its purpose                          |              | Ensure that the building achieves a good acoustic performance including sound insulation meet the appropriate standard for its purpose.   |  |   |
| Minimum Standards: No 1 - 4 points   |              | 1 - 2,5 points  |  |   |
| <b>Hea 04: Water Quality</b>   |              | <b>Drinking Water Provision</b>   |  |   |
| It is intended as a credit in the design stage to minimize the risk of water contamination in building services and ensure the provision of clean, fresh sources of water for buildings users. |              | Ensure the provision of clean, fresh sources of water for buildings users.  |  |   |
| Minimum Standards: Yes 1 point   |              | 1 - 2,5 points  |  |   |
|  |              | <b>Outdoor Space</b>  |  |   |
|  |              | Ensure that outdoors are free of heat islands and potentially hazardous chemical, biological and particulate contaminants, which adversely affect exterior air quality and temperature. |  |   |
|  |              | 1 - 2 points  |  |   |
| <b>Hea 06: Safety and Security</b>   |              |   | <b>Occupant Satisfaction Survey</b>  | <b>Staff Development</b>  |
| It is intended as a credit in the design stage to recognize and encourage effective design measures that promote low risk, safe and secure access to and use of the building.                  |              |   | Conduct surveys that assess building occupants' comfort, acoustic, indoor air quality, lighting levels, building cleanliness and any other comfort issues. | Ensure there is a understanding and implementation of the minimum health and wellbeing standards for the buildings environment.                 |
|  |              |   | 1 - 3 points   | 1 - 3 points  |
|  |              |   |  | <b>Staff Feedback Mechanism</b>   |
|  |              |   |  | Ensure there is a dynamic system of claims and suggestions to allow a good feedback for maintenance.  |
| Minimum Standards: No 1 - 2 points   |              |   |  | 1 - 3 points  |
|  |              |   |  | <b>Targeting and Monitoring</b>   |
|  |              |   |  | Monitor, identify and solve problems that jeopardies the health and wellbeing of occupants.   |
|  |              |   |  | 1 - 3 points  |
|  |              |   |  | <b>Management Training</b>  |
|  |              |   |  | Ensure that the personnel of maintenance are well trained to understand and implement an efficient health and wellbeing management and control. |
|  |              |   |  | 1 - 3 points  |
|  |              |   |  | <b>Stakeholder Enjoyment</b>  |
|  |              |   |  | To promote the participation of stakeholder in the decisions and action taken to improve environmental quality of the building.                 |
|  |              |   |  | 1 - 3 points  |
| <b>Possible Points:</b>  | <b>20</b>    | <b>17</b>   | <b>15</b>  | <b>15</b>   |
| <b>Environmental Section Weighting</b>   | <b>15,0%</b> | <b>17,0%</b>  | <b>15,0%</b>   | <b>15,0%</b>  |

## POLLUTION

| BREEAM for New Buildings  | BREEAM In Use  |  |   |
|---|--|--|---|
|   | ASSET RATING   | BUILDING MANAGEMENT RATING   | ORGANISATIONAL RATING   |
|   | <b>Ground/Water Pollution Control</b><br><br>Guaranty the efficiency of the building to control chemicals into ground and water.   | <b>Management/Maintenance of Ground Water Pollution Control Measures</b><br><br>Implement a monitoring system that will allow to measure and control any hazardous chemical leakage into ground and water.               | <b>Management/Maintenance of Ground Water Pollution Control Measures</b><br><br>Ensure that there is a constant follow up of the monitoring system to prevent any hazardous chemical leakage into ground and water. |
|   | 1 - 2,5 points   | 1 - 2 points   | 1 - 2,5 points  |
| <b>Pol 03: Surface Water Run-off</b><br><br>It is intended as a credit in the design stage to avoid, reduce and delay the discharge of rainfall to public sewers and water courses, therefore minimizing risk of localized flooding on and off site, watercourses pollution and other environmental damage. | <b>Flood Risk</b><br><br>Evaluate the buildings' capacity to manage and store rainfall water to minimize risk of localized flooding on and off site.                                       | <b>Flood Risk Management plan and Procedures</b><br><br>Implement rainfall water control systems and infrastructure that will prevent the risk of localized flooding on and off site.                                    | <b>Flood Risk Management plan and Procedures</b><br><br>Ensure that the maintenance personnel carry out an efficient rainfall management and maintenance of the control system facilities.                          |
|   | 1 - 2 points   | 1 - 2 points   | 1 - 2 points  |
|   | <b>Flood Management Facilities</b><br><br>Ensure that the building counts with management practices and control structures and areas to drain surface water in a sustainable fashion.      |  |   |
| Minimum Standards: No   | 1-5 points   | 1 - 2 points   |   |
| <b>Pol 01: Impact of Refrigerants</b><br><br>It is intended as a credit in the design stage to reduce the level of greenhouse gas emissions arising from the leakage of refrigerants from building systems.   | <b>Refrigerant Type and Leakage Detection/Control</b><br><br>Ensure that levels of greenhouse gas emissions arising from the leakage of refrigerants from building systems are controlled. | <b>Refrigerant Leakage Monitoring</b><br><br>Implement a monitoring system that will allow to measure and control the levels of greenhouse gas emissions arising from the leakage of refrigerants from building systems. | <b>Control of Hazardous Chemicals etc.</b><br><br>Maintain a follow up of monitoring systems that control and prevent levels hazardous chemicals and other pollutants into the air, ground and water.               |
| Minimum Standards: No   | 1 - 3 points   | 1 - 2,5 points   | 1 - 2 points  |
| <b>Pol 02: NO x Emissions</b><br><br>It is intended as a credit in the design stage to encourage the supply of heat and/or coolth from a system that minimizes NO x emissions, and therefore reduces pollution of the local environment.  | <b>Emissions to Air</b><br><br>Ensure that the building counts with HVAC systems that don't produce greenhouse gases.  | <b>Control of Emission to Air</b><br><br>Implement a monitoring system to measure emissions to air produced by buildings' activities and apply this information to reduce, improve or change this activities.            | <b>Control of Emission to Air</b><br><br>Maintain a formal tracking program that reduce and report unwanted emissions.  |
| Minimum Standards: No   | 1-3 points   | 1 - 2,5 points   | 1 - 2 points  |
|   | <b>Land Contamination</b><br><br>Ensure that the buildings counts with the necessary control to prevent waste and chemical from contaminating the land.                                    | <b>Land Contamination</b><br><br>Implement a supervising method that will allow to control and prevent any land contamination.   | <b>Land Contamination</b><br><br>Maintain a permanent supervision of contamination management to control and prevent any land pollution.  |
|   | 1 - 2,5 points   | 1 - 2 points   | 1 - 2 points  |

| BREEAM for New Buildings   |              | BREEAM In Use |  |                       |
|--|--------------|---------------|--|-----------------------|
|  |              | ASSET RATING  | BUILDING MANAGEMENT RATING   | ORGANISATIONAL RATING |
| <p><b>Pol 04: Reduction of Night time Light Pollution</b></p> <p>It is intended as a credit in the design stage to ensure that external lighting is concentrated in the appropriate areas and that upward lighting is minimized, reducing unnecessary light pollution, energy consumption and nuisance to neighboring properties.</p> <p>Minimum Standards: No 1 point</p> |              |               | <p><b>Light Pollution control</b></p> <p>Implement programs to ensure lightning control systems and/or implement site lightning criteria that will eliminate light trespass from the building site, improve night sky access, and reduce development impact on nocturnal environment.</p> <p>1 point</p> |                       |
| <p><b>Pol 05: Noise Attenuation</b></p> <p>It is intended as a credit in the design stage to reduce the likelihood of noise from the new development affecting nearby noise-sensitive buildings.</p> <p>Minimum Standards: No 1 point</p>  |              |               | <p><b>Maintenance Procedures/Plans</b></p> <p>Implement management procedures that will measure and prevent noise from the buildings' operation to affect neighboring properties.</p> <p>1 - 2 points</p>  |                       |
| <b>Possible Points:</b>  | <b>13</b>    | <b>14</b>     | <b>13</b>  | <b>10,5</b>           |
| <b>Environmental Section Weighting</b>   | <b>10,0%</b> | <b>14,0%</b>  | <b>13,0%</b>   | <b>10,5%</b>          |

## LAND USE AND ECOLOGY

| BREEAM for New Buildings   |  | BREEAM In Use  |  |  |
|--|--|--|--|--|
|  |  | ASSET RATING   | BUILDING MANAGEMENT RATING   | ORGANISATIONAL RATING  |
| <b>LE 01: Site Selection</b>   | <p>It is intended as a credit in the design stage to encourage the use of previously developed and/or contaminated land and avoid land which has not been previously disturbed.</p> <p>Minimum Standards: No 1-2 points</p>  |  |  |  |
| <b>LE 02: Ecological value of site and protection of ecological features</b> | <p>It is intended as a credit in the design stage to encourage development on land that already has limited value to wildlife and to protect existing ecological features from substantial damage during site preparation and completion of construction works.</p> <p>Minimum Standards: No 1 point</p> | <b>Ecological Value</b><br>Recognize the development of project on land that already has limited value to wildlife and to protect existing ecological features from substantial damage during site preparation and completion of construction works. |  | <b>Enhancement of Ecological Value</b><br>Ensure that occupants and maintenance personnel understand and enhance the value to wildlife and to protect existing ecological features from substantial damage during the operation and maintenance of the building. |
| <b>LE 03: Mitigating ecological impact</b>                                   | <p>It is intended as a credit in the design stage to minimise the impact of a building development on existing site ecology.</p> <p>Minimum Standards: Yes 1-2 points</p>  |  |  |  |
| <b>LE 04: Enhancing Sight Ecology</b>  | <p>It is intended as a credit to recognise and encourage actions taken during the design stage to maintain and enhance the ecological value of the site as a result of development.</p> <p>Minimum Standards: No 1-3 points</p>  |  | <b>Ecological Survey</b><br>Maintain and enhance the ecological value of the site by implementing constant surveys to ensure protection.                           | <b>Biodiversity Survey of Sight</b><br>Ensure that the maintenance personnel implement permanent surveys to evaluate to condition of biodiversity in the sight.  |
| <b>LE 05: Long Term Impact on Biodiversity</b>                               | <p>It is intended as a credit in the design stage to minimise the long term impact of the development on the site and the surrounding area's biodiversity, by protecting and enhancing ecological landscape and habitat.</p> <p>Minimum Standards: No 1-2 points</p>                                     |  | <b>Biodiversity Action Plan</b><br>Maintain and enhance a biodiversity action plan minimize the long term impact of the operation and maintenance of the building. | <b>Biodiversity Action Plan</b><br>Ensure that the occupants and maintenance personnel understand and implement the biodiversity action plan.  |
| <b>Possible Points:</b>  | <b>10</b>  | <b>9,5</b>   | <b>12,5</b>  | <b>10</b>  |
| <b>Environmental Section Weighting</b>                                       | <b>10,0%</b>   | <b>9,5%</b>  | <b>12,5%</b>   | <b>5,0%</b>  |

## TRANSPORT

| BREEAM for New Buildings   | BREEAM In Use   |                            |   |
|--|---|----------------------------|---|
|  | ASSET RATING  | BUILDING MANAGEMENT RATING | ORGANISATIONAL RATING   |
| <p><b>Tra 01: Public Transport Accessibility</b></p> <p>It is intended as a credit in the design stage to recognise and encourage development in proximity of good public transport networks, thereby helping to reduce transport-related pollution and congestion.</p> <p>Minimum Standards: No      1 - 6 points</p>   | <p><b>Accessibility/availability to Public Transport</b></p> <p>Recognise and encourage development in proximity of good public transport networks.</p> <p>1 - 3 points</p>   |                            | <p><b>Accessibility/availability to Public Transport</b></p> <p>Ensure and encourage occupants to understand and take advantage of the accessibility and availability of public transportation.</p> <p>1 - 3 points</p> |
| <p><b>Tra 02: Proximity to Amenities</b></p> <p>It is intended as a credit in the design stage to encourage and reward a building that is located in close proximity to local amenities, thereby reducing the need for extended travel or multiple trips.</p> <p>Minimum Standards: No      1 point</p>  | <p><b>Proximity to Amenities</b></p> <p>Recognize and reward a building that is located in close proximity to local amenities, thereby reducing the need for extended travel or multiple trips.</p> <p>1 - 3 points</p> |                            |   |
| <p><b>Tra 03: Cyclist Facilities</b></p> <p>It is intended as a credit in the design stage to encourage building users to cycle by ensuring adequate provision of cyclist facilities.</p> <p>Minimum Standards: Yes      1-2 points</p>  | <p><b>Cyclist Facilities</b></p> <p>Ensure adequate provision of cyclist facilities to encourage building users to cycle.</p> <p>1 - 2,5 points</p>   |                            |   |
|  | <p><b>Pedestrian/Cyclist Safety</b></p> <p>Recognize and encourage the provision of safe cycling and pedestrian routes inside and outside facilities.</p> <p>1 - 3 points</p>   |                            |   |
| <p><b>Tra 04: Maximum Car Parking Capacity</b></p> <p>It is intended as a credit in the stage of design to encourage the use of alternative means of transport to the building other than the private car, thereby helping to reduce transport related emissions and traffic congestion associated with the building's operation.</p> <p>Minimum Standards: No      1-2 points</p> |   |                            | <p><b>Car Sharing/Staff Travel Schemes</b></p> <p>Ensure that occupants understand and implement travel plans that include car sharing or other alternatives to reduce the use of private car.</p> <p>1 - 3 points</p>  |
| <p><b>Tra 05: Travle Plan</b></p> <p>It is intended as a credit in the design stage to encourage the consideration given to accommodating a range of travel options for building users, thereby encouraging the reduction of user reliance on forms of travel that have the highest environmental impact.</p> <p>Minimum Standards: No      1-2 points</p>                         |   |                            | <p><b>Green Travel Plans/Iniciatives</b></p> <p>Ensure that occupants understand and implement travel plans that will reduce the impact of travelling to and from the building facilities.</p> <p>1 - 3,5 points</p>    |

| BREEAM for New Buildings               |             | BREEAM In Use |                            |   |
|--|-------------|---------------|----------------------------|---|
|  |             | ASSET RATING  | BUILDING MANAGEMENT RATING | ORGANISATIONAL RATING   |
|  |             |               |                            | <b>Business Travel Policies and Procedures</b><br>Ensure that occupants understand and follow a business travel policy to reduce or prevent unnecessary travelling.<br>1 - 3 points           |
|  |             |               |                            | <b>Measuring and Recording Travel Impacts</b><br>Ensure a permanent measurement and recording of the impacts generated by the occupants means of transportation.<br>1 - 3 points              |
|  |             |               |                            | <b>Delivery Management</b><br>Ensure that occupants understand and implement a delivery management plan that reduces environmental impacts caused by delivery transportation.<br>1 - 3 points |
| <b>Possible Points:</b>                | <b>12</b>   | <b>11,5</b>   | <b>0</b>                   | <b>18,5</b>   |
| <b>Environmental Section Weighting</b> | <b>8,0%</b> | <b>11,5%</b>  | <b>0,0%</b>                | <b>18,5%</b>  |



## MANAGEMENT

| BREEAM for New Buildings  | BREEAM In Use |  |  |
|---|---------------|--|--|
|   | ASSET RATING  | BUILDING MANAGEMENT RATING   | ORGANISATIONAL RATING  |
| <b>Man 01: Sustainable Procurement</b><br>It is intended as a credit in the development of the project to ensure delivery of a functional and sustainable asset designed and built in accordance with performance expectations.                                       |               | <b>Building User Guide</b><br>Recognize and encourage the implementation of a specification manual that describes with detail the operation of the building and that can be followed by the occupants.   |  |
|   |               | 1.5 points   |  |
|   |               | <b>Environmental Management System</b><br>Recognize and encourage a management plan to ensure a low environmental impact caused by the building operation and maintenance.   | <b>Environmental Management System</b><br>Ensure that the personnel of maintenance understand and implement the environmental management system to reduce and prevent environmental impact.  |
|   |               | 1.5 points   | 2 points   |
|   |               | <b>Operating Manuals</b><br>Recognize and encourage the implementation of operating manual that describes with detail the operating systems of the building that need specification.   |  |
|   | 1.5 points    |  |  |
|   |               | <b>Building User Liaison Mechanisms and Education Programme</b><br>Recognize and encourage mechanisms and education programmes that will allow the occupants and maintenance personnel to become acquainted with the building operating systems. | <b>Building User Liaison Mechanisms and Education Programme</b><br>Ensure that occupants and personnel of maintenance understand the operating nature of the building.   |
|   | 1.5 points    | 2 points   |  |
| <b>Minimum Standards: No</b>  | 1-8 points    |  |  |
| <b>Man 02: Responsible Construction Practices</b><br>It is intended as a credit in the development of the project to recognise and encourage construction sites which are managed in an environmentally and socially considerate, responsible and accountable manner. |               | <b>Local Environmental Responsibility</b><br>Recognise and encourage a facility that is managed in an environmentally and socially considerate, responsible and accountable manner.  | <b>Local Environmental Responsibility</b><br>Ensure that occupants and personnel of maintenance understand and implement practices that will manage the facility in an environmentally and socially considerate, responsible and accountable manner. |
|   |               | 1.5 points   | 2 points   |
| <b>Minimum Standards: Yes</b>   | 1-2 points    |  |  |
| <b>Man 03: Construction Site Impacts</b><br>It is intended as a credit in the development of the project to recognise and encourage construction sites managed in an environmentally sound manner in terms of resource use, energy consumption and pollution.         |               |  |  |
|   |               | 1-5 points   |  |
| <b>Minimum Standards: Yes</b>   | 1-5 points    |  |  |

| BREEAM for New Buildings   |  | BREEAM In Use |  |   |
|--|--|---------------|--|---|
|  |  | ASSET RATING  | BUILDING MANAGEMENT RATING   | ORGANISATIONAL RATING   |
| <b>Man 04: Stakeholder Participation</b><br>It is intended as a credit in the development of the project to design, plan and deliver accessible functional and inclusive buildings in consultation with current and future building users and other stakeholders.<br><br>Minimum Standards: Yes 1-4 points |  |               |  |   |
| <b>Man 05: Service Life Planning and Costing</b><br>It is intended as a credit in the design stage to recognise and encourage life cycle costing and service life planning in order to improve design, specification and through-life maintenance and operation.<br><br>Minimum Standards: No 1-3 points   |  |               |  |   |
|  |  |               | <b>Environmental Policy Implementation</b><br>Recognize and encourage the maintenance of permanent policies that will reduce and prevent environmental impact produced by the building operation and maintenance.<br><br>1,5 points  | <b>Environmental Policies</b><br>Ensure the understanding and compliance of environmental policies that reduce environmental impact caused by operation, maintenance and upgrade of the building.<br><br>2 points   |
|  |  |               | <b>Environmental Purchasing Policy Implementation</b><br>Recognize and encourage the maintenance of permanent policies that will reduce and prevent environmental impact of materials, goods, and consumables acquired for the operation, maintenance and upgrades of buildings.<br><br>1,5 points | <b>Environmental Purchasing Policy Implementation</b><br>Ensure the compliance of policies that reduce environmental impact of materials, goods, and consumables acquired for use in the operations, maintenance and upgrades of buildings.<br><br>2 points |
|  |  |               | <b>Planned Maintenance Policy/Plan</b><br>Recognize the maintenance of a plans to encourage the compliance of environmental policies.<br><br>1,5 points  | <b>Business Continuity Plans</b><br>Ensure that occupants understand and implement practices that will give continuity to environmental plans.<br><br>2 points  |
|  |  |               | <b>Refurbishment Policy</b><br>Recognize and encourage the maintenance of permanent policies that will reduce and prevent the environmental and air quality impacts produced in the refurbishment of buildings.<br><br>1,5 points  |   |
| <b>Possible Points:</b>  |  | <b>22</b>     | <b>0</b>   | <b>15</b>   |
| <b>Environmental Section Weighting</b>   |  | <b>12,0%</b>  | <b>0,0%</b>  | <b>15,0%</b>  |
|  |  |               |  | <b>12</b>   |
|  |  |               |  | <b>12,0%</b>  |

## INNOVATION

| BREEAM for New Buildings  |                   | BREEAM In Use |                                  |                          |
|---|-------------------|---------------|----------------------------------|--------------------------|
|   |                   | ASSET RATING  | BUILDING<br>MANAGEMENT<br>RATING | ORGANISATIONAL<br>RATING |
| <b>Inn 01: Innovation</b><br>It is intended as a credit to support innovation within the construction industry through the recognition of sustainability related benefits which are not rewarded by standard BREEAM issues. |                   |               |                                  |                          |
| Minimum Standards: No   | 1-10 points       |               |                                  |                          |
| <b>Possible Points:</b>   | <b>10</b>         | <b>0</b>      | <b>0</b>                         | <b>0</b>                 |
| <b>Environmental Section Weighting</b>  | <b>Additional</b> | <b>0,0%</b>   | <b>0,0%</b>                      | <b>0,0%</b>              |

# ENERGY & ATMOSPHERE

| BREEAM for New Buildings   |   | LEED for New Construction and Major Renovations   |   | REHABILITATION PROFILE: Assessment Tool  |   |
|--|---|---|---|--|---|
| PHYSICAL PERFORMANCE   |   | PHYSICAL PERFORMANCE  |   | PHYSICAL PERFORMANCE   |   |
| <b>Ene 01:</b><br>Reduction of CO2 Emissions<br>It is intended as a credit in the design stage to recognize and encourage buildings designed to minimize operational energy demand, consumption and CO2 emissions, by designing to improve the Energy Performance Ratio (EPR) and minimizing carbon dioxide emissions. | <b>Ene 02:</b><br>Energy Monitoring<br>It is intended as a credit in the design stage to recognize and encourage the installation of energy sub-metering that facilitates the monitoring of operational energy consumption.   | <b>Ene 03:</b><br>Energy Efficient Laboratory Systems<br>It is intended as a credit in the design stage to recognize and encourage laboratory areas that are designed to minimize the CO2 emissions associated with their operational energy consumption, using efficient fume cupboards in the areas needed. | <b>Ene 04:</b><br>Low and Zero Carbon Technologies<br>It is intended as a credit in the design stage to reduce carbon emissions and atmospheric pollution by encouraging local energy generation from renewable and low or zero carbon technologies with 5% rate in the use of renewable energies.            | <b>EA 01:</b><br>Reduction of CO2 Emissions<br>Recognize and encourage minimum operational energy demand, consumption and CO2 emissions associated with the building's operations and activities, by evaluating the inherent design of the building, improving the Energy Performance Ratio (EPR) and minimizing carbon dioxide emissions. | <b>EA 02:</b><br>Energy Efficient Laboratory Systems<br>Recognize and encourage laboratory areas that are designed to minimize the CO2 emissions associated with their operational energy consumption, using efficient fume cupboards in the areas needed.                  |
| 1 - 15 points  | 1 - 5 points  | 1 - 15 points   | 1 - 5 points  | 1 - 15 points  | 1 - 5 points  |
| <b>Ene 07:</b><br>Energy Efficient Laboratory Systems<br>It is intended as a credit in the design stage to recognize and encourage laboratory areas that are designed to minimize the CO2 emissions associated with their operational energy consumption, using efficient fume cupboards in the areas needed.          | <b>Ene 02:</b><br>Energy Monitoring<br>It is intended as a credit in the design stage to recognize and encourage the installation of energy sub-metering that facilitates the monitoring of operational energy consumption.   | <b>Ene 03:</b><br>Energy Efficient Laboratory Systems<br>It is intended as a credit in the design stage to recognize and encourage laboratory areas that are designed to minimize the CO2 emissions associated with their operational energy consumption, using efficient fume cupboards in the areas needed. | <b>Ene 04:</b><br>Low and Zero Carbon Technologies<br>It is intended as a credit in the design stage to reduce carbon emissions and atmospheric pollution by encouraging local energy generation from renewable and low or zero carbon technologies with 5% rate in the use of renewable energies.            | <b>EA 03:</b><br>Energy Monitoring: Measurement and Verification<br>Recognize and encourage the installation of energy sub-metering that facilitates the monitoring of operational energy consumption and assures ongoing accountability and optimizing of building energy consumption performance over time                               | <b>EA 04:</b><br>Green Power Technologies<br>Reduce carbon emissions and atmospheric pollution by encouraging local energy generation or self supply through renewable and low or zero carbon technologies sources to supply a significant proportion of the energy demand. |
| 1 - 5 points   | 1 - 5 points  | 1 - 5 points  | 1 - 5 points  | 1 - 5 points   | 1 - 5 points  |
| <b>Ene 02:</b><br>Energy Monitoring<br>It is intended as a credit in the design stage to recognize and encourage the installation of energy sub-metering that facilitates the monitoring of operational energy consumption.  | <b>Ene 03:</b><br>Energy Efficient Laboratory Systems<br>It is intended as a credit in the design stage to recognize and encourage laboratory areas that are designed to minimize the CO2 emissions associated with their operational energy consumption, using efficient fume cupboards in the areas needed. | <b>Ene 04:</b><br>Low and Zero Carbon Technologies<br>It is intended as a credit in the design stage to reduce carbon emissions and atmospheric pollution by encouraging local energy generation from renewable and low or zero carbon technologies with 5% rate in the use of renewable energies.            | <b>Ene 05:</b><br>Energy Efficient Laboratory Systems<br>It is intended as a credit in the design stage to recognize and encourage laboratory areas that are designed to minimize the CO2 emissions associated with their operational energy consumption, using efficient fume cupboards in the areas needed. | <b>EA 05:</b><br>Energy Monitoring: Measurement and Verification<br>Recognize and encourage the installation of energy sub-metering that facilitates the monitoring of operational energy consumption and assures ongoing accountability and optimizing of building energy consumption performance over time                               | <b>EA 06:</b><br>Green Power Technologies<br>Reduce carbon emissions and atmospheric pollution by encouraging local energy generation or self supply through renewable and low or zero carbon technologies sources to supply a significant proportion of the energy demand. |
| 1 - 5 points   | 1 - 5 points  | 1 - 5 points  | 1 - 5 points  | 1 - 5 points   | 1 - 5 points  |

# ENERGY & ATMOSPHERE

| BREEAM In Use  |  | LEED Existing Buildings: Operation and Management  |   | REHABILITATION PROFILE: Assessment Tool   |   |
|--|--|--|---|---|---|
| ASSET RATING   | BUILDING MANAGEMENT RATING   | ORGANISATIONAL RATING  | BUILDING MANAGEMENT RATING  | ORGANISATIONAL RATING   | ORGANISATIONAL RATING   |
| <b>Level of CO2 Emissions:</b><br>It is intended as a credit in the stage of building operation to evaluate the building's inherent performance with operational energy demand, consumption and CO2 emissions. | <b>Level of CO2 Emissions:</b><br>It is intended as a credit in the stage of building operation to maintain operating strategies that minimize operational energy demand, consumption and CO2 emission.      | <b>Carbon Footprint:</b><br>It is intended as a credit in the stage of building operation to ensure that operating strategies that minimize operational and occupants' energy demand, consumption and CO2 emission are maintained. | <b>Level of CO2 Emissions:</b><br>Recognize and encourage a permanent maintenance of operating strategies that minimize operational energy demand, consumption and CO2 emissions.   | <b>Carbon Footprint:</b><br>Recognize and encourage the permanent maintenance of operating strategies that minimize operational energy demand, consumption and CO2 emissions.   | <b>Level of CO2 Emissions:</b><br>Recognize and encourage the permanent maintenance of operating strategies that minimize operational energy demand, consumption and CO2 emissions.   |
| 1 - 7 points   | 1 - 5.5 points   | 1 - 3.5 points   | 1 - 5.5 points  | 1 - 3.5 points  | 1 - 3.5 points  |
| <b>Sub-metering of Substantial Energy Uses</b><br>It is intended as a credit in the stage of building operation to evaluate the building's major energy using system.  | <b>Energy/CO2 monitoring, targeting &amp; reduction</b><br>Implement a constant monitoring to address changes in major energy using systems to make them more efficient.                                     | <b>Targeting and Monitoring</b><br>Ensure that periodic adjustments and reviews of building's monitoring of target operating systems are made to maintain an optimal energy efficiency.  | <b>Performance Measurement: Monitoring and Targeting</b><br>Provide information to support energy management and the ongoing accountability and optimization of building energy performance and to identify opportunities for additional energy-saving investment and improvements.   | <b>Performance Measurement: Monitoring and Targeting</b><br>Ensure that periodic adjustments and reviews of building's monitoring of target operating systems are made to maintain an optimal energy efficiency measurement.  | <b>Performance Measurement: Monitoring and Targeting</b><br>Ensure that periodic adjustments and reviews of building's monitoring of target operating systems are made to maintain an optimal energy efficiency measurement.  |
| 1 - 6.5 points   | 1 - 5.5 points   | 1 - 3 points   | 1 - 5 points  | 1 - 5 points  | 1 - 5 points  |
| <b>Sub-metering of Areas/Tenancy</b><br>Facilitate the monitoring of operational energy consumption of the different building areas and tenants.   | <b>Energy Reporting/Information</b><br>Maintain an energy management and ongoing accountability of building energy performance.  | <b>Measuring and Recording</b><br>Ensure that periodic reviews of building's monitoring and measuring's of building energy performance are made.   | <b>EA CREDIT 3.1 - 3.3: Building Automation System, System Level Metering</b><br>It is intended as a credit in the stage of building's operation to provide information to support energy management and the ongoing accountability and optimization of building energy performance and to identify opportunities for additional energy-saving investment and improvements. | <b>EA CREDIT 3.1 - 3.3: Building Automation System, System Level Metering</b><br>It is intended as a credit in the stage of building's operation to provide information to support energy management and the ongoing accountability and optimization of building energy performance and to identify opportunities for additional energy-saving investment and improvements. | <b>EA CREDIT 3.1 - 3.3: Building Automation System, System Level Metering</b><br>It is intended as a credit in the stage of building's operation to provide information to support energy management and the ongoing accountability and optimization of building energy performance and to identify opportunities for additional energy-saving investment and improvements. |
| 1 - 6.5 points   | 1 - 5 points   | 1 - 3 points   | 1 - 5 points  | 1 - 3 points  | 1 - 5 points  |
| <b>Renewable and Low Emission Energy (built in)</b><br>Encourage and recognize the use of on-site and off-site renewable energies that reduce environmental impacts associated with fossil fuel energy use.    | <b>On-Site and Off-Site Renewable Energy</b><br>Encourage and recognize increasing levels of on-site and off-site renewable energies to reduce environmental impacts associated with fossil fuel energy use. | <b>EA CREDIT 4:</b><br>On-Site and Off-Site Renewable Energy<br>Encourage and recognize increasing levels of on-site and off-site renewable energies to reduce environmental impacts associated with fossil fuel energy use.       | <b>On-Site and Off-Site Renewable Energy</b><br>Maintain increasing levels of on-site and off-site renewable energies to reduce environmental impacts associated with fossil fuel energy use, during the building's operation.  | <b>On-Site and Off-Site Renewable Energy</b><br>Maintain increasing levels of on-site and off-site renewable energies to reduce environmental impacts associated with fossil fuel energy use, during the building's operation.  | <b>On-Site and Off-Site Renewable Energy</b><br>Maintain increasing levels of on-site and off-site renewable energies to reduce environmental impacts associated with fossil fuel energy use, during the building's operation.  |
| 1 - 6.5 points   | 1 - 5 points   | 1 - 3 points   | 1 - 5 points  | 1 - 3 points  | 1 - 4 points  |

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| <p><b>EA CREDIT 6: Green Power</b><br/>It is intended as a credit in the stage of design and planning to engage in a green power contract of local utilities, for the development and use of grid-source energy technologies on a net zero pollution basis.</p> <p>1 - 5 points</p>   | <p><b>PREREQ3: CFC Reduction in HVAC&amp;R Equipment</b><br/>Minimum requirement in the design and development stage to reduce ozone depletion by preventing the use of CFC-based refrigerants in HVAC&amp;R base building systems.</p> <p>1 point</p>   | <p><b>EA CREDIT 4: Ozone Depletion</b><br/>It is intended as a credit in the stage of design to prevent the use of HCFC's or Halon in HVAC&amp;R equipment, in order to reduce ozone depletion and support early compliance with the Montreal Protocol.</p> <p>1 point</p>   | <p><b>Poi 01: Impact of Refrigerants</b><br/>It is intended as a credit in the design stage to reduce the level of greenhouse gas emissions arising from the leakage of refrigerants from building systems.</p> <p>1 - 2 points</p>              | <p><b>Ene 03: External Lighting</b><br/>It is intended as a credit in the design stage to recognize and encourage the specification of energy-efficient light fittings for external areas of the development.</p> <p>1 - 3 points</p>            | <p><b>Ene 06: Energy Efficient Transportation Systems</b><br/>It is intended as a credit in the design stage to recognize and encourage the specification of energy-efficient transportation systems, by analyzing transportation demand, usage and energy consumption and efficiency of lifts, escalators or moving walks.</p> <p>1 point</p> |
| <p><b>EA PREREQ 3: CFC Reduction in HVAC&amp;R Equipment</b><br/>Minimum requirement in the design and development stage to reduce ozone depletion by preventing the use of CFC-based refrigerants in HVAC&amp;R base building systems.</p> <p>1 - 5 points</p>   | <p><b>EA 05: Ozone Depletion &amp; Greenhouse Gases</b><br/>Recognize and encourage the installation of energy efficient HVAC&amp;R systems, therefore reducing operational greenhouse gas emissions and preventing the use of CFC-based refrigerants or Halon resulting from the system's energy use.</p> <p>1 - 5 points</p>   | <p><b>EA CREDIT 5: Refrigerant Management</b><br/>It is intended as a credit in the stage of building's operation to eliminate the use of refrigerants in base building HVAC&amp;R systems or try to operate the facility without mechanical cooling and refrigeration equipment, with the purpose of reducing ozone depletion and support early compliance with the Montreal Protocol while minimizing direct contributions to global warming.</p> <p>1 point</p> | <p><b>Refrigerant Type and Leakage Detection/Control</b><br/>Ensure that levels of greenhouse gas emissions arising from the leakage of refrigerants from building systems are controlled.</p> <p>1 - 2,5 points</p>                             | <p><b>Refrigerant Leakage Monitoring</b><br/>Implement a monitoring system that will allow to measure and control the levels of greenhouse gas emissions arising from the leakage of refrigerants from building systems.</p> <p>1 - 2 points</p> | <p><b>EA 06: Efficient Equipment &amp; Systems</b><br/>Recognize minimum level efficiency for the base building and systems and encourage procurement of energy-efficient equipment (including transportation systems and light fittings), to ensure optimum performance and energy savings in operation.</p> <p>1 - 3 points</p>              |
| <p><b>EA CREDIT 5: Refrigerant Management: Ozone Protection</b><br/>Minimum requirement in the stage of building's operation to reduce stratospheric ozone depletion by eliminating the use of CFC-based refrigerants in HVAC&amp;R base building systems if economically feasible or developed a phase-out plan that identifies a schedule for replacement.</p> <p>1 point</p> | <p><b>EA CREDIT 5: Refrigerant Management</b><br/>It is intended as a credit in the stage of building's operation to eliminate the use of refrigerants in base building HVAC&amp;R systems or try to operate the facility without mechanical cooling and refrigeration equipment, with the purpose of reducing ozone depletion and support early compliance with the Montreal Protocol while minimizing direct contributions to global warming.</p> <p>1 point</p> | <p><b>Refrigerant Management</b><br/>Eliminate the use of refrigerants in base building HVAC&amp;R systems or try to operate the facility without mechanical cooling and refrigeration equipment.</p> <p>1 - 2 points</p>  | <p><b>Refrigerant Leakage Monitoring</b><br/>Implement a monitoring system that will allow to measure and control the levels of greenhouse gas emissions arising from the leakage of refrigerants from building systems.</p> <p>1 - 2 points</p> | <p><b>Control of Hazardous Chemicals etc.</b><br/>Maintain a follow up of monitoring systems that control and prevent levels of hazardous chemicals and other pollutants into the air, ground and water.</p> <p>1 - 2 points</p>                 | <p><b>Control of Hazardous Chemicals etc.</b><br/>Maintain a follow up of monitoring systems that control and prevent levels of hazardous chemicals and other pollutants into the air, ground and water.</p> <p>1 - 2 points</p>   |
| <p><b>EA CREDIT 6: Green Power</b><br/>It is intended as a credit in the stage of design and planning to engage in a green power contract of local utilities, for the development and use of grid-source energy technologies on a net zero pollution basis.</p> <p>1 - 5 points</p>   | <p><b>EA PREREQ 3: CFC Reduction in HVAC&amp;R Equipment</b><br/>Minimum requirement in the design and development stage to reduce ozone depletion by preventing the use of CFC-based refrigerants in HVAC&amp;R base building systems.</p> <p>1 point</p>   | <p><b>EA CREDIT 4: Ozone Depletion</b><br/>It is intended as a credit in the stage of design to prevent the use of HCFC's or Halon in HVAC&amp;R equipment, in order to reduce ozone depletion and support early compliance with the Montreal Protocol.</p> <p>1 point</p>   | <p><b>Poi 01: Impact of Refrigerants</b><br/>It is intended as a credit in the design stage to reduce the level of greenhouse gas emissions arising from the leakage of refrigerants from building systems.</p> <p>1 - 2 points</p>              | <p><b>Ene 03: External Lighting</b><br/>It is intended as a credit in the design stage to recognize and encourage the specification of energy-efficient light fittings for external areas of the development.</p> <p>1 - 3 points</p>            | <p><b>Ene 06: Energy Efficient Transportation Systems</b><br/>It is intended as a credit in the design stage to recognize and encourage the specification of energy-efficient transportation systems, by analyzing transportation demand, usage and energy consumption and efficiency of lifts, escalators or moving walks.</p> <p>1 point</p> |

|   |  |  |   |  |
|---|--|--|---|--|
| <p><b>Ene 08:</b></p> <p>It is intended as a credit in the design stage to recognize and encourage procurement of energy-efficient equipment to ensure optimum performance and energy savings in operation.</p> <p>1 - 2 points</p>   | <p><b>PREREQ 2:</b></p> <p>Minimum requirement in the design stage to establish the minimum level efficiency for the base building and systems, by using design tools and computer simulation models to assess and maximize the energy performance of the building.</p>  | <p><b>Minimum Energy Performance</b></p> <p>EA PREREQ 2:</p> <p>Minimum requirement in the design stage to establish the minimum level efficiency for the base building and systems, by using design tools and computer simulation models to assess and maximize the energy performance of the building.</p>   | <p><b>Energy Efficient Equipment</b></p> <p>Ensure a sustainable purchasing of equipment acquired for use in the operations and maintenance of building.</p> <p>1 - 3 points</p>  | <p><b>Minimum Energy Efficiency Performance</b></p> <p>Minimum requirement in the stage of building's operation to establish the minimum level of operating energy efficiency performance for the building and system, by implementing building commissioning and using energy-saving operational and management practices. It is required to earn at least two points under Energy &amp; Atmosphere Credit 1.</p> |
| <p><b>Ene 09:</b></p> <p>It is intended as a credit in the design stage to produce a reduced energy means of drying clothes, by designing an adequate internal or external space for this use.</p> <p>1 point</p>   | <p><b>EA PREREQ 1:</b></p> <p>Minimum requirement in the design and development stage to verify and ensure that fundamental building elements and systems are designed, installed and calibrated to operate as intended, by implementing fundamental best practice commissioning procedures.</p>   | <p><b>EA PREREQ 1:</b></p> <p>Minimum requirement in the design and development stage to verify and ensure that fundamental building elements and systems are designed, installed and calibrated to operate as intended, by implementing fundamental best practice commissioning procedures.</p>   | <p><b>Drying Spaces</b></p> <p>Implement a monitoring system to measure emissions to air produced by buildings' activities and apply this information to reduce, improve or change this activities.</p> <p>1 - 2 points</p> | <p><b>Control of Emission to Air</b></p> <p>Implement a monitoring system to measure emissions to air produced by buildings' activities and apply this information to reduce, improve or change this activities.</p>   |
| <p><b>Poi 02:</b></p> <p>It is intended as a credit in the design stage to encourage the supply of heat and/or coolth from a system that minimizes NO x emissions, and therefore reduces pollution of the local environment.</p> <p>1-3 points</p>  | <p><b>EA 07:</b></p> <p>Optimize Energy Performance</p> <p>It is intended as a credit in the stage of design to achieve increasing levels of energy performance above the prerequisite standard and reduce design energy cost to minimize environmental impacts associated with excessive energy use, through a functional design of the building's envelope and building's system.</p> <p>1-10 points</p> | <p><b>EA 07:</b></p> <p>Optimize Energy Performance</p> <p>It is intended as a credit in the stage of building's operation to achieve an increased level of operating energy efficiency performance relative to typical building of similar type to reduce environmental impacts associated with excessive energy use, by achieving an EPA rating or demonstrating energy efficiency percentiles.</p> <p>1-15 points</p> <p>(2 mandatory points)</p> | <p><b>NO x Emissions</b></p> <p>Ensure that the building counts with HVAC systems that don't produce greenhouse gases.</p> <p>1 - 2,5 points</p>  | <p><b>Control of Emission to Air</b></p> <p>Implement a monitoring system to measure emissions to air produced by buildings' activities and apply this information to reduce, improve or change this activities.</p>   |
| <p><b>Ene 09:</b></p> <p>It is intended as a credit in the design stage to produce a reduced energy means of drying clothes, by designing an adequate internal or external space for this use.</p> <p>1 point</p>   | <p><b>EA PREREQ 1:</b></p> <p>Minimum requirement in the design and development stage to verify and ensure that fundamental building elements and systems are designed, installed and calibrated to operate as intended, by implementing fundamental best practice commissioning procedures.</p>   | <p><b>EA PREREQ 1:</b></p> <p>Minimum requirement in the design and development stage to verify and ensure that fundamental building elements and systems are designed, installed and calibrated to operate as intended, by implementing fundamental best practice commissioning procedures.</p>   | <p><b>Drying Spaces</b></p> <p>Provide a foundation for training and system analysis, to improve energy management.</p> <p>1 - 3 points</p>   | <p><b>Control of Emission to Air</b></p> <p>Maintain a formal tracking program that reduce and report unwanted emissions.</p>  |
| <p><b>Ene 09:</b></p> <p>It is intended as a credit in the design stage to produce a reduced energy means of drying clothes, by designing an adequate internal or external space for this use.</p> <p>1 point</p>   | <p><b>EA PREREQ 1:</b></p> <p>Minimum requirement in the design and development stage to verify and ensure that fundamental building elements and systems are designed, installed and calibrated to operate as intended, by implementing fundamental best practice commissioning procedures.</p>   | <p><b>EA PREREQ 1:</b></p> <p>Minimum requirement in the design and development stage to verify and ensure that fundamental building elements and systems are designed, installed and calibrated to operate as intended, by implementing fundamental best practice commissioning procedures.</p>   | <p><b>Drying Spaces</b></p> <p>Provide a foundation for training and system analysis, to improve energy management.</p> <p>1 - 3 points</p>   | <p><b>Control of Emission to Air</b></p> <p>Maintain a formal tracking program that reduce and report unwanted emissions.</p>  |
| <p><b>PREREQ 3:</b></p> <p>Minimum Energy Efficiency Performance</p> <p>Establish the minimum level of operating energy efficiency performance for the building and system, by implementing building commissioning and using energy-saving operational and management practices. It is required to earn at least two points under Energy &amp; Atmosphere Credit 1.</p> | <p><b>EA PREREQ 1:</b></p> <p>Minimum requirement in the design and development stage to verify and ensure that fundamental building elements and systems are designed, installed and calibrated to operate as intended, by implementing fundamental best practice commissioning procedures.</p>   | <p><b>EA PREREQ 1:</b></p> <p>Minimum requirement in the design and development stage to verify and ensure that fundamental building elements and systems are designed, installed and calibrated to operate as intended, by implementing fundamental best practice commissioning procedures.</p>   | <p><b>Energy Management Training</b></p> <p>Provide a foundation for training and system analysis, to improve energy management.</p> <p>1 - 3.5 points</p>  | <p><b>Control of Emission to Air</b></p> <p>Maintain a formal tracking program that reduce and report unwanted emissions.</p>  |

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|---|--|---|--|--|--|---|
|   | <p><b>EA CREDIT 3: Additional Commissioning</b></p> <p>It is intended as a credit in the stage of design and development to verify and ensure that the entire building is designed, constructed and calibrated to operate as intended, by implementing additional commissioning to the Fundamental Building Commissioning Prerequisite 1 that will last since the early design phase till the end of construction.</p> | <p><b>EA 10: Additional Commissioning</b></p> <p>Verify and ensure that the entire building is designed, constructed and calibrated to operate as intended, by implementing additional commissioning to the Fundamental Building Commissioning Prerequisite 1 that will last since the early design phase till the end of construction.</p> | <p><b>Energy Audit</b></p> <p>Maintain a permanent evaluation of the building's energy performance and compliance with policies.</p>   | <p><b>Energy Policies</b></p> <p>Ensure the understanding and implementation of energy efficiency policies of the buildings occupants.</p> | <p><b>Existing Building Commissioning: Investigation and Analysis, Implementation, Ongoing Commissioning</b></p> <p><b>EA CREDIT 2.1 - 2.3:</b></p> <p>Three intended credits in the stage of building's operation:</p> <ol style="list-style-type: none"> <li>1) To develop an understanding of the operation of the building's major energy-using system;</li> <li>2) To implement minor improvements and identify planned capital projects to ensure that the building's major energy-using systems are repaired, operated and maintained;</li> <li>3) To implement commissioning to address changes in facility occupancy, usage, maintenance, and repair. Make periodic adjustments and reviews of building operating systems and procedures essential for optimal energy efficiency and service provision; all three with the purpose of optimizing energy performance.</li> </ol> | <p><b>Energy Audit</b></p> <p>To implement commissioning to address changes in facility occupancy, usage, maintenance, and repair. Make periodic adjustments, evaluations and reviews of building operating systems and procedures essential for optimal energy efficiency and service provision</p> <p><b>Energy Policies</b></p> <p>Ensure the understanding and implementation of energy efficiency policies of the buildings occupants.</p> |
|   | <p>1, points</p>   | <p>1, points</p>  | <p>1 - 5,5 points</p>  | <p>1 - 3,5 points</p>  | <p>1-6 points</p>  | <p>1 - 3,5 points</p>   |
| <p><b>Possible Points:</b></p> <p>Environmental Section Weighting</p> | <p><b>41</b></p> <p>19,0%</p>  | <p><b>50</b></p> <p>27,0%</p>   | <p><b>Maintenance Regimen / Schedules</b></p> <p>Design regimen and schedules to maintain an organized development of the building's energy efficiency management.</p> <p><b>35,5</b></p> <p>31,5%</p> | <p><b>23,5</b></p> <p>19,5%</p>  | <p><b>Maintenance Regimen / Schedules</b></p> <p>Design regimen and schedules to maintain an organized development of the building's energy efficiency management.</p> <p><b>56,5</b></p> <p>36,0%</p>   | <p><b>25,5</b></p> <p>36,0%</p>   |







# MATERIALS & RESOURCES

| BREEAM for New Buildings   |  | LEED FOR New Construction and Major Renovations  |   | REHABILITATION PROFILE: Assessment Tool  |  |
|--|--|--|---|--|--|
| ASSET RATING   | BUILDING MANAGEMENT RATING   | BREEAM In Use  | LEED Existing Buildings: Operation and Management   | BUILDING MANAGEMENT RATING   | ORGANISATIONAL RATING  |
| <b>Mat 01: Designing for Robustness</b><br>It is intended as a credit in the design stage to recognize and encourage adequate protection of exposed elements of the building and landscape, therefore minimizing the frequency of replacement and maximizing materials optimization. | <b>MR 01: Robustness</b><br>Evaluate and encourage adequate protection of exposed elements of the building and landscape, therefore minimizing the frequency of replacement and maximizing materials optimization.   | <b>ASSET RATING</b><br>Robustness<br>Evaluate the impact protection, durability of the material and the building's design for longevity. | <b>ORGANISATIONAL RATING</b><br>Robustness<br>Evaluate the impact protection, durability of the material and the building's design for longevity. | <b>BUILDING MANAGEMENT RATING</b><br>Robustness<br>Evaluate the impact protection, durability of the material and the building's design for longevity. | <b>ORGANISATIONAL RATING</b><br>Robustness<br>Evaluate the impact protection, durability of the material and the building's design for longevity.                                |
| Minimum Standards: No  | <b>MR 02: Quality of Asset</b><br>Evaluate and recognize a good physical state and quality of the building's materials.  | <b>Quality of asset</b><br>Evaluate the physical state and quality of the building's materials.  | <b>Quality of asset</b><br>Evaluate the physical state and quality of the building's materials.   | <b>Quality of asset</b><br>Evaluate the physical state and quality of the building's materials.  | <b>Quality of asset</b><br>Evaluate the physical state and quality of the building's materials.  |
| Minimum Standards: No  | <b>MR 03: Security and Fire Protection</b><br>Recognize and encourage the quality and maintenance status of the building's components and remotely monitored security systems to prevent the risk of fires and other emergencies and protect occupants and building. | <b>Security</b><br>Recognize and encourage the quality and maintenance status of the building's components and security systems.         | <b>Security</b><br>Examine and ensure the quality and status of the security systems, covering building and site arrangement facilities.          | <b>Security</b><br>Examine and ensure the quality and status of the security systems, covering building and site arrangement facilities.               | <b>Security</b><br>Ensure that the occupants and maintenance personnel understand and implement the security plans and systems, and have constant training and emergency drills. |

# MATERIALS & RESOURCES

| BREEAM In Use  |  | LEED Existing Buildings: Operation and Management  |  | Assessment Profile for Operation and Maintenance  |  |
|--|--|--|--|---|--|
| ASSET RATING   | BUILDING MANAGEMENT RATING   | BREEAM In Use  | LEED Existing Buildings: Operation and Management  | BUILDING MANAGEMENT RATING  | ORGANISATIONAL RATING  |
| <b>1 - 2.5 points</b><br><b>Security System Remote Monitoring</b><br>Implement and maintain monitoring systems to detect emergency situations and prevent the risk occupants and building.                 | <b>1 - 2 points</b><br><b>Security Survey</b><br>Examine and ensure the quality and status of the security systems, covering building and site arrangement facilities.                                     | <b>1 - 2.5 points</b><br><b>Security</b><br>Recognize and encourage the quality and maintenance status of the building's components and security systems.  | <b>1 - 2 points</b><br><b>Security</b><br>Examine and ensure the quality and status of the security systems, covering building and site arrangement facilities.  | <b>1 - 2 points</b><br><b>Security System &amp; Survey</b><br>Maintenance of a monitoring systems to detect emergency situations and prevent the risk of occupants and building, and implement permanent surveys to evaluate the quality and status of the security systems, covering building and site arrangement facilities. | <b>0.75 points</b><br><b>Security</b><br>Ensure that the occupants and maintenance personnel understand and implement the security plans and systems, and have constant training and emergency drills.                                 |
| <b>1 - 2 points</b><br><b>Fire Protection</b><br>Evaluate the existence of remotely monitored fire alarms and fire protection system.  | <b>1 - 2 points</b><br><b>Fire Protection / Resilience</b><br>Implement emergency plans that prevent the risk of fires and protect occupants and building.   | <b>1 - 2 points</b><br><b>Fire Protection</b><br>Evaluate the existence of remotely monitored fire alarms and fire protection system.  | <b>1 - 2 points</b><br><b>Fire Protection / Resilience</b><br>Implement emergency plans that prevent the risk of fires and protect occupants and building.   | <b>1 - 2 points</b><br><b>Fire Protection / Resilience</b><br>Implement emergency plans that prevent the risk of fires and protect occupants and building.  | <b>0.75 points</b><br><b>Fire Protection / Resilience</b><br>Ensure that occupants and maintenance personnel understand and implement the emergency plans that prevent the risk of fires and protect occupants and building.           |
| <b>1 - 2 points</b><br><b>Hazardous Materials</b><br>Reduce exposure of building occupants and maintenance personnel to potentially hazardous particulate contaminants coming from the building materials. | <b>1 - 2 points</b><br><b>Hazardous Materials</b><br>Reduce exposure of building occupants and maintenance personnel to potentially hazardous particulate contaminants coming from the building materials. | <b>1 - 2 points</b><br><b>Hazardous Materials</b><br>Reduce exposure of building occupants and maintenance personnel to potentially hazardous particulate contaminants coming from the building materials. | <b>1 - 2 points</b><br><b>Hazardous Materials</b><br>Reduce exposure of building occupants and maintenance personnel to potentially hazardous particulate contaminants coming from the building materials. | <b>1 - 2 points</b><br><b>Hazardous Materials</b><br>Reduce exposure of building occupants and maintenance personnel to potentially hazardous particulate contaminants coming from the building materials.  | <b>0.75 points</b><br><b>Hazardous Materials</b><br>Ensure that occupants and maintenance personnel understand and implement strategies to prevent potentially hazardous particulate contamination coming from the building materials. |
| <b>1 - 2 points</b><br><b>Measuring and Recording</b><br>Ensure a permanent measurement and recording of the material that go in and out of the building, and are used for its operation and maintenance.  | <b>1 - 2 points</b><br><b>Measuring and Recording</b><br>Ensure a permanent measurement and recording of the material that go in and out of the building, and are used for its operation and maintenance.  | <b>1 - 2 points</b><br><b>Measuring and Recording</b><br>Ensure a permanent measurement and recording of the material that go in and out of the building, and are used for its operation and maintenance.  | <b>1 - 2 points</b><br><b>Measuring and Recording</b><br>Ensure a permanent measurement and recording of the material that go in and out of the building, and are used for its operation and maintenance.  | <b>1 - 2 points</b><br><b>Measuring and Recording</b><br>Ensure a permanent measurement and recording of the material that go in and out of the building, and are used for its operation and maintenance.   | <b>0.50 points</b><br><b>Measuring and Recording</b><br>Ensure a permanent measurement and recording of the material that go in and out of the building, and are used for its operation and maintenance.                               |

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| <p><b>Mat 01:</b><br/><b>Life Cycle Impacts</b><br/>It is intended as a credit in the design stage to recognize and encourage the use of construction materials with a low environmental impact (including embodied carbon) over the full life cycle of the building.</p>  | <p><b>MR CREDIT 1: Building Reuse</b><br/>It is intended as a credit in the stage of design to extend the life cycle of existing building stock, conserve resources, retain cultural resources, reduce environmental impacts of new buildings as they relate to materials manufacturing and transport, all this by reusing large portions of existing structures during renovations or redevelopment projects.</p> | <p>1-3 points</p> |
| <p><b>Mat 02:</b><br/><b>Hard Landscaping and Boundary Protection</b><br/>It is intended as a credit in the design stage to recognize and encourage the specification of materials for boundary protection and external hard surfaces that have a low environmental impact, taking account of the full life cycle of materials used.</p> | <p><b>MR CREDIT 3: Resource Reuse</b><br/>It is intended as a credit in the stage of design to identify opportunities to incorporate salvage or refurbished materials into the building in order to reduce environmental impacts related to materials manufacturing and transport.</p>   | <p>1-3 points</p> |
| <p><b>Mat 03:</b><br/><b>Responsible Sourcing of Materials</b><br/>It is intended as a credit in the design stage to recognize and encourage the specification of responsible sourced materials for key building elements.</p>   | <p><b>MR CREDIT 5: Local/Regional Materials</b><br/>It is intended as a credit in the stage of design to use a minimum of 20% of building materials that are manufactured regionally, in order to increase demand for building products that are manufactured locally, thereby reducing the environmental impacts resulting from their transportation and supporting the local economy.</p>                        | <p>1-2 points</p> |
| <p>Minimum Standards: Yes</p> <p>3 points</p>  | <p><b>MR CREDIT 6: Rapidly Renewable Materials</b><br/>It is intended as a credit in the stage of design to use rapidly renewable material for 5% of total building materials, in order to replace and reduce the use and depletion of finite raw, and long-cycle renewable materials.</p>   | <p>1 points</p>   |
| <p><b>MR CREDIT 7: Certified Wood</b><br/>It is intended as a credit in the stage of design to use a minimum of 50% certified wood-based material to encourage environmentally responsible forest management.</p>  |  | <p>1 points</p>   |

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| <p><b>MR 04:</b><br/><b>Building Reuse*</b><br/>Recognize and encourage the reuse of large portions of existing structures during renovations or redevelopment projects.</p>  | <p><b>MR 05:</b><br/><b>Resource Reuse</b><br/>Identify the incorporation of salvage or refurbished materials or elements into the building for upgrades or maintenance, in order to reduce environmental impacts related to materials manufacturing and transport.</p>  | <p>1 - 3 points</p> |
| <p><b>MR 06:</b><br/><b>Hard Landscaping and Boundary Protection</b><br/>Recognize and encourage the specification of materials for boundary protection and external hard surfaces that have a low environmental impact, taking account of the full life cycle of materials used.</p>           | <p><b>MR 07:</b><br/><b>Responsible Sourcing: Local/Regional Materials</b><br/>Recognize and encourage the use of a minimum of 20% of building materials that are manufactured regionally, in order to increase demand for building products that are manufactured locally, thereby reducing the environmental impacts resulting from their transportation and supporting the local economy.</p> | <p>1 point</p>      |
| <p><b>MR 08:</b><br/><b>Responsible Sourcing: Rapidly Renewable Materials</b><br/>Recognize and encourage the use of rapidly renewable material for 5% of total building materials, in order to replace and reduce the use and depletion of finite raw, and long-cycle renewable materials.</p> | <p><b>MR 09:</b><br/><b>Responsible Sourcing: Certified Wood</b><br/>Recognize and encourage the use of a minimum of 50% certified wood-based material to encourage environmentally responsible forest management.</p>   | <p>1-2 points</p>   |
| <p>Minimum Standards: No</p> <p>1 point</p>   |  | <p>1 points</p>     |

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|  | <p><b>Targeting and Monitoring</b><br/>Identify high impact materials that go in and out of the building and implement strategies to reduce their use in the operation and maintenance of the building.</p>   | <p>0,50 points</p> |
|  | <p><b>Environmental Policies</b><br/>Ensure the compliance of policies that reduce environmental impact caused by materials that go in for operation, maintenance and upgrade of the building, and materials that go out as solid waste.</p>  | <p>0,75 points</p> |
|  | <p><b>MR PREREQ 1: Sustainable Purchasing Policy</b><br/>Minimum requirement in the stage of building's operation to have in place a sustainable purchasing policy in order to reduce the environmental impacts of materials acquired for use in the operations, maintenance, and upgrades of buildings.</p>  | <p>0,75 points</p> |
|  | <p><b>MR CREDIT 3: Sustainable Purchasing: Facility Alteration and Additions</b><br/>It is intended as a credit in the stage of building's operation to reduce the environmental and air quality impacts of the materials acquired for use in the upgrade of buildings, by maintaining a sustainable purchasing program that achieves at least 50% of total purchase for facility alterations and additions...</p>            | <p>1 points</p>    |
|  | <p><b>MR CREDIT 4: Sustainable Purchasing: Reduced Mercury in Lamps</b><br/>It is intended as a credit in the stage of building's operation to reestablish and maintain a toxic material source reduction program to reduce the amount of mercury brought onto the building site through purchases of lamps, developing a lighting purchasing plan that specifies maximum levels of mercury permitted in lamps purchased.</p> | <p>1 points</p>    |

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|  | <p><b>Targeting and Monitoring</b><br/>Identify high impact materials that go in and out of the building and implement strategies to reduce their use in the operation and maintenance of the building.</p>   | <p>0,50 points</p> |
|  | <p><b>Environmental Policies</b><br/>Ensure the compliance of policies that reduce environmental impact caused by materials that go in for operation, maintenance and upgrade of the building, and materials that go out as solid waste.</p>  | <p>0,75 points</p> |
|  | <p><b>PREREQ 1: Sustainable Purchasing Policy</b><br/>Minimum requirement in the stage of building's operation to have in place a sustainable purchasing policy in order to reduce the environmental impacts of materials acquired for use in the operations, maintenance, and upgrades of buildings.</p> | <p>1 point</p>     |
|  | <p><b>Sustainable Purchasing: Facility Alteration and Additions</b><br/>Maintain a reduced environmental and air quality impacts of the materials acquired for use in the upgrade of buildings.</p>   | <p>0,75 points</p> |
|  | <p><b>Sustainable Purchasing: Reduced Mercury in Lamps</b><br/>Maintain a toxic material source reduction program to reduce the amount of mercury brought onto the building site through purchases of lamps.</p>  | <p>1 point</p>     |

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| <b>Mat 04: Insulation</b><br>It is intended as a credit in the design stage to recognize and encourage the use of thermal insulation which has a low embodied environmental impact relative to its thermal properties and has been responsibly sourced. | 2 points |  |  |           |           |
| Minimum Standards: No   |          |  |  |           |           |
| <b>Possible Points:</b>   |          |  |  | <b>13</b> | <b>13</b> |
| Environmental Section Weighting   |          |  |  | 12,5%     | 18,9%     |

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| <b>MR 10: Responsible Sourcing: Insulation</b><br>Recognize and encourage the use of thermal insulation which has a low embodied environmental impact relative to its thermal properties and has been responsibly sourced. | 1 - 2 points |  |  |           |             |
|  |              |  |  |           |             |
|  |              |  |  |           |             |
| <b>Possible Points:</b>  |              |  |  | <b>16</b> | <b>0,0%</b> |
|  |              |  |  |           |             |

|  |            |  |  |             |             |
|--|------------|--|--|-------------|-------------|
| <b>MR CREDIT 1: Sustainable Purchasing: Ongoing Consumables</b><br>It is intended as a credit in the stage of building's operation to reduce the environmental and air quality impacts of the materials acquired for use in the operations and maintenance of building, by maintaining a sustainable purchasing program that achieves at least 40% of total purchase of ongoing consumables.                 | 1-3 points |  |  |             |             |
| <b>MR CREDIT 2: Sustainable Purchasing: Durable Goods</b><br>It is intended as a credit in the stage of building's operation to reduce the environmental and air quality impacts of the materials acquired for use in the operations and maintenance of building. Points are awarded when achieving sustainable purchases of at least 40% of the total purchase of electric-powered equipment and furniture. | 1-2 points |  |  |             |             |
| <b>MR CREDIT 5: Sustainable Purchasing: Food</b><br>It is intended as a credit in the stage of building's operation to reduce the environmental and transportation impacts associated with food production and distribution, by achieving a sustainable purchase of at least 25% of total combined food and beverage purchases.  | 1 point    |  |  |             |             |
| <b>Possible Points:</b>  |            |  |  | <b>8</b>    | <b>8</b>    |
|  |            |  |  | <b>8,5%</b> |             |
|  |            |  |  | <b>5,5</b>  | <b>5,5%</b> |
|  |            |  |  | <b>4,5</b>  | <b>3,5%</b> |
| <b>Environmental Section Weighting</b>   |            |  |  |             |             |

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|---|------------|--|--|-------------|-------------|
| <b>Sustainable Purchasing: Ongoing Consumables</b><br>Maintain a sustainable purchasing program to reduce environmental and air quality impacts of ongoing consumables used for operations and maintenance of building. | 1-3 points |  |  |             |             |
| <b>Sustainable Purchasing: Durable Goods</b><br>Maintain a sustainable purchasing program to reduce environmental and air quality impacts of durable goods purchased for operations and maintenance of building.        | 1-2 points |  |  |             |             |
| <b>Sustainable Purchasing: Food</b><br>Maintain a sustainable purchasing program to reduce the environmental and transportation impacts associated with food production and distribution.                               | 1 point    |  |  |             |             |
| <b>Possible Points:</b>   |            |  |  | <b>14</b>   | <b>4,5</b>  |
|   |            |  |  | <b>0,0%</b> | <b>0,0%</b> |
| <b>Environmental Section Weighting</b>  |            |  |  |             |             |

## WASTE

| BREEAM for New Buildings |  | LEED FOR New Construction and Major Renovations  |  | REHABILITATION PROFILE: Assessment Tool  |  |
|--------------------------|--|--|--|--|--|
| ASSET RATING             | BUILDING MANAGEMENT RATING   | ORGANISATIONAL RATING  | PHYSICAL PERFORMANCE   | ASSET RATING   | BUILDING MANAGEMENT RATING   |
|                          | <b>Wst 01: Construction Waste Management</b><br>It is intended as a credit in the design stage to promote resource efficiency via the effective management and reduction of construction waste.  | <b>MR CREDIT 2: Construction Waste Management</b><br>It is intended as a credit in the construction stage to implement a waste management plan to achieve recycle and/or salvage of construction, demolition and land clearing waste, in order to divert these debris from landfill disposal and redirect recyclable material back to the manufacturing process. | <b>WA 01: Construction Waste Management</b><br>Implement a waste management plan to achieve recycle and/or salvage of construction, demolition and land clearing waste DURING THE CONSTRUCTION of the building, in order to divert these debris from landfill disposal and redirect recyclable material back to the manufacturing process. |  | <b>Waste Management Plan</b><br>Ensure that occupants and maintenance personnel understand and implement the solid waste management plans and policies.  |
| 4 points                 | 1-2 points   | 1-4 points   |  | 1-2.5 points   | 1-2.5 points   |
|                          | <b>Wst 02: Recycled Aggregates</b><br>It is intended as a credit in the design stage to promote recognize and encourage the use of recycled and secondary aggregates, thereby reducing the demand for virgin material and optimizing material efficiency in construction.                        | <b>MR CREDIT 4: Recycled Content</b><br>It is intended as a credit in the stage of design to increase demand for building products that incorporate recycled content materials, by establishing percentile goals and therefore reducing the impact of new material.  | <b>WA 02: Recycled Content</b><br>Recognize and encourage the demand for building products that incorporate recycled content materials, by establishing percentile goals and therefore reducing the impact resulting from the extraction of new material.  |  | <b>Waste Management Training</b><br>Ensure that the maintenance personnel understand and implement the solid waste management plan, and carry out a permanent training for it.   |
| 1 point                  | 1-2 points   | 1-2 points   |  | 1-2.5 points   | 1 point  |
|                          | <b>Wst 03: Operational Waste</b><br>It is intended as a credit in the design stage to promote recognize and encourage the provision of dedicated storage facilities for a buildings' operational related recyclable waste streams, so that this waste is diverted form landfill or incineration. | <b>PREREQ 1: Storage and Collection of Recyclables</b><br>Minimum requirement in the design stage to designate an area of the project for recyclable collection and storage that serves the entire building, in order to reduce waste generated by buildings occupants that is hauled to and disposed of in landfills.   | <b>MR PREREQ 1: Storage and Collection of Recyclables</b><br>Recognize and encourage the use of designated area of the project for recyclable collection and storage that serves the entire building, in order to reduce waste generated by buildings occupants that is hauled to and disposed of in landfills.                            |  | <b>MR CREDIT 7: Solid Waste Management: Ongoing Consumable</b><br>It is intended as a credit in the stage of building's operation to facilitate the reduction of ongoing waste and toxins generated from the use of ongoing consumables products by building occupant and building operation that are hauled to and disposed of in landfills or incineration facilities. All this by reusing, recycling or composting 50% or more of the ongoing consumables waste stream. |
| 1 point                  | 1-2 points   | 1 point  |  | 1-2.5 points   | 1 point  |
|                          | <b>Wst 03: Operational Waste</b><br>It is intended as a credit in the design stage to promote recognize and encourage the provision of dedicated storage facilities for a buildings' operational related recyclable waste streams, so that this waste is diverted form landfill or incineration. | <b>WA 03: Operational Waste</b><br>It is intended as a credit in the design stage to promote recognize and encourage the provision of dedicated storage facilities for a buildings' operational related recyclable waste streams, so that this waste is diverted form landfill or incineration.  |  | <b>Measuring and Recording</b><br>Ensure a permanent measurement and recording of the waste produced on the operation and maintenance of the building. | <b>Solid Waste Management: Waste Stream Audit</b><br>Identify the reduction of ongoing waste and toxins generated, by conducting waste management stream audits of the building's ongoing consumable waste stream.   |
| 1 point                  | 1 point  | 1 point  |  | 1-2 points   | 1-2.5 points   |

## WASTE

| BREEAM In Use |                            | LEED Existing Buildings: Operation and Management  |  | REHABILITATION PROFILE: Assessment Tool |  |
|---------------|----------------------------|--|--|---|--|
| ASSET RATING  | BUILDING MANAGEMENT RATING | ORGANISATIONAL RATING  | PHYSICAL PERFORMANCE   | ASSET RATING                            | BUILDING MANAGEMENT RATING   |
|               |                            | <b>Waste Management Plan</b><br>Ensure that occupants and maintenance personnel understand and implement the solid waste management plans and policies.  | <b>MR PREREQ 2: Solid Waste Management</b><br>Minimum requirement in the stage of building's operation to have in place a solid waste management policy for the building and site, in order to reduce the amount of waste and toxins that are hauled to and disposed of in landfills or incineration facilities.   |   | <b>Solid Waste Management</b><br>Have in place a solid waste management policy for the building and site, in order to reduce the amount of waste and toxins that are hauled to and disposed of in landfills or incineration facilities.  |
|               |                            | <b>Waste Management Training</b><br>Ensure that the maintenance personnel understand and implement the solid waste management plan, and carry out a permanent training for it.   | <b>MR CREDIT 9: Solid Waste Management: Facility Alterations and Additions</b><br>It is intended as a credit in the stage of building's operation to divert construction and demolition waste from disposal to landfills and incineration facilities and redirect recovered resources to the manufacturing process and redirect reusable material to appropriate sites. Divert at least 70% of waste.  |   | <b>Solid Waste Management: Facility Alterations and Additions</b><br>Recognize a plan to divert construction and demolition waste from disposal to landfills and incineration facilities and redirect recyclable resources to the manufacturing process and redirect reusable material to appropriate sites. |
|               |                            | <b>Storage of Recyclable Waste</b><br>Recognize and encourage the use of designate an area of the project for recyclable collection and storage that serves the entire building, in order to reduce waste generated by buildings occupants that is hauled to and disposed of in landfills. | <b>MR CREDIT 7: Solid Waste Management: Ongoing Consumable</b><br>It is intended as a credit in the stage of building's operation to facilitate the reduction of ongoing waste and toxins generated from the use of ongoing consumables products by building occupant and building operation that are hauled to and disposed of in landfills or incineration facilities. All this by reusing, recycling or composting 50% or more of the ongoing consumables waste stream.               |   | <b>Solid Waste Management: Ongoing Consumable</b><br>Identify the reduction of ongoing waste and toxins generated from the use of ongoing consumables products by building occupant and building operation that are disposed of in landfills or incineration facilities.                                     |
|               |                            |  | <b>MR CREDIT 8: Solid Waste Management: Durable Goods</b><br>It is intended as a credit in the stage of building's operation to facilitate the reduction of ongoing waste and toxins generated from the use of durable goods by building occupant and building operation that are hauled to and disposed of in landfills or incineration facilities. All this by maintaining a waste reduction, reuse and recycling program that addresses durable goods that are replaced infrequently. |   | <b>Solid Waste Management: Durable Goods</b><br>Identify the reduction of ongoing waste and toxins generated from the use of durable goods by building occupant and building operation that are hauled to and disposed of in landfills or incineration facilities.   |
|               |                            |  | <b>MR CREDIT 6: Solid Waste Management: Waste Stream Audit</b><br>It is intended as a credit in the stage of building's operation to facilitate the reduction of ongoing waste and toxins generated by building occupant and building operation that are hauled to and disposed of in landfills or incineration facilities All this by conducting waste management stream audits of the building's ongoing consumable waste stream.  |   | <b>Solid Waste Management: Waste Stream Audit</b><br>Identify the reduction of ongoing waste and toxins generated, by conducting waste management stream audits of the building's ongoing consumable waste stream.   |
|               |                            |  |  |   |  |

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|---|----------------|-------------------------|
| <p><b>Wst 04:</b> Speculative Floor and Ceiling Finishes</p> <p>It is intended as a credit in the design stage to encourage the specification and fitting of floor and ceiling finishes selected by the building occupant and therefore avoid unnecessary waste of materials.</p> | <p>1 point</p> | <p>7</p> <p>6,0%</p>    |
| <p><b>Wst 04:</b> Speculative Floor and Ceiling Finishes</p> <p>It is intended as a credit in the design stage to encourage the specification and fitting of floor and ceiling finishes selected by the building occupant and therefore avoid unnecessary waste of materials.</p> |                | <p>1 point</p>          |
| <p><b>Targeting and Monitoring</b></p> <p>Use recordings to identify solid waste with high impact produced in the operation and maintenance of the building, and implement strategies to reduce this impact.</p>  |                | <p>1 - 2 points</p>     |
| <p><b>Measuring and Recording</b></p> <p>Ensure a permanent measurement and recording of the waste produced on the operation and maintenance of the building.</p>   |                | <p>1 - 2 points</p>     |
| <p><b>Targeting and Monitoring</b></p> <p>Use recordings to identify solid waste with high impact produced in the operation and maintenance of the building, and implement strategies to reduce this impact.</p>  |                | <p>1 - 2 points</p>     |
| <p><b>Targeting and Monitoring</b></p> <p>Use recordings to identify solid waste with high impact produced in the operation and maintenance of the building, and implement strategies to reduce this impact.</p>  |                | <p>1 - 2 points</p>     |
| <p><b>Possible Points:</b></p>  |                | <p>4</p>                |
| <p><b>Environmental Section Weighting</b></p>   |                | <p>5</p> <p>3,0%</p>    |
| <p><b>Possible Points:</b></p>  |                | <p>8</p> <p>4,0%</p>    |
| <p><b>Environmental Section Weighting</b></p>   |                | <p>7</p> <p>6,0%</p>    |
| <p><b>Possible Points:</b></p>  |                | <p>9</p> <p>9,0%</p>    |
| <p><b>Environmental Section Weighting</b></p>   |                | <p>3,0%</p> <p>9,0%</p> |

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| <p><b>Wst 04:</b> Speculative Floor and Ceiling Finishes</p> <p>It is intended as a credit in the design stage to encourage the specification and fitting of floor and ceiling finishes selected by the building occupant and therefore avoid unnecessary waste of materials.</p> | <p>1 point</p> | <p>8</p> <p>4,0%</p>    |
| <p><b>Wst 04:</b> Speculative Floor and Ceiling Finishes</p> <p>It is intended as a credit in the design stage to encourage the specification and fitting of floor and ceiling finishes selected by the building occupant and therefore avoid unnecessary waste of materials.</p> |                | <p>1 point</p>          |
| <p><b>Targeting and Monitoring</b></p> <p>Use recordings to identify solid waste with high impact produced in the operation and maintenance of the building, and implement strategies to reduce this impact.</p>  |                | <p>1 - 2 points</p>     |
| <p><b>Measuring and Recording</b></p> <p>Ensure a permanent measurement and recording of the waste produced on the operation and maintenance of the building.</p>   |                | <p>1 - 2 points</p>     |
| <p><b>Targeting and Monitoring</b></p> <p>Use recordings to identify solid waste with high impact produced in the operation and maintenance of the building, and implement strategies to reduce this impact.</p>  |                | <p>1 - 2 points</p>     |
| <p><b>Targeting and Monitoring</b></p> <p>Use recordings to identify solid waste with high impact produced in the operation and maintenance of the building, and implement strategies to reduce this impact.</p>  |                | <p>1 - 2 points</p>     |
| <p><b>Possible Points:</b></p>  |                | <p>4</p>                |
| <p><b>Environmental Section Weighting</b></p>   |                | <p>5</p> <p>3,0%</p>    |
| <p><b>Possible Points:</b></p>  |                | <p>8</p> <p>4,0%</p>    |
| <p><b>Environmental Section Weighting</b></p>   |                | <p>7</p> <p>6,0%</p>    |
| <p><b>Possible Points:</b></p>  |                | <p>9</p> <p>9,0%</p>    |
| <p><b>Environmental Section Weighting</b></p>   |                | <p>3,0%</p> <p>9,0%</p> |

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|---|----------------|-------------------------|
| <p><b>Wst 04:</b> Speculative Floor and Ceiling Finishes</p> <p>It is intended as a credit in the design stage to encourage the specification and fitting of floor and ceiling finishes selected by the building occupant and therefore avoid unnecessary waste of materials.</p> | <p>1 point</p> | <p>7</p> <p>6,0%</p>    |
| <p><b>Wst 04:</b> Speculative Floor and Ceiling Finishes</p> <p>It is intended as a credit in the design stage to encourage the specification and fitting of floor and ceiling finishes selected by the building occupant and therefore avoid unnecessary waste of materials.</p> |                | <p>1 point</p>          |
| <p><b>Targeting and Monitoring</b></p> <p>Use recordings to identify solid waste with high impact produced in the operation and maintenance of the building, and implement strategies to reduce this impact.</p>  |                | <p>1 - 2 points</p>     |
| <p><b>Measuring and Recording</b></p> <p>Ensure a permanent measurement and recording of the waste produced on the operation and maintenance of the building.</p>   |                | <p>1 - 2 points</p>     |
| <p><b>Targeting and Monitoring</b></p> <p>Use recordings to identify solid waste with high impact produced in the operation and maintenance of the building, and implement strategies to reduce this impact.</p>  |                | <p>1 - 2 points</p>     |
| <p><b>Targeting and Monitoring</b></p> <p>Use recordings to identify solid waste with high impact produced in the operation and maintenance of the building, and implement strategies to reduce this impact.</p>  |                | <p>1 - 2 points</p>     |
| <p><b>Possible Points:</b></p>  |                | <p>4</p>                |
| <p><b>Environmental Section Weighting</b></p>   |                | <p>5</p> <p>3,0%</p>    |
| <p><b>Possible Points:</b></p>  |                | <p>8</p> <p>4,0%</p>    |
| <p><b>Environmental Section Weighting</b></p>   |                | <p>7</p> <p>6,0%</p>    |
| <p><b>Possible Points:</b></p>  |                | <p>9</p> <p>9,0%</p>    |
| <p><b>Environmental Section Weighting</b></p>   |                | <p>3,0%</p> <p>9,0%</p> |

## HEALTH AND WELLBEING

## HEALTH AND WELLBEING

| BREEAM for New Buildings   |   | LEED FOR New Construction and Major Renovations   |  | REHABILITATION PROFILE: Assessment Tool   |  |
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| BREEAM In Use  |   | LEED Existing Buildings: Operation and Management   |  | REHABILITATION PROFILE: Assessment Tool   |  |
| ASSET RATING   | BUILDING MANAGEMENT RATING  | ORGANISATIONAL RATING   | ASSET RATING   | BUILDING MANAGEMENT RATING  | ORGANISATIONAL RATING  |
| <p><b>Hea 01: Visual Comfort</b></p> <p>It is intended as a credit in the design stage to ensure daylight, artificial lighting and occupant controls are considered for best practice visual performance and comfort for building occupants.</p> <p><b>Prerequisite:</b> All fluorescent and compact fluorescent lamps are fitted with high frequency ballast.</p> | <p><b>EQ CREDIT 8: Day Light and Views</b></p> <p>It is intended as a credit in the design stage to provide connection between indoor spaces and outdoor environment through the introduction of sunlight and views into the occupied areas of the building, by designing the building to maximize daylight and view opportunities.</p>             | <p><b>HW 01: Visual Comfort</b></p> <p>Provide connection between indoor spaces and outdoor environment through the introduction of sunlight and views into the occupied areas of the building, and ensure that daylight, artificial lighting and occupant controls are considered for best practice visual performance and comfort for building occupants.</p> | <p><b>Daylighting</b></p> <p>Ensure that the building achieves minimum daylight factors in spaces occupied for visual tasks.</p>   | <p><b>Maintenance of Lighting Levels</b></p> <p>Implement systems and occupant controls of natural and artificial lighting to suit individual preferences and the needs of specific tasks, to promote the productivity, comfort and well-being of building occupants.</p>                                     | <p><b>Maintenance of Visual Comfort</b></p> <p>Encourage a management plan to have a permanent connections between indoor and outdoor environments, and ensure that daylight, artificial lighting and occupant controls are considered for best practice visual performance and comfort for building occupants.</p>      |
| 1 - 5 points   | 1-2 points  | 1 - 5 points  | 1 - 2,5 points   | 1 - 3 points  | 1 - 3 points   |
| <p><b>Hea 02: Indoor Air Quality</b></p> <p>It is intended as a credit in the design stage to recognize and encourage a healthy internal environment through the specification and installation of appropriate ventilation, equipment and finishes.</p>  | <p><b>PREREQ 1: Minimum IAQ Performance</b></p> <p>Minimum requirement in the design stage to meet with the minimum ventilation requirements in order to establish minimum indoor air quality (IAQ) performance to prevent the development of indoor air quality problems in buildings, maintaining the health and well being of the occupants.</p> | <p><b>EQ PREREQ 1: Minimum IAQ Performance</b></p> <p>Minimum requirement in the design stage to meet with the minimum ventilation requirements in order to establish minimum indoor air quality (IAQ) performance to prevent the development of indoor air quality problems in buildings, maintaining the health and well being of the occupants.</p>          | <p><b>Artificial Lighting Design</b></p> <p>Ensure that the building achieves minimum artificial light factors in spaces occupied for visual tasks, when there is not enough daylight.</p> | <p><b>Outdoor Air Introduction and Exhaust Systems</b></p> <p>Recognize and encourage the conduction of constant air flow monitoring to maintain minimum indoor air quality (IAQ) performance to enhance indoor air quality in building, thus contributing to the health and well-being of the occupants.</p> | <p><b>PREREQ 01: Outdoor Air Introduction and Exhaust Systems</b></p> <p>Recognize and encourage the conduction of constant air flow monitoring to maintain minimum indoor air quality (IAQ) performance to enhance indoor air quality in building, thus contributing to the health and well-being of the occupants.</p> |
| 1 - 5 points   | 1 - 5 points  | 1 - 5 points  | 1 - 2,5 points   | 1 - 3 points  | 1 - 3 points   |
| <p><b>Hea 02: Indoor Air Quality</b></p> <p>It is intended as a credit in the design stage to recognize and encourage a healthy internal environment through the specification and installation of appropriate ventilation, equipment and finishes.</p>  | <p><b>PREREQ 1: Minimum IAQ Performance</b></p> <p>Minimum requirement in the design stage to meet with the minimum ventilation requirements in order to establish minimum indoor air quality (IAQ) performance to prevent the development of indoor air quality problems in buildings, maintaining the health and well being of the occupants.</p> | <p><b>EQ PREREQ 1: Minimum IAQ Performance</b></p> <p>Minimum requirement in the design stage to meet with the minimum ventilation requirements in order to establish minimum indoor air quality (IAQ) performance to prevent the development of indoor air quality problems in buildings, maintaining the health and well being of the occupants.</p>          | <p><b>Indoor Air Quality</b></p> <p>Ensure that the building provides a healthy internal environment through appropriate ventilation.</p>  | <p><b>IAQ Best Management Practices: Increased Ventilation</b></p> <p>Increase outdoor mechanical and natural air ventilation rates above minimum requirements in order to improve indoor air quality for occupants' comfort, well-being, and productivity.</p>   | <p><b>IAQ Best Management Practices: Increased Ventilation</b></p> <p>Increase outdoor mechanical and natural air ventilation rates above minimum requirements in order to improve indoor air quality for occupants' comfort, well-being, and productivity.</p>  |
| 1 points   | 1 points  | 1 points  | 1 - 2,5 points   | 1 - 3 points  | 1 points   |

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| <p><b>EQ PREREQ2: Environmental Tobacco Smoke (ETS) Control</b></p> <p>Minimum requirement in the design and development stage to prevent the exposure of nonsmokers to ETS by prohibiting smoking in the building, OR, designating separate smoking rooms with isolated ventilation systems.</p> | <p><b>EQ CREDIT 5: Indoor Chemical &amp; Pollutant Source Control</b></p> <p>It is intended as a credit in the design stage to minimize cross-contamination of regularly occupied occupancy by chemical pollutants, in order to avoid exposure of building occupants to potentially hazardous chemicals that adversely impact air quality.</p> <p>1-2 points</p> |  |  |
| <p><b>EQ PREREQ2: Environmental Tobacco Smoke (ETS) Control</b></p> <p>Minimum requirement in the design and development stage to prevent the exposure of nonsmokers to ETS by prohibiting smoking in the building, OR, designating separate smoking rooms with isolated ventilation systems.</p> | <p><b>HW 02: Indoor Chemical &amp; Pollutant Source Control</b></p> <p>Minimize cross-contamination of regularly occupied occupancy by chemical pollutants, in order to avoid exposure of building occupants to potentially hazardous chemicals that adversely impact air quality.</p> <p>1-2 points</p>   |  |  |

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|   | <p><b>Cleaning Policies</b></p> <p>Reduce the exposure of occupants and maintenance personnel to potentially hazardous chemicals, biological, and particulate contaminants.</p> <p>1 - 3 points</p>  |   |   |
| <p><b>EQ PREREQ 2: Environmental Tobacco Smoke (ETS) Control</b></p> <p>Minimum requirement in the stage of building's operation to prevent the exposure of nonsmokers to ETS by prohibiting smoking in the building, OR, providing separate smoking rooms with isolated ventilation systems.</p> | <p><b>EQ PREREQ 3: Green Cleaning Policy</b></p> <p>Minimum requirement in the stage of building's operation to follow a green cleaning policy to reduce the exposure of building occupants and maintenance personnel to potentially hazardous chemicals, biological, and particulate contaminants, which affect air quality, human health, building finishes, building systems and the environment.</p> | <p><b>EQ CREDIT 3.8: Green Cleaning: Entryway System</b></p> <p>It is intended as a credit in the stage of building's operation to reduce the exposure of occupants and maintenance personnel to potentially hazardous chemical, biological and particulate contaminants, which adversely affect air quality, human health, building finishes, building systems and the environment, by using entryway systems (grilles, grates, mats) to reduce the amount of dirt, dust, pollen and other particles entering the building at all public entryways.</p> <p>1 point</p> | <p><b>EQ CREDIT 3.9: Green Cleaning: Indoor Integrated Pest Management</b></p> <p>It is intended as a credit in the stage of building's operation to reduce the exposure of occupants and maintenance personnel to potentially hazardous chemical, biological and particulate contaminants, which adversely affect air quality, human health, building finishes, building systems and the environment, by developing, implementing and maintaining an indoor integrated pest management (IPM) plan, to manage indoor pests in a way that protects human health and surrounding environments.</p> <p>1 point</p> |

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| <p><b>PREREQ.02: Environmental Tobacco Smoke (ETS) Control</b></p> <p>Prevent the exposure of nonsmokers to ETS by prohibiting smoking in the building, OR, providing separate smoking rooms with isolated ventilation systems.</p> | <p><b>PREREQ.03: Green Cleaning Policy</b></p> <p>Follow a green cleaning policy to reduce the exposure of building occupants and maintenance personnel to potentially hazardous chemicals, biological, and particulate contaminants, which affect air quality, human health, building finishes, building systems and the environment.</p> | <p><b>Green Cleaning: Entryway System</b></p> <p>Maintain green cleaning plan to reduce the exposure of occupants and maintenance personnel to potentially hazardous chemical, biological and particulate contaminants, by using entryway systems (grilles, grates, mats) to reduce the amount of dirt, dust, pollen and other particles entering the building at all public entryways.</p> <p>1 point</p> | <p><b>Green Cleaning: Indoor Integrated Pest Management</b></p> <p>Implement and maintain an indoor integrated pest management (IPM) plan, to manage indoor pests in a way that protects human health and surrounding environments.</p> <p>1 point</p> |
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| <p><b>EQ CREDIT 4: Low-Emitting Materials</b></p> <p>It is intended as a credit in the stage of design and construction to reduce the quantity of indoor air contaminants that are odorous or potentially irritating to provide installer and occupant health and comfort, by meeting or exceeding VOC limits for adhesive, sealants, paints, composite wood products and carpet systems.</p> <p>1-4 points</p> | <p><b>HW 03: Low-Emitting Materials</b></p> <p>Reduce the quantity of indoor air contaminants that are odorous or potentially irritating to provide installer and occupant health and comfort, by meeting or exceeding VOC limits for adhesive, sealants, paints, composite wood products and carpet systems.</p> <p>1-4 points</p>  | <p><b>Volatile Organic Compounds</b></p> <p>Reduce the quantity of indoor air contaminants that are odorous or potentially irritating to provide installer and occupant health and comfort, by meeting VOC limits for adhesive, sealants, paints, composite wood products and carpet systems.</p> <p>1 - 3 points</p> | <p><b>EQ CREDIT 1.4: IAQ Best Management Practices: Reduce Particulates in Air Distribution</b></p> <p>It is intended as a credit in the stage of building's operation to maintain filtration media with potentially hazardous particulate removal effectiveness, that allows to reduce exposure of building occupants and maintenance personnel.</p> <p>1 points</p>   | <p><b>IAQ Best Management Practices: Reduce Particulates in Air Distribution</b></p> <p>Maintain filtration media with potentially hazardous particulate contaminant removal effectiveness, that allows to reduce exposure of building occupants and maintenance personnel.</p> <p>1 point</p>   |
| <p><b>EQ CREDIT 3: Construction IAQ Management Plan</b></p> <p>It is intended as a credit in the stage of design and development to create and implement an IAQ management plan for the construction/renovation and preoccupancy phases of the building, to prevent IAQ problems, in order to sustain long term installer and occupant health and comfort.</p> <p>1-2 points</p>                                | <p><b>HW 04: Construction IAQ Management Plan</b></p> <p>It is intended as a credit in the stage of design and development to create and implement an IAQ management plan for the construction/renovation and preoccupancy phases of the building, to prevent IAQ problems, in order to sustain long term installer and occupant health and comfort.</p> <p>1-2 points</p> | <p><b>Refurbishment Policies</b></p> <p>Prevent indoor air quality problems resulting from any construction or renovation projects and thus help sustain the comfort and well being of construction workers and building occupants.</p> <p>1 - 3 points</p>   | <p><b>EQ CREDIT 1.5: IAQ Best Management Practices: Management for Facility Alterations and additions</b></p> <p>It is intended as a credit in the stage of building's operation to developed and implement an IAQ management plan for the construction and renovation phases to prevent indoor air quality problems resulting from any construction or renovation projects and thus help sustain the comfort and well being of construction workers and building occupants.</p> <p>1 points</p>        | <p><b>IAQ Best Management Practices: Management for Facility Alterations and additions</b></p> <p>Maintain filtration media with potentially hazardous particulate contaminant removal effectiveness, that allows to reduce exposure of building occupants and maintenance personnel.</p> <p>1 point</p>   |
| <p><b>Hea 03: Thermal Comfort</b></p> <p>It is intended as a credit in the design stage to ensure that appropriate comfort levels are achieved through design, and controls are selected to maintain a thermally comfortable environment for occupants within the building.</p> <p>1 - 2 points</p>   | <p><b>EQ CREDIT 7: Thermal Comfort</b></p> <p>It is intended as a credit in the stage of design to create a thermally comfortable environment that supports the productive and healthy performance of the building occupant, by designing the building envelope and HVAC system to maintain good comfort ranges.</p> <p>1-2 points</p>                                     | <p><b>Thermal Control</b></p> <p>Ensure that the building achieves a thermally comfortable environment for its occupants.</p> <p>1 - 2,5 points</p>   | <p><b>EQ CREDIT 2.3: Occupant Comfort: Thermal Comfort Monitoring</b></p> <p>It is intended as a credit in the stage of building's operation to have a permanent monitoring system that supports the appropriate operations and maintenance of buildings and building systems so that they continue to meet target building performance goals over the long term and provide a comfortable thermal environment that supports the productivity and well-being of building occupants.</p> <p>1 points</p> | <p><b>Occupant Comfort: Thermal Comfort Monitoring</b></p> <p>Maintain a permanent monitoring system that supports the appropriate operations of the building and its systems so that they continue to meet target building performance goals over the long term and provide a comfortable thermal environment that supports the productivity and well-being of building occupants.</p> <p>1 point</p> |
| <p><b>EQ CREDIT 2: Increase Ventilation Effectiveness</b></p> <p>It is intended as a credit in the design stage to design the HVAC system and building envelope to optimize air change effectiveness, in order to provide an effective delivery and mixing of fresh air to support the health, safety, and comfort of building occupants.</p> <p>1 points</p>   | <p><b>EQ CREDIT 2: Increase Ventilation Effectiveness</b></p> <p>It is intended as a credit in the design stage to design the HVAC system and building envelope to optimize air change effectiveness, in order to provide an effective delivery and mixing of fresh air to support the health, safety, and comfort of building occupants.</p> <p>1 points</p>              |   |   |  |

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| <p><b>Hea 05: Acoustic Performance</b><br/>It is intended as a credit in the design stage to ensure the buildings' acoustic performance including sound insulation meet the appropriate standard for its purpose.</p> <p>1 - 4 points</p>   |  | <p><b>HW 06: Acoustic Performance</b><br/>Ensure the buildings' acoustic performance including sound insulation meet the appropriate standard for its purpose</p> <p>1-4 points</p>  | <p><b>Acoustic Performance</b><br/>Ensure that the building achieves a good acoustic performance including sound insulation meet the appropriate standard for its purpose</p> <p>1 - 2,5 points</p>   |   |  |   |
| <p><b>Hea 04: Water Quality</b><br/>It is intended as a credit in the design stage to minimize the risk of water contamination in building services and ensure the provision of clean, fresh sources of water for buildings users.</p> <p>1 point</p>   |  | <p><b>HW 07: Water Quality</b><br/>Minimize the risk of water contamination in building services and ensure the provision of clean, fresh sources of water for buildings users.</p> <p>1 point</p>   | <p><b>Drinking Water Provision</b><br/>Ensure the provision of clean, fresh sources of water for buildings users.</p> <p>1 - 2,5 points</p>   |   |  |   |
| <p><b>Hea 06: Safety and Security</b><br/>It is intended as a credit in the design stage to recognize and encourage effective design measures that promote low risk, safe and secure access to and use of the building.</p> <p>1 - 2 points</p>   |  | <p><b>HW 08: Safety and Security</b><br/>Recognize and encourage effective design measures that promote low risk, safe and secure access to and use of the building.</p> <p>1 - 2 points</p>   | <p><b>Outdoor Space</b><br/>Ensure that outdoors are no heat islands and are free of potentially hazardous chemical, biological and particulate contaminants, which adversely affect exterior air quality and temperature.</p> <p>1 - 2 points</p>  |   |  |   |
| <p><b>EQ CREDIT 6: Controllability of Systems</b><br/>It is intended as a credit in the stage of design to provide a high level of individual occupant control of thermal, ventilation and lighting system support optimum health, productivity and comfort conditions, by designing the building with occupant control for airflow, temperature and lightning.</p> <p>1-2 points</p> |  | <p><b>HW 09: Controllability of Systems</b><br/>Provide a high level of individual occupant control of thermal, ventilation and lighting system support optimum health, productivity and comfort conditions, by designing the building with occupant control for airflow, temperature and lightning.</p> <p>1 - 2 points</p> | <p><b>Occupant Satisfaction Survey</b><br/>Provide for the assessment of building occupants' comfort, acoustic, indoor air quality, lighting levels, building cleanliness and any other comfort issues, by conducting occupant surveys for identifying and addressing these issues.</p> <p>1 - 3 points</p> | <p><b>Staff Development</b><br/>Ensure there is a understanding and implementation of the minimum health and wellbeing standards for the buildings environment.</p> <p>1 - 3 points</p>   | <p><b>EQ CREDIT 2.1: Occupant Survey</b><br/>It is intended as a credit in the stage of building's operation to provide for the assessment of building occupants' comfort, acoustic, indoor air quality, lighting levels, building cleanliness and any other comfort issues, by conducting occupant surveys for identifying and addressing these issues.</p> <p>1 points</p> | <p><b>Staff Development</b><br/>Ensure there is a understanding and implementation of the minimum health and wellbeing standards for the buildings environment.</p> <p>1 - 3 points</p>   |
| <p><b>EQ CREDIT 6: Controllability of Systems</b><br/>It is intended as a credit in the stage of design to provide a high level of individual occupant control of thermal, ventilation and lighting system support optimum health, productivity and comfort conditions, by designing the building with occupant control for airflow, temperature and lightning.</p> <p>1-2 points</p> |  | <p><b>HW 09: Controllability of Systems</b><br/>Provide a high level of individual occupant control of thermal, ventilation and lighting system support optimum health, productivity and comfort conditions, by designing the building with occupant control for airflow, temperature and lightning.</p> <p>1 - 2 points</p> | <p><b>Occupant Satisfaction Survey</b><br/>Provide for the assessment of building occupants' comfort, acoustic, indoor air quality, lighting levels, building cleanliness and any other comfort issues, by conducting occupant surveys for identifying and addressing these issues.</p> <p>1 - 3 points</p> | <p><b>Staff Feedback Mechanism</b><br/>Ensure there is a dynamic system of claims and suggestions to allow a good feedback for maintenance.</p> <p>1 - 3 points</p>   | <p><b>EQ CREDIT 2.2: Occupant-Controlled Lighting</b><br/>It is intended as a credit in the stage of building's operation to implement system and occupant control of ambient and task lighting to suit individual preferences and the needs of specific tasks, to promote the productivity, comfort and well-being of building occupants.</p> <p>1 points</p>               | <p><b>Staff Feedback Mechanism</b><br/>Ensure there is a dynamic system of claims and suggestions to allow a good feedback for maintenance.</p> <p>1 - 3 points</p>   |
| <p><b>EQ CREDIT 6: Controllability of Systems</b><br/>It is intended as a credit in the stage of design to provide a high level of individual occupant control of thermal, ventilation and lighting system support optimum health, productivity and comfort conditions, by designing the building with occupant control for airflow, temperature and lightning.</p> <p>1-2 points</p> |  | <p><b>HW 09: Controllability of Systems</b><br/>Provide a high level of individual occupant control of thermal, ventilation and lighting system support optimum health, productivity and comfort conditions, by designing the building with occupant control for airflow, temperature and lightning.</p> <p>1 - 2 points</p> | <p><b>Occupant Comfort: Occupant Survey</b><br/>Provide for the assessment of building occupants' comfort, acoustic, indoor air quality, lighting levels, building cleanliness and any other comfort issues, by conducting occupant surveys for identifying and addressing these issues.</p> <p>1 point</p> | <p><b>Occupant Comfort: Occupant-Controlled Lighting</b><br/>Implement system and occupant control of ambient and task lighting to suit individual preferences and the needs of specific tasks, to promote the productivity, comfort and well-being of building occupants.</p> <p>1 point</p> |  | <p><b>Occupant Comfort: Occupant Survey</b><br/>Provide for the assessment of building occupants' comfort, acoustic, indoor air quality, lighting levels, building cleanliness and any other comfort issues, by conducting occupant surveys for identifying and addressing these issues.</p> <p>1 point</p> |

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|  | <p><b>EQ CREDIT 1: Carbon Dioxide (CO2) Monitoring</b></p> <p>It is intended as a credit in the design stage to provide capacity for indoor air quality (IAQ) monitoring to sustain long-term occupant health and comfort, by installing a permanent CO2 monitoring system that provides feedback on ventilation performance.</p> <p>1 point</p> | <p><b>HW 10: Carbon Dioxide (CO2) Monitoring</b></p> <p>Provide capacity for indoor air quality (IAQ) monitoring to sustain long-term occupant health and comfort, by installing a permanent CO2 monitoring system that provides feedback on ventilation performance.</p> <p>1 point</p> |  |  | <p><b>Targeting and Monitoring</b></p> <p>Monitor, identify and solve problems that jeopardies the health and wellbeing of occupants</p> <p>1 - 3 points</p> | <p><b>EQ CREDIT 1.2: IAQ Best Management Practices: Outdoor Air Delivery Monitoring</b></p> <p>It is intended as a credit in the stage of building's operation to have continuous monitoring systems that provide feedback on ventilation system performance to help sustain occupants comfort and well being.</p> <p>1 points</p> | <p><b>IAQ Best Management Practices: Outdoor Air Delivery Monitoring</b></p> <p>Maintain a continuous monitoring systems that provide feedback on ventilation system performance to help sustain occupants comfort and well being.</p> <p>1 point</p> <p>1 - 3 points</p> |  | <p><b>EQ CREDIT 1.1: Carbon Dioxide (CO2) Monitoring</b></p> <p>It is intended as a credit in the design stage to provide capacity for indoor air quality (IAQ) monitoring to sustain long-term occupant health and comfort, by installing a permanent CO2 monitoring system that provides feedback on ventilation performance.</p> <p>1 point</p> |  |  | <p><b>Management Training</b></p> <p>Ensure that the personnel of maintenance are well trained to understand and implement an efficient health and wellbeing management and control.</p> <p>1 - 3 points</p> | <p><b>EQ CREDIT 1.1: IAQ Best Management Practices: IAQ Management Program</b></p> <p>It is intended as a credit in the stage of building's operation to developed an ongoing IAQ management program to enhance indoor air quality (IAQ) by optimizing practices to prevent the development of indoor air quality problems in buildings, correcting them when they occur, and maintaining the well being of all occupants.</p> <p>1 points</p> | <p><b>IAQ Best Management Practices: IAQ Management Program</b></p> <p>Maintain and developed an ongoing IAQ management program to enhance IAQ by optimizing practices to prevent the development of indoor air quality problems in buildings, correcting them when they occur, and maintaining the well being of all occupants.</p> <p>1 point</p> <p>1 - 3 points</p> |  |  |  |  | <p><b>Stakeholder Engagement</b></p> <p>To promote the participation of stakeholder in the decisions and action taken to improve environmental quality of the building.</p> <p>1 - 3 points</p> | <p><b>Stakeholder Engagement</b></p> <p>To promote the participation of stakeholder in the decisions and action taken to improve environmental quality of the building.</p> <p>1 - 3 points</p> | <p><b>Stakeholder Engagement</b></p> <p>To promote the participation of stakeholder in the decisions and action taken to improve environmental quality of the building.</p> <p>1 - 3 points</p> |  |  |  |  | <p><b>EQ CREDIT 3.1: Green Cleaning: High-Performance Cleaning Program</b></p> <p>It is intended as a credit in the stage of building's operation to reduce the exposure of occupants and maintenance personnel to potentially hazardous chemical, biological and particulate contaminants, by having a high-performance cleaning program, supported by a green cleaning policy.</p> <p>1 points</p> | <p><b>Green Cleaning: High-Performance Cleaning Program</b></p> <p>Reduce the exposure of occupants and maintenance personnel to potentially hazardous chemical, biological and particulate contaminants, by having a high-performance cleaning program, supported by a green cleaning policy.</p> <p>1 point</p> | <p><b>Green Cleaning: High-Performance Cleaning Program</b></p> <p>Reduce the exposure of occupants and maintenance personnel to potentially hazardous chemical, biological and particulate contaminants, by having a high-performance cleaning program, supported by a green cleaning policy.</p> <p>1 point</p> <p>1 - 3 points</p> |
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| SUSTAINABLE SITE   |   | REHABILITATION PROFILE: Assessment Tool  |  |
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| BREEAM for New Buildings   | LEED FOR New Construction and Major Renovations   | PHYSICAL PERFORMANCE   |  |
| <p><b>LE 01: Site Selection</b></p> <p>It is intended as a credit in the design stage to encourage the use of previously developed and/or contaminated land and avoid land which has not been previously disturbed.</p> <p>1-2 points</p>  | <p><b>SS CREDIT 1: Site Selection</b></p> <p>It is intended as a credit in the stage of preparation to pursue an appropriate site selection for the project development, in this way reducing environmental impact from the building's location.</p> <p>1 point</p>   | <p><b>SS 01: Site Selection</b></p> <p>Appropriate site selection for the construction of the building, to reduce environmental impact from the building's location.</p> <p>1-2 points</p>   |  |
| <p><b>LE 02: Ecological value of site and protection of ecological features</b></p> <p>It is intended as a credit in the design stage to encourage development on land that already has limited value to wildlife and to protect existing ecological features from substantial damage during site preparation and completion of construction works.</p> <p>1 point</p> | <p><b>SS CREDIT 2: Urban Redevelopment</b></p> <p>Intended as a credit in stage of preparation or pre-design to encourage the selection of the site to be in urban areas with existing infrastructure, in order to protect greenfield and preserve habitat and natural recourses.</p> <p>1 point</p>                      | <p><b>SS 02: Urban Redevelopment</b></p> <p>Encourage the selection of the site to be in urban areas with existing infrastructure, in order to protect greenfield and preserve habitat and natural recourses.</p> <p>1 point</p>   |  |
| <p><b>LE 03: Mitigating ecological impact</b></p> <p>It is intended as a credit in the design stage to minimise the impact of a building development on existing site ecology.</p> <p>1-2 points</p>   | <p><b>SS CREDIT 3: Brownfield Redevelopment</b></p> <p>Intended as a credit in stage of preparation or pre-design (site selection) to encourage damage site rehabilitation and reduce the pressure of undeveloped land.</p> <p>1 point</p>  | <p><b>SS 03: Ecological value of site and protection of ecological features</b></p> <p>It is intended as a credit in the design stage to encourage development on land that already has limited value to wildlife, encourage damage site rehabilitation and brownfield redevelopment and and reduce the pressure of undeveloped land.</p> <p>1 - 9.5 points</p>                    |  |
|  | <p><b>SS CREDIT 5: Reduced Site Disturbance</b></p> <p>Intended credit in the stage of design and planning in order to limit site disturbance during and after the construction, with the purpose of conserving natural areas and restore damage areas to provide habitat and promote biodiversity.</p> <p>1-2 points</p> | <p><b>SS 04: Reduced Site Disturbance and Enhance Site Ecology</b></p> <p>Intended credit in the stage of design and planning in order to limit site disturbance and reduce the development footprint, during and after the construction, with the purpose of conserving natural areas and restore damage areas to provide habitat and promote biodiversity.</p> <p>1-2 points</p> |  |

| SUSTAINABLE SITE  |   | REHABILITATION PROFILE: Assessment Tool   |   |
|---|---|---|---|
| BREEAM In Use   | LEED Existing Buildings: Operation and Management   | BUILDING MANAGEMENT RATING  | ORGANISATIONAL RATING   |
| ASSET RATING  | BUILDING MANAGEMENT RATING  | ORGANISATIONAL RATING   | BUILDING MANAGEMENT RATING  |
|   | <p><b>SS CREDIT 1: LEED Certified Design and Construction</b></p> <p>It is intended as a credit to reward buildings that were certified during their stage of design and construction.</p> <p>1 point</p>   |   | <p><b>Green Label' Certified Design and Construction</b></p> <p>Recognize and reward buildings that were certified during their stage of design and construction.</p> <p>1 point</p>  |
|   |   |   |   |
| <p><b>Ecological Value</b></p> <p>Recognize the development of project on land that already has limited value to wildlife and to protect existing ecological features from substantial damage during site preparation and completion of construction works.</p> <p>1 - 9.5 points</p> |   | <p><b>Enhancement of Ecological Value</b></p> <p>Ensure that occupants and maintenance personnel understand and enhance the value to wildlife and to protect existing ecological features from substantial damage during the operation and maintenance of the building.</p> <p>1 - 2 points</p> | <p><b>Enhancement of Ecological Value</b></p> <p>Ensure that occupants and maintenance personnel understand and enhance the value to wildlife and to protect existing ecological features from substantial damage during the operation and maintenance of the building.</p> <p>1 - 2 points</p> |
|   | <p><b>SS CREDIT 5: Reduced Site Disturbance: Protect or Restore Open Space</b></p> <p>Intended credit in the stage of building's operation to develop management plans that will restore damage site areas and conserve existing natural site areas to provide habitat and promote biodiversity.</p> <p>1 point</p> |   | <p><b>Reduced Site Disturbance: Protect or Restore Open Space</b></p> <p>Encourage the development of management plans that will restore damage site areas and conserve existing natural site areas to provide habitat and promote biodiversity.</p> <p>1-point</p>                             |

|   |   |   |   |  |
|---|---|---|---|--|
| <p><b>LE 04: Enhancing Site Ecology</b></p> <p>It is intended as a credit to recognise and encourage actions taken during the design stage to maintain and enhance the ecological value of the site as a result of development.</p> <p>1-3 points</p>   | <p><b>SS PREREQ1: Erosion and Sedimentation Control</b></p> <p>Required as a prerequisite during the stage of construction to prevent storm water run-off and/or wind erosion, sedimentation or air pollution with dust and particles on site.</p>  | <p><b>SS PREREQ1: Erosion and Sedimentation Control</b></p> <p>Required as a prerequisite during the stage of construction to prevent storm water run-off and/or wind erosion, sedimentation or air pollution with dust and particles on site.</p>  | <p><b>Ecological Survey</b></p> <p>Maintain and enhance the ecological value of the site by implementing constant surveys to ensure protection.</p> <p>1 - 6.5 points</p>   | <p><b>Biodiversity Survey of Site</b></p> <p>Ensure that the maintenance personnel implement permanent surveys to evaluate to condition of biodiversity in the sight.</p> <p>1,5 points</p>  |
| <p><b>LE 05: Long Term Impact on Biodiversity</b></p> <p>It is intended as a credit in the design stage to minimise the long term impact of the development on the site and the surrounding area's biodiversity, by protecting and enhancing ecological landscape and habitat.</p> <p>1-2 points</p>                                  | <p><b>SS PREREQ1: Erosion and Sedimentation Control</b></p> <p>Required as a prerequisite during the stage of construction to prevent storm water run-off and/or wind erosion, sedimentation or air pollution with dust and particles on site.</p>  | <p><b>SS PREREQ1: Erosion and Sedimentation Control</b></p> <p>Required as a prerequisite during the stage of construction to prevent storm water run-off and/or wind erosion, sedimentation or air pollution with dust and particles on site.</p>  | <p><b>Biodiversity Action Plan</b></p> <p>Maintain and enhance a biodiversity action plan minimize the long term impact of the operation and maintenance of the building.</p> <p>1 - 6.5 points</p>   | <p><b>Biodiversity Survey of Site</b></p> <p>Ensure that the maintenance personnel implement permanent surveys to evaluate to condition of biodiversity in the sight.</p> <p>1,5 points</p>  |
| <p><b>LE 05: Long Term Impact on Biodiversity</b></p> <p>It is intended as a credit in the design stage to minimise the long term impact of the development on the site and the surrounding area's biodiversity, by protecting and enhancing ecological landscape and habitat.</p> <p>1-2 points</p>                                  | <p><b>SS 05: Long Term Impact on Exterior &amp; Biodiversity</b></p> <p>It is intended as a credit in the design stage to minimise the long term impact of the development on the site and the surrounding area's biodiversity, by protecting and enhancing ecological landscape and habitat.</p> <p>1-2 points</p>                   | <p><b>SS 06: Landscape and Exterior Design to Reduce Heat Islands</b></p> <p>Intended credit in the stage of design to create external areas that will reduce and prevent heat islands, in order to minimize impacts on microclimate and human and wild life habitat.</p> <p>1-2 points</p>   | <p><b>Biodiversity Action Plan</b></p> <p>Maintain and enhance a biodiversity action plan minimize the long term impact of the operation and maintenance of the building.</p> <p>1 - 6.5 points</p>   | <p><b>Biodiversity Survey of Site</b></p> <p>Ensure that the maintenance personnel implement permanent surveys to evaluate to condition of biodiversity in the sight.</p> <p>1,5 points</p>  |
| <p><b>Pol 03: Surface Water Run-off</b></p> <p>It is intended as a credit in the design stage to avoid, reduce and delay the discharge of rainfall to public sewers and water courses, therefore minimizing risk of localized flooding on and off site, watercourses pollution and other environmental damage.</p>                    | <p><b>SS 07: Storm Water Management</b></p> <p>Intended credit in the stage of design to create strategies for the future operating building, that will maintain natural stormwater flows by promoting infiltration, minimizing water runoff and reducing contaminants.</p> <p>1-5 points</p>   | <p><b>SS 07: Storm Water Management</b></p> <p>Intended credit in the stage of design to create strategies for the future operating building, that will maintain natural stormwater flows by promoting infiltration, minimizing water runoff and reducing contaminants.</p> <p>1-5 points</p>   | <p><b>Ground/Water Pollution Control Measures</b></p> <p>Guaranty the efficiency of the building to control chemicals into ground and water.</p> <p>1 - 2.5 points</p>  | <p><b>Flood Risk</b></p> <p>Evaluate the buildings' capacity to manage and store rainfall water to minimize risk of localized flooding on and off site.</p> <p>1 - 2 points</p>  |
| <p><b>SS CREDIT 6: Storm Water Management</b></p> <p>Intended credit in the stage of design to create strategies for the future operating building, that will maintain natural stormwater flows by promoting infiltration, minimizing water runoff and reducing contaminants.</p> <p>1-2 points</p>                                   | <p><b>SS CREDIT 6: Storm Water Management</b></p> <p>Intended credit in the stage of design to create strategies for the future operating building, that will maintain natural stormwater flows by promoting infiltration, minimizing water runoff and reducing contaminants.</p> <p>1-2 points</p>                                   | <p><b>SS CREDIT 6: Storm Water Management</b></p> <p>Intended credit in the stage of design to create strategies for the future operating building, that will maintain natural stormwater flows by promoting infiltration, minimizing water runoff and reducing contaminants.</p> <p>1-2 points</p>                                   | <p><b>Management/Maintenance of Ground Water Pollution Control Measures</b></p> <p>Implement a monitoring system that will allow to measure and control any hazardous chemical leakage into ground and water.</p> <p>1 - 2 points</p>                               | <p><b>Flood Risk Management plan and Procedures</b></p> <p>Implement rainfall water control systems and infrastructure that will prevent the risk of localized flooding on and off site.</p> <p>1 - 2 points</p>   |
| <p><b>SS CREDIT 3: Storm Water Management</b></p> <p>Intended credit in the stage of design to create strategies for the future operating building, that will maintain natural stormwater flows by promoting infiltration, minimizing water runoff and reducing contaminants.</p> <p>1-2 points</p>                                   | <p><b>SS CREDIT 3: Storm Water Management</b></p> <p>Intended credit in the stage of design to create strategies for the future operating building, that will maintain natural stormwater flows by promoting infiltration, minimizing water runoff and reducing contaminants.</p> <p>1-2 points</p>                                   | <p><b>SS CREDIT 3: Storm Water Management</b></p> <p>Intended credit in the stage of design to create strategies for the future operating building, that will maintain natural stormwater flows by promoting infiltration, minimizing water runoff and reducing contaminants.</p> <p>1-2 points</p>                                   | <p><b>Management/Maintenance of Ground Water Pollution Control Measures</b></p> <p>Implement a monitoring system that will allow to measure and control any hazardous chemical leakage into ground and water.</p> <p>1 - 2 points</p>                               | <p><b>Flood Risk Management plan and Procedures</b></p> <p>Implement rainfall water control systems and infrastructure that will prevent the risk of localized flooding on and off site.</p> <p>1 - 2 points</p>   |
| <p><b>SS CREDIT 2: Storm Water Management</b></p> <p>Intended credit in the stage of design to create strategies for the future operating building, that will maintain natural stormwater flows by promoting infiltration, minimizing water runoff and reducing contaminants.</p> <p>1-2 points</p>                                   | <p><b>SS CREDIT 2: Storm Water Management</b></p> <p>Intended credit in the stage of design to create strategies for the future operating building, that will maintain natural stormwater flows by promoting infiltration, minimizing water runoff and reducing contaminants.</p> <p>1-2 points</p>                                   | <p><b>SS CREDIT 2: Storm Water Management</b></p> <p>Intended credit in the stage of design to create strategies for the future operating building, that will maintain natural stormwater flows by promoting infiltration, minimizing water runoff and reducing contaminants.</p> <p>1-2 points</p>                                   | <p><b>Management/Maintenance of Ground Water Pollution Control Measures</b></p> <p>Implement a monitoring system that will allow to measure and control any hazardous chemical leakage into ground and water.</p> <p>1 - 2 points</p>                               | <p><b>Flood Risk Management plan and Procedures</b></p> <p>Implement rainfall water control systems and infrastructure that will prevent the risk of localized flooding on and off site.</p> <p>1 - 2 points</p>   |
| <p><b>SS CREDIT 7: Heat Islands Reduction</b></p> <p>Intended credit for the stage of building's operation to employ strategies, materials and landscaping techniques that reduce heat absorption of external existing materials, in order to minimize impacts on microclimate and human and wild life habitat.</p> <p>1-2 points</p> | <p><b>SS CREDIT 7: Heat Islands Reduction</b></p> <p>Intended credit for the stage of building's operation to employ strategies, materials and landscaping techniques that reduce heat absorption of external existing materials, in order to minimize impacts on microclimate and human and wild life habitat.</p> <p>1-2 points</p> | <p><b>SS CREDIT 7: Heat Islands Reduction</b></p> <p>Intended credit for the stage of building's operation to employ strategies, materials and landscaping techniques that reduce heat absorption of external existing materials, in order to minimize impacts on microclimate and human and wild life habitat.</p> <p>1-2 points</p> | <p><b>Heat Islands Reduction</b></p> <p>Maintain strategies, materials and landscaping techniques that reduce heat absorption of external existing materials, in order to minimize impacts on microclimate and human and wild life habitat.</p> <p>1 - 6 points</p> | <p><b>Biodiversity Action Plan</b></p> <p>Maintain and enhance a biodiversity action plan to encourage environmentally sensitive building exterior and hardscape management practices that provide a clean, well-maintained and safe building exterior while supporting high-performance building operations.</p> <p>1 point</p> |
| <p><b>Biodiversity Survey of Site</b></p> <p>Ensure that the occupants and maintenance personnel understand and implement the biodiversity action plan.</p> <p>1,5 points</p>   | <p><b>Biodiversity Survey of Site</b></p> <p>Ensure that the occupants and maintenance personnel understand and implement the biodiversity action plan.</p> <p>1,5 points</p>   | <p><b>Biodiversity Survey of Site</b></p> <p>Ensure that the occupants and maintenance personnel understand and implement the biodiversity action plan.</p> <p>1,5 points</p>   | <p><b>Management/Maintenance of Ground Water Pollution Control Measures</b></p> <p>Ensure that there is a constant follow up of the monitoring system to prevent any hazardous chemical leakage into ground and water.</p> <p>1 - 2.5 points</p>                    | <p><b>Flood Risk Management plan and Procedures</b></p> <p>Ensure that the maintenance personnel carry out an efficient rainfall management and maintenance of the control system facilities.</p> <p>1 - 2 points</p>  |
| <p><b>Biodiversity Survey of Site</b></p> <p>Ensure that the occupants and maintenance personnel understand and implement the biodiversity action plan.</p> <p>1,5 points</p>   | <p><b>Biodiversity Survey of Site</b></p> <p>Ensure that the occupants and maintenance personnel understand and implement the biodiversity action plan.</p> <p>1,5 points</p>   | <p><b>Biodiversity Survey of Site</b></p> <p>Ensure that the occupants and maintenance personnel understand and implement the biodiversity action plan.</p> <p>1,5 points</p>   | <p><b>Management/Maintenance of Ground Water Pollution Control Measures</b></p> <p>Ensure that there is a constant follow up of the monitoring system to prevent any hazardous chemical leakage into ground and water.</p> <p>1 - 2.5 points</p>                    | <p><b>Flood Risk Management plan and Procedures</b></p> <p>Ensure that the maintenance personnel carry out an efficient rainfall management and maintenance of the control system facilities.</p> <p>1 - 2 points</p>  |

|   |   |  |   |  |   |   |   |   |   |   |   |   |   |  |   |
|---|---|--|---|--|---|---|---|---|---|---|---|---|---|--|---|
| <p><b>Pol 04: Reduction of Night time Light Pollution</b></p> <p>1-5 points</p> <p>It is intended as a credit in the design stage to ensure that external lighting is concentrated in the appropriate areas and that upward lighting is minimized, reducing unnecessary light pollution and nuisance to neighboring properties.</p> | <p><b>SS CREDIT 8: Light Pollution Reduction</b></p> <p>1-2 points</p> <p>Intended credit in the stage of design to implement site lighting criteria that will eliminate light trespass from the building site, improve night sky access, and reduce development impact on nocturnal environment.</p> | <p><b>Pol 05: Noise Attenuation</b></p> <p>1 point</p> <p>It is intended as a credit in the design stage to reduce the like hood of noise from the new development affecting nearby noise-sensitive buildings.</p> | <p><b>SS 08: Light Pollution Reduction</b></p> <p>1 point</p> <p>It is intended as a credit in the design stage to ensure that external lighting is concentrated in the appropriate areas and that upward lighting is minimized, reducing unnecessary light pollution, energy consumption and nuisance to neighboring properties.</p> | <p><b>Flood Management Facilities</b></p> <p>Ensure that the building counts with management practices and control structures and areas to drain surface water in a sustainable fashion.</p> <p>1 - 2 points</p> | <p><b>Light Pollution control</b></p> <p>1 point</p> <p>Implement programs to ensure lightning control systems and/or implement site lighting criteria that will eliminate light trespass from the building site, improve night sky access, and reduce development impact on nocturnal environment.</p> | <p><b>Maintenance Procedures/Plans</b></p> <p>1 - 2 points</p> <p>Implement management procedures that will measure and prevent noise from the buildings' operation to affect neighboring properties.</p> | <p><b>SS 09: Noise Attenuation</b></p> <p>1 point</p> <p>It is intended as a credit in the design stage to reduce the like hood of noise from the new development affecting nearby noise-sensitive buildings.</p> | <p><b>Light Pollution control</b></p> <p>1 point</p> <p>Implement programs to ensure lightning control systems and/or implement site lighting criteria that will eliminate light trespass from the building site, improve night sky access, and reduce development impact on nocturnal environment.</p> | <p><b>Light Pollution Reduction</b></p> <p>1 point</p> <p>Intended credit in the stage of building's operation to implement programs to ensure lightning control systems and/or implement site lighting criteria that will eliminate light trespass from the building site, improve night sky access, and reduce development impact on nocturnal environment.</p> | <p><b>Maintenance Procedures/Plans</b></p> <p>1 - 2 points</p> <p>Implement management procedures that will measure and prevent noise from the buildings' operation to affect neighboring properties.</p> | <p><b>Light Pollution control</b></p> <p>1 point</p> <p>Implement programs to ensure lightning control systems and/or implement site lighting criteria that will eliminate light trespass from the building site, improve night sky access, and reduce development impact on nocturnal environment.</p> | <p><b>Light Pollution control</b></p> <p>1 point</p> <p>Implement programs to ensure lightning control systems and/or implement site lighting criteria that will eliminate light trespass from the building site, improve night sky access, and reduce development impact on nocturnal environment.</p> | <p><b>Maintenance Procedures/Plans</b></p> <p>1 - 2 points</p> <p>Implement management procedures that will measure and prevent noise from the buildings' operation to affect neighboring properties.</p> | <p><b>SS CREDIT 8: Light Pollution Reduction</b></p> <p>1 point</p> <p>Intended credit in the stage of building's operation to implement programs to ensure lightning control systems and/or implement site lighting criteria that will eliminate light trespass from the building site, improve night sky access, and reduce development impact on nocturnal environment.</p> | <p><b>Maintenance Procedures/Plans</b></p> <p>1 - 2 points</p> <p>Implement management procedures that will measure and prevent noise from the buildings' operation to affect neighboring properties.</p> |
| <p><b>Possible Points:</b></p> <p>10</p>  | <p>10</p>   | <p>10</p>  | <p>10</p>   | <p>9,5</p>   | <p>12,5</p>   | <p>10</p>   | <p>8</p>  | <p>9,5%</p>   | <p>12,5%</p>  | <p>5,0%</p>   | <p>0,0%</p>   | <p>23,5</p>   | <p>0,0%</p>   | <p>9,5</p>   | <p>0,0%</p>   |
| <p><b>Environmental Section Weighting</b></p> <p>10,0%</p>  | <p>10,0%</p>  | <p>10,0%</p>   | <p>10,0%</p>  | <p>23,5</p>  | <p>0,0%</p>   | <p>9,5</p>  | <p>0,0%</p>   | <p>23,5</p>   | <p>0,0%</p>   | <p>9,5</p>  | <p>0,0%</p>   |   |   |  |   |

# TRANSPORT

# TRANSPORT

| BREEAM for New Buildings |  | LEED for New Construction and Major Renovations  |  | REHABILITATION PROFILE: Assessment Tool  |   | BREEAM In Use       |                     | LEED Existing Buildings: Operation and Management |                     | REHABILITATION PROFILE: Assessment Tool |                       |
|--------------------------|--|--|--|--|---|---------------------|---------------------|---|---------------------|---|-----------------------|
| BREEAM for New Buildings |  | LEED for New Construction and Major Renovations  |  | PHYSICAL PERFORMANCE Assessment Tool   |   | ASSET RATING        |                     | BUILDING MANAGEMENT RATING                        |                     | ORGANISATIONAL RATING                   |                       |
| <b>Tra 01:</b>           | <b>Public Transport Accessibility</b><br>It is intended as a credit in the design stage to recognise and encourage development in proximity of good public transport networks, thereby helping to reduce transport-related pollution and congestion.   | <b>SS CREDIT 4:</b> <b>Alternative Transportation</b><br>Intended as a credit in stage of preparation (site selection) and design to encourage ideas and strategies that will prevent and/or reduce pollution and land development impacts from automobile use.  | <b>TR 01:</b> <b>Public Transport Accessibility</b><br>It is intended as a credit in the design stage to recognise and encourage development in proximity of good public transport networks, thereby helping to reduce transport-related pollution and congestion.   | <b>Accessability/availability to Public Transport</b><br>Recognise and encourage development in proximity of good public transport networks.   | <b>SS CREDIT 4:</b> <b>Alternative Transportation</b><br>Intended as a credit in stage of buildings operation in order to implement strategies to encourage the use of alternative transportation for commuting trips in order to reduce pollution and land development impacts from conventional automobile use. | <b>1 - 6 points</b> | <b>1 - 6 points</b> | <b>1 - 3 points</b>                               | <b>1 - 3 points</b> | <b>1 - 3 points</b>                     | <b>1 - 3 points</b>   |
| <b>Tra 02:</b>           | <b>Proximity to Amenities</b><br>It is intended as a credit in the design stage to encourage and reward a building that is located in close proximity to local amenities, thereby reducing the need for extended travel or multiple trips.   | <b>TR 02:</b> <b>Proximity to Amenities</b><br>It is intended as a credit in the design stage to encourage and reward a building that is located in close proximity to local amenities, thereby reducing the need for extended travel or multiple trips.   | <b>TR 02:</b> <b>Proximity to Amenities</b><br>It is intended as a credit in the design stage to encourage and reward a building that is located in close proximity to local amenities, thereby reducing the need for extended travel or multiple trips.   | <b>Proximity to Amenities</b><br>Recognize and reward a building that is located in close proximity to local amenities, thereby reducing the need for extended travel or multiple trips. |   | <b>1 - 3 points</b> | <b>1 - 3 points</b> | <b>1 - 3 points</b>                               |                     |   | <b>1 - 3 points</b>   |
| <b>Tra 03:</b>           | <b>Cyclist Facilities</b><br>It is intended as a credit in the design stage to encourage building users to cycle by ensuring adequate provision of cyclist facilities.   | <b>TR 03:</b> <b>Cyclist Facilities</b><br>It is intended as a credit in the design stage to encourage building users to cycle by ensuring adequate provision of cyclist facilities.   | <b>TR 03:</b> <b>Cyclist Facilities</b><br>It is intended as a credit in the design stage to encourage building users to cycle by ensuring adequate provision of cyclist facilities.   | <b>Cyclist Facilities</b><br>Ensure adequate provision of cyclist facilities to encourage building users to cycle.   |   | <b>1 point</b>      | <b>1 - 3 points</b> |   |                     |   |                       |
| <b>Tra 04:</b>           | <b>Maximum Car Parking Capacity</b><br>It is intended as a credit in the stage of design to encourage the use of alternative means of transport to the building other than the private car, thereby helping to reduce transport related emissions and traffic congestion associated with the building's operation. | <b>TR 04:</b> <b>Maximum Car Parking Capacity</b><br>It is intended as a credit in the stage of design to encourage the use of alternative means of transport to the building other than the private car, thereby helping to reduce transport related emissions and traffic congestion associated with the building's operation. | <b>TR 04:</b> <b>Maximum Car Parking Capacity</b><br>It is intended as a credit in the stage of design to encourage the use of alternative means of transport to the building other than the private car, thereby helping to reduce transport related emissions and traffic congestion associated with the building's operation. | <b>Pedestrian/Cyclist Safety</b><br>Recognize and encourage the provision of safe cycling and pedestrian routes inside and outside facilities.   |   | <b>1 - 2 points</b> | <b>1 - 3 points</b> |   |                     |   |                       |
| <b>Tra 05:</b>           | <b>Travel Plan</b><br>It is intended as a credit in the design stage to encourage the consideration given to accommodating a range of travel options for building users, thereby encouraging the reduction of user reliance on forms of travel that have the highest environmental impact.                         | <b>TR 05:</b> <b>Travel Plan</b><br>It is intended as a credit in the design stage to encourage the consideration given to accommodating a range of travel options for building users, thereby encouraging the reduction of user reliance on forms of travel that have the highest environmental impact.                         | <b>TR 05:</b> <b>Travel Plan</b><br>It is intended as a credit in the design stage to encourage the consideration given to accommodating a range of travel options for building users, thereby encouraging the reduction of user reliance on forms of travel that have the highest environmental impact.                         | <b>Car Sharing/Staff Travel Schemes</b><br>Ensure that occupants understand and implement travel plans that include car sharing or other alternatives to private car.                    | <b>Green Travel Plans/Initiatives</b><br>Ensure that occupants understand and implement travel plans that will reduce the impact of travelling to and from the building facilities.   | <b>1 - 2 points</b> | <b>1 - 2 points</b> | <b>1 - 3 points</b>                               | <b>1 - 4 points</b> | <b>1 - 3 points</b>                     | <b>1 - 3.5 points</b> |





# MANAGEMENT

| REHABILITATION PROFILE: Assessment Tool   |  |
|---|--|
| PHYSICAL PERFORMANCE  | ASSET RATING   |
| <p><b>Man 01: Sustainable Procurement</b><br/>Ensure delivery of a functional and sustainable asset designed and built in accordance with performance expectations.</p>   | <p><b>Building User Guide</b><br/>Recognize and encourage the implementation of a specification manual that describes with detail the operation of the building and that can be followed by the occupants.</p> <p>1.5 points</p> |
| <p><b>Man 02: Responsible Construction Practices</b><br/>Recognise and encourage construction sites which are managed in an environmentally and socially considerate, responsible and accountable manner.</p>   | <p><b>Environmental Management System</b><br/>Recognize and encourage a management plan to ensure a low environmental impact caused by the building operation and maintenance.</p> <p>1.5 points</p>                             |
| <p><b>Man 03: Construction Site Impacts</b><br/>Recognise and encourage construction sites managed in an environmentally sound manner in terms of resource use, energy consumption and pollution.</p>   | <p><b>Operating Manuals</b><br/>Recognize and encourage the implementation of operating manual that describes with detail the operating systems of the building that need specification.</p> <p>1.5 points</p>                   |
| <p><b>Man 01: Sustainable Procurement</b><br/>It is intended as a credit in the development of the project to ensure delivery of a functional and sustainable asset designed and built in accordance with performance expectations.</p>                                       | <p><b>Building User Guide</b><br/>Recognize and encourage the implementation of a specification manual that describes with detail the operation of the building and that can be followed by the occupants.</p> <p>1.5 points</p> |
| <p><b>Man 02: Responsible Construction Practices</b><br/>It is intended as a credit in the development of the project to recognise and encourage construction sites which are managed in an environmentally and socially considerate, responsible and accountable manner.</p> | <p><b>Environmental Management System</b><br/>Ensure that the personnel of maintenance understand and implement the environmental management system to reduce and prevent environmental impact.</p> <p>2 points</p>              |
| <p><b>Man 03: Construction Site Impacts</b><br/>It is intended as a credit in the development of the project to recognise and encourage construction sites managed in an environmentally sound manner in terms of resource use, energy consumption and pollution.</p>         | <p><b>Operating Manuals</b><br/>Recognize and encourage the implementation of operating manual that describes with detail the operating systems of the building that need specification.</p> <p>1.5 points</p>                   |

| REHABILITATION PROFILE: Assessment Tool  |  |
|--|--|
| BUILDING MANAGEMENT RATING   | ORGANISATIONAL RATING  |
| <p><b>Building User Guide</b><br/>Recognize and encourage the implementation of a specification manual that describes with detail the operation of the building and that can be followed by the occupants.</p> <p>1.5 points</p>   | <p><b>Building User Guide</b><br/>Recognize and encourage the implementation of a specification manual that describes with detail the operation of the building and that can be followed by the occupants.</p> <p>1.5 points</p>   |
| <p><b>Environmental Management System</b><br/>Recognize and encourage a management plan to ensure a low environmental impact caused by the building operation and maintenance.</p> <p>1.5 points</p>   | <p><b>Environmental Management System</b><br/>Recognize and encourage a management plan to ensure a low environmental impact caused by the building operation and maintenance.</p> <p>1.5 points</p>   |
| <p><b>Operating Manuals</b><br/>Recognize and encourage the implementation of operating manual that describes with detail the operating systems of the building that need specification.</p> <p>1.5 points</p>   | <p><b>Operating Manuals</b><br/>Recognize and encourage the implementation of operating manual that describes with detail the operating systems of the building that need specification.</p> <p>1.5 points</p>   |
| <p><b>Building User Liaison Mechanisms and Education Programme</b><br/>Recognize and encourage mechanisms and education programmes that will allow the occupants and maintenance personnel to become acquainted with the building operating systems.</p> <p>1.5 points</p> | <p><b>Building User Liaison Mechanisms and Education Programme</b><br/>Recognize and encourage mechanisms and education programmes that will allow the occupants and maintenance personnel to become acquainted with the building operating systems.</p> <p>1.5 points</p> |
| <p><b>Local Environmental Responsibility</b><br/>Recognise and encourage a facility that is managed in an environmentally and socially considerate, responsible and accountable manner.</p> <p>1.5 points</p>  | <p><b>Local Environmental Responsibility</b><br/>Recognise and encourage a facility that is managed in an environmentally and socially considerate, responsible and accountable manner.</p> <p>1.5 points</p>  |
| <p><b>Building User Liaison Mechanisms and Education Programme</b><br/>Recognize and encourage mechanisms and education programmes that will allow the occupants and maintenance personnel to become acquainted with the building operating systems.</p> <p>1.5 points</p> | <p><b>Building User Liaison Mechanisms and Education Programme</b><br/>Recognize and encourage mechanisms and education programmes that will allow the occupants and maintenance personnel to become acquainted with the building operating systems.</p> <p>1.5 points</p> |
| <p><b>Local Environmental Responsibility</b><br/>Recognise and encourage a facility that is managed in an environmentally and socially considerate, responsible and accountable manner.</p> <p>1.5 points</p>  | <p><b>Local Environmental Responsibility</b><br/>Recognise and encourage a facility that is managed in an environmentally and socially considerate, responsible and accountable manner.</p> <p>1.5 points</p>  |

|  |   |  |   |              |              |
|--|---|--|---|--------------|--------------|
| <b>Man 04:</b><br>Stakeholder Participation<br>It is intended as a credit in the development of the project to design, plan and deliver accessible functional and inclusive buildings in consultation with current and future building users and other stakeholders. | <b>Man 04:</b><br>Stakeholder Participation<br>Recognize the existence of a design, plan and deliver accessible functional and inclusive buildings in consultation with current and future building users and other stakeholders. |  |   |              |              |
| <b>Man 05:</b><br>Service Life Planning and Costing<br>It is intended as a credit in the design stage to recognise and encourage life cycle costing and service life planning in order to improve design, specification and through-life maintenance and operation.  | <b>Man 05:</b><br>Service Life Planning and Costing<br>Recognise and encourage life cycle costing and service life planning in order to improve design, specification and through-life maintenance and operation.                 |  |   |              |              |
|  |   | <b>Environmental Policy Implementation</b><br>Recognize and encourage the maintenance of permanent policies that will reduce and prevent environmental impact produced by the building operation and maintenance.  | <b>Environmental Policies</b><br>Ensure the understanding and compliance of environmental policies that reduce environmental impact caused by operation, maintenance and upgrade of the building.   | 1.5 points   | 2 points     |
|  |   | <b>Environmental Purchasing Policy Implementation</b><br>Recognize and encourage the maintenance of permanent policies that will reduce and prevent environmental impact of materials, goods, and consumables acquired for the operation, maintenance and upgrades of buildings. | <b>Environmental Purchasing Policy Implementation</b><br>Ensure the compliance of policies that reduce environmental impact of materials, goods, and consumables acquired for use in the operations, maintenance and upgrades of buildings. | 1.5 points   | 2 points     |
|  |   | <b>Planned Maintenance Policy/Plan</b><br>Recognize the maintenance of a plans to encourage the compliance of environmental policies.  | <b>Business Continuity Plans</b><br>Ensure that occupants understand and implement practices that will give continuity to environmental plans.  | 1.5 points   | 2 points     |
|  |   | <b>Refurbishment Policy</b><br>Recognize and encourage the maintenance of permanent policies that will reduce and prevent the environmental and air quality impacts produced in the refurbishment of buildings.  |   | 1.5 points   |              |
| <b>Possible Points:</b>  |   |  |   | <b>15</b>    | <b>12</b>    |
| <b>Environmental Section Weighting</b>   |   |  |   | <b>15.0%</b> | <b>12.0%</b> |

**NOTE:** The LEED Tool does not include a Management Environmental Issue; therefore there is no comparative analysis. The same criterion used in both BREEAM lists will be used for the Rehabilitation Profile Assessment Tool.

| INNOVATION  |  |   |   |
|---|--|---|---|
| BREEAM for New Buildings  |  | BREEAM In Use   |   |
| LEED FOR New Construction and Major Renovations   |  | LEED Existing Buildings: Operation and Management   |   |
| REHABILITATION PROFILE: Assessment Tool   |  | Assessment Profile for Operation and Maintenance  |   |
| PHYSICAL PERFORMANCE  |  | ORGANISATIONAL RATING   |   |
| BUILDING MANAGEMENT RATING  |  | ASSET RATING  |   |
| <b>Inn 01:</b><br>Innovation<br>It is intended as a credit to support innovation within the construction industry through the recognition of sustainability related benefits which are not rewarded by standard BREEAM issues.                            | <b>ID CREDIT 1:</b> Innovation in Design<br>It is intended as a credit in the design stage to provide design teams and projects the opportunity to be awarded points for exceptional performance above requirements set by LEED Green Building Rating Systems and/or innovative performance in Green Building categories not specifically addressed by the LEED Green Rating System. Up to 4 points can be awarded for each innovation credit. | <b>ID CREDIT 1.1 - 1.4:</b> Innovation in Operations<br>It is intended as a credit in the stage of building's operation to provide building operations, maintenance and upgrade teams with the opportunity to earn points for environmental benefits achieved beyond those already addressed by the Rehabilitation Profile tool for Management and Organization Rating System. Up to 4 points can be awarded by implementing and maintaining actions that provide added environmental benefits. | <b>Innovation in Operations</b><br>Provide building operations, maintenance and upgrade teams with the opportunity to earn points for environmental benefits achieved beyond those already addressed by the Rehabilitation Profile tool for Management and Organization Rating System. Up to 4 points can be awarded by implementing and maintaining actions that provide added environmental benefits. |
| <b>Inn 02:</b><br>Innovation<br>Support and encourage the design integration required by a Green Building project and to streamline the application and certification process, by having LEED Accredited Professionals participating in the project team. | <b>ID CREDIT 2:</b> LEED Accredited Professional<br>It is intended as a credit in the design stage to support and encourage the design integration required by a LEED Green Building project and to streamline the application and certification process, by having LEED Accredited Professionals participating in the project team.   | <b>ID CREDIT 2:</b> LEED Accredited Professional<br>It is intended as a credit in the stage of building's operation to support and encourage the operations, maintenance, upgrade and project team integration required for LEED for Existing Buildings: O & M implementation and to streamline the application and certification process, by having LEED Accredited Professionals participating in the project team.   | <b>Accredited Professional</b><br>Support and encourage the operations, maintenance, upgrade and project team integration required for Rehabilitation Profile tool for Management and Organization Rating System implementation and to streamline the application and certification process, by having Accredited Professionals participating in the project team.                                      |
| <b>Inn 03:</b><br>Innovation<br>Support and encourage the design integration required by a Green Building project and to streamline the application and certification process, by having LEED Accredited Professionals participating in the project team. | <b>ID CREDIT 3:</b> LEED Accredited Professional<br>It is intended as a credit in the design stage to support and encourage the design integration required by a Green Building project and to streamline the application and certification process, by having LEED Accredited Professionals participating in the project team.  | <b>ID CREDIT 3:</b> Documenting Sustainable Building Cost Impacts<br>It is intended as a credit in the stage of building's operation to document sustainable building cost impacts, by tracking building operation cost to identify any positive impacts related to the sustainable performance improvements to the building and its operations.  | <b>Documenting Sustainable Building Cost Impacts</b><br>Document sustainable building cost impacts, by tracking building operation cost to identify any positive impacts related to the sustainable performance improvements to the building and its operations.  |
| <b>Possible Points:</b><br>10   | <b>Possible Points:</b><br>5   | <b>Possible Points:</b><br>7  | <b>Possible Points:</b><br>7  |
| <b>Environmental Section Weighting</b><br>Additional  | <b>Environmental Section Weighting</b><br>7.3%   | <b>Environmental Section Weighting</b><br>7.8%  | <b>Environmental Section Weighting</b><br>5.0%  |

| INNOVATION  |  |   |   |
|---|--|---|---|
| BREEAM for New Buildings  |  | BREEAM In Use   |   |
| LEED FOR New Construction and Major Renovations   |  | LEED Existing Buildings: Operation and Management   |   |
| REHABILITATION PROFILE: Assessment Tool   |  | Assessment Profile for Operation and Maintenance  |   |
| PHYSICAL PERFORMANCE  |  | ORGANISATIONAL RATING   |   |
| BUILDING MANAGEMENT RATING  |  | ASSET RATING  |   |
| <b>Inn 01:</b><br>Innovation<br>It is intended as a credit to support innovation within the construction industry through the recognition of sustainability related benefits which are not rewarded by standard BREEAM issues.                            | <b>ID CREDIT 1:</b> Innovation in Design<br>It is intended as a credit in the design stage to provide design teams and projects the opportunity to be awarded points for exceptional performance above requirements set by LEED Green Building Rating Systems and/or innovative performance in Green Building categories not specifically addressed by the LEED Green Rating System. Up to 4 points can be awarded for each innovation credit. | <b>ID CREDIT 1.1 - 1.4:</b> Innovation in Operations<br>It is intended as a credit in the stage of building's operation to provide building operations, maintenance and upgrade teams with the opportunity to earn points for environmental benefits achieved beyond those already addressed by the Rehabilitation Profile tool for Management and Organization Rating System. Up to 4 points can be awarded by implementing and maintaining actions that provide added environmental benefits. | <b>Innovation in Operations</b><br>Provide building operations, maintenance and upgrade teams with the opportunity to earn points for environmental benefits achieved beyond those already addressed by the Rehabilitation Profile tool for Management and Organization Rating System. Up to 4 points can be awarded by implementing and maintaining actions that provide added environmental benefits. |
| <b>Inn 02:</b><br>Innovation<br>Support and encourage the design integration required by a Green Building project and to streamline the application and certification process, by having LEED Accredited Professionals participating in the project team. | <b>ID CREDIT 2:</b> LEED Accredited Professional<br>It is intended as a credit in the design stage to support and encourage the design integration required by a LEED Green Building project and to streamline the application and certification process, by having LEED Accredited Professionals participating in the project team.   | <b>ID CREDIT 2:</b> LEED Accredited Professional<br>It is intended as a credit in the stage of building's operation to support and encourage the operations, maintenance, upgrade and project team integration required for LEED for Existing Buildings: O & M implementation and to streamline the application and certification process, by having LEED Accredited Professionals participating in the project team.   | <b>Accredited Professional</b><br>Support and encourage the operations, maintenance, upgrade and project team integration required for Rehabilitation Profile tool for Management and Organization Rating System implementation and to streamline the application and certification process, by having Accredited Professionals participating in the project team.                                      |
| <b>Inn 03:</b><br>Innovation<br>Support and encourage the design integration required by a Green Building project and to streamline the application and certification process, by having LEED Accredited Professionals participating in the project team. | <b>ID CREDIT 3:</b> LEED Accredited Professional<br>It is intended as a credit in the design stage to support and encourage the design integration required by a Green Building project and to streamline the application and certification process, by having LEED Accredited Professionals participating in the project team.  | <b>ID CREDIT 3:</b> Documenting Sustainable Building Cost Impacts<br>It is intended as a credit in the stage of building's operation to document sustainable building cost impacts, by tracking building operation cost to identify any positive impacts related to the sustainable performance improvements to the building and its operations.  | <b>Documenting Sustainable Building Cost Impacts</b><br>Document sustainable building cost impacts, by tracking building operation cost to identify any positive impacts related to the sustainable performance improvements to the building and its operations.  |
| <b>Possible Points:</b><br>10   | <b>Possible Points:</b><br>5   | <b>Possible Points:</b><br>7  | <b>Possible Points:</b><br>7  |
| <b>Environmental Section Weighting</b><br>Additional  | <b>Environmental Section Weighting</b><br>7.3%   | <b>Environmental Section Weighting</b><br>7.8%  | <b>Environmental Section Weighting</b><br>5.0%  |