



**NON-RESIDENTIAL EXISTING BUILDING
(NREB): HOSPITAL**

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INTRODUCTION

WHAT IS THE GREEN BUILDING INDEX?

The Green Building Index (GBI) is an environmental rating system for buildings developed by PAM (Pertubuhan Akitek Malaysia / Malaysian Institute of Architects) and ACEM (the Association of Consulting Engineers Malaysia). The Green Building Index is Malaysia's first comprehensive rating system for evaluating the environmental design and performance of Malaysian buildings based on the six (6) main criterias of Energy Efficiency, Indoor Environment Quality, Sustainable Site Planning & Management, Materials & Resources, Water Efficiency, and Innovation.

The Green Building Index is fundamentally derived from existing rating tools, including the Singapore Green Mark and the Australian Green Star system, but extensively modified for relevance to the Malaysian tropical weather, environmental context, cultural and social needs.

This GBI initiative aims to assist the building industry in its march towards sustainable development. The GBI environmental rating system is created to:

- **Define green building by establishing a common language and standard of measurement;**
- **Promote integrated, whole-building design;**
- **Recognise and reward environmental leadership;**
- **Transform the built environment to reduce the environmental impact of development; and**
- **Ensure new buildings remain relevant in the future and existing buildings are refurbished and thereafter sustained properly to remain relevant.**

WHO CAN USE THE GREEN BUILDING INDEX (NON-RESIDENTIAL)?

GBI encourage all members of Project Teams, Building owners, Developers and other interested parties (including Contractors, Government and Design and Build Contractors) to use the Green Building Index to validate environmental initiatives of the design phase of new non-residential construction or base non-residential building refurbishment; or construction and procurement phase of non-residential buildings. Use of the Green Building Index is encouraged on all such projects to assess and improve their environmental attributes.

Use of the Green Building Index tool without formal certification by an independent accredited GBI Certifier does not entitle the user or any other party to promote the Green Building Index rating achieved. No fee is payable for such use, however formal recognition of the Green Building Index rating - and the right to promote same - requires undertaking the formal certification process offered by Greenbuildingindex Sdn. Bhd. (GSB).

Whilst GBI NREB is a generic rating tool for Office Buildings, GBI NREB: HOSPITAL (developed in collaboration with the Ministry of Health and Healthcare Technical Services Sdn Bhd) is a bespoke rating tool developed for Hospitals.

All Green Building Index rating tools are reviewed annually; please forward any feedback to info@greenbuildingindex.org.

HOW TO USE THE GREEN BUILDING INDEX?

- Complete the Building Input worksheet as the building's type and location may affect the predicted rating.
- Complete the remaining worksheets by reviewing each credit in each category and entering the number of points you predict the building will achieve in the 'No. of Points Achieved' column. Calculators are provided for a number of the tool's credits.
- Enter any points that may be achieved but need to be confirmed in the 'Points to be Confirmed' column.
- Enter any comments required in the 'Comments' column.
- The predicted rating is shown in the Summary worksheet. More detail on point scores (both achieved and those to be confirmed) are shown in the Credit Summary and Graphical Summary worksheets at the end of the tool.

PROJECT INFORMATION

PROJECT NAME		
PROJECT REGISTRATION NO.		
PROJECT ADDRESS		
	<small>POSTCODE</small>	<small>STATE</small>
CONSTRUCTION TYPE		
TOTAL GROSS FLOOR AREA (GFA)		
LAND AREA (FOR LANDED PROPERTY)		
REGISTRATION FEE (EXCLUDING GST)		
TARGETTED RATING		
TOTAL POINTS CLAIM		
EXPECTED CONSTRUCTION DATE	<small>COMMENCED</small>	<small>COMPLETION</small>
DATE BUILDING COMPLETED (NREB/IEB ONLY)		
PROJECT DESCRIPTION & MAJOR DESIGN FEATURES		

CONSULTANTS INFORMATION

OWNER'S NAME			
COMPANY			
OWNER'S REPRESENTATIVE	NAME	DESIGNATION	

ARCHITECT	NAME	PROFESSIONAL REG. NO.	COMPANY
CIVIL ENGINEER	NAME	PROFESSIONAL REG. NO.	COMPANY
STRUCTURAL ENGINEER	NAME	PROFESSIONAL REG. NO.	COMPANY
MECHANICAL ENGINEER	NAME	PROFESSIONAL REG. NO.	COMPANY
ELECTRICAL ENGINEER	NAME	PROFESSIONAL REG. NO.	COMPANY
QUANTITY SURVEYOR	NAME	PROFESSIONAL REG. NO.	COMPANY
LAND SURVEYOR	NAME	PROFESSIONAL REG. NO.	COMPANY
LANDSCAPE ARCHITECT	NAME	PROFESSIONAL REG. NO.	COMPANY
COMMISSIONING SPECIALIST (CxS)	NAME	PROFESSIONAL REG. NO.	COMPANY
GBI FACILITATOR	NAME	PROFESSIONAL REG. NO.	COMPANY
OTHER SPECIALIST CONSULTANT(S)			
MAIN CONTRACTOR			
LOCAL AUTHORITY			

DETAIL ASSESSMENT CRITERIA SUMMARY OF FINAL SCORE

PART	ITEM	MAXIMUM POINTS	SCORE
1	Energy Efficiency (EE)	38	
2	Indoor Environmental Quality (EQ)	21	
3	Sustainable Site Planning & Management (SM)	10	
4	Material & Resources (MR)	9	
5	Water Efficiency (WE)	12	
6	Innovation (IN)	10	
TOTAL SCORE		100	

GREEN BUILDING INDEX CLASSIFICATION

POINTS	GBI RATING
86 to 100 points	Platinum
76 to 85 points	Gold
66 to 75 points	Silver
50 to 65 points	Certified

DETAIL ASSESSMENT CRITERIA

SUMMARY OF CONTENTS

PART	CRITERIA	ITEM	POINTS	TOTAL	
1	EE	ENERGY EFFICIENCY			38
	Design & Performance				
	EE1	Minimum EE Performance	2		
	EE2	Lighting Zoning	3		
	EE3	Electrical Sub-metering	2		
	EE4	Renewable Energy	5		
	EE5	Advanced or Improved EE Performance - BEI	15		
	Commissioning				
	EE6	Enhanced or Re-commissioning	4		
	EE7	On-going Post Occupancy Commissioning	2		
	Monitoring, Improvement & Maintenance				
EE8	EE Monitoring & Improvement	2			
EE9	Sustainable Maintenance	3			
2	EQ	INDOOR ENVIRONMENTAL QUALITY			21
	Air Quality				
	EQ1	Minimum IAQ Performance	1		
	EQ2	IAQ Treatment of Recirculating Conditioned Air	1		
	EQ3	Carbon Dioxide Monitoring and Control	1		
	EQ4	Indoor Air Pollutants	2		
	EQ5	Mould Prevention	1		
	Thermal Comfort				
	EQ6	Thermal Comfort: Design & Controllability of Systems	2		
	EQ7	Air Change Effectiveness	1		
	Lighting, Visual & Acoustic Comfort				
	EQ8	Daylighting	2		
	EQ9	Daylight Glare Control	1		
	EQ10	Electric Lighting Levels	1		
	EQ11	High Frequency Ballasts	1		
EQ12	External Views	2			
EQ13	Internal Noise Levels	1			
Verification					
EQ14	IAQ Before/During Occupancy	2			
EQ15	Occupancy Comfort Survey: Verification	2			
3	SM	SUSTAINABLE SITE PLANNING & MANAGEMENT			10
	Facility Management				
	SM1	GBI Rated Design & Construction	1		
	SM2	Building Exterior Management	1		
	SM3	Integrated Pest Management, Erosion Control & Landscape Management	1		
	Transportation				
	SM4	Green Vehicle Priority - Low Emitting & Fuel Efficient Vehicles	1		
	SM5	Parking Capacity	1		
	Reduce Heat Island Effect				
SM6	Greenery & Roof	4			
SM7	Building User Manual	1			

DETAIL ASSESSMENT CRITERIA SUMMARY OF CONTENTS (CONTINUED)

PART	CRITERIA	ITEM	POINTS	TOTAL
4	MR	MATERIALS & RESOURCES		9
	Reused & Recycled Materials			
	MR1	Material Reuse and Selection	1	
	MR2	Recycle Content Materials	1	
	Sustainable Materials & Resources and Policy			
	MR3	Sustainable Timber	1	
	MR4	Sustainable Purchasing Policy	1	
	Waste Management			
	MR5	Storage, Collection & Disposal of Recyclables	3	
	Green Products			
MR6	Refrigerants & Clean Agents	2		
5	WE	WATER EFFICIENCY		12
	Water Harvesting & Recycling			
	WE1	Rainwater Harvesting	3	
	WE2	Water Recycling	2	
	Increased Efficiency			
	WE3	Water Efficient - Irrigation/Landscaping	2	
WE4	Water Efficient Fittings	3		
WE5	Metering & Leak Detection System	2		
6	IN	INNOVATION		10
	IN1	Innovation & Environmental Initiatives	9	
	IN2	Green Building Index Facilitator	1	
			TOTAL POINTS	100

1

ENERGY EFFICIENCY (EE)

DESIGN & PERFORMANCE | COMMISSIONING | MONITORING, IMPROVEMENT & MAINTENANCE

38 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS ALLOCATED	MAX POINTS	SCORE
DESIGN & PERFORMANCE				
EE1	MINIMUM EE PERFORMANCE (MANDATORY COMPLIANCE)			
	Establish minimum energy efficiency (EE) performance to reduce energy consumption in buildings, thus reducing CO ₂ emission to the atmosphere. Meet the following minimum EE requirements as stipulated in MS 1525:		2	
	a) OTTV ≤ 50, RTTV ≤ 25, Roof U-Value ≤ 0.4 (Light weight) or ≤ 0.6 (Heavy weight). Submit calculations (use of the BEIT software or other GBI approved software is acceptable), AND	1		
	b) Provision of Energy Management Control system where Air-conditioned space ≥ 4000 m ² .	1		
EE2	LIGHTING ZONING			
	Provide flexible lighting controls to optimise energy savings:-		3	
	All individual or enclosed spaces to be individually switched; and the size of individually switched lighting zones shall not exceed 100m ² for 90% of the NLA; with switching clearly labelled and easily accessible by building occupants/management.	1		
	Provide auto-sensor controlled lighting in conjunction with daylighting strategy for all perimeter zones and daylight areas, if any.	1		
	Provide motion sensors or similar to complement lighting zoning for floor area equivalent to at least 25% of NLA.	1		
EE3	ELECTRICAL SUB-METERING & TENANT SUB-METERING			
	Monitor energy consumption of key building services as well as all tenancy areas:-		2	
	Provide sub-metering for all energy use ≥ 100kVa	1		
	Provide separate sub-metering for lighting and/or power at each floor or tenancy.	1		
EE4	RENEWABLE ENERGY			
	Encourage use of renewable energy:-		5	
	Where 0.25 % of the Maximum electricity Demand (M.D.) or total electricity consumption, or 2 kWp (PV or equiv) whichever is the greater is generated by renewable energy, OR	1		
	Where 0.5 % of the M.D. or total electricity consumption, or 5 kWp (PV or equiv) whichever is the greater is generated by renewable energy, OR	2		
	Where 1.0 % of the M.D. or total electricity consumption, or 10 kWp (PV or equiv) whichever is the greater is generated by renewable energy, OR	3		
	Where 1.5 % of the M.D. or total electricity consumption, or 20 kWp (PV or equiv) whichever is the greater is generated by renewable energy, OR	4		
	Where 2.0 % of the M.D. or total electricity consumption, or 40 kWp (PV or equiv) whichever is the greater is generated by renewable energy.	5		
EE5	ADVANCED OR IMPROVED EE PERFORMANCE			
	l) Exceed Energy Efficiency (EE) performance better than the baseline minimum to reduce energy consumption in the building. Achieve Building Energy Intensity (BEI) as defined by GBI for the following corresponding credit points. The default operating hours for this Hospital rating tool is 24/7. Non-electricity fuel energy is excluded in the BEI calculation. BEI ₁ values listed below apply to Hospital providing limited clinical services such as day surgery, etc. BEI ₂ values apply to Hospital that provides major clinical services (requiring high energy intensity) which must include the following:- a) Surgery under general anaesthetic b) Intensive Care Unit c) Radiology		15	
	BEI ₁ ≤ 200, BEI ₂ ≤ 290, OR	2		
	BEI ₁ ≤ 190, BEI ₂ ≤ 270, OR	3		
	BEI ₁ ≤ 175, BEI ₂ ≤ 250, OR	5		
	BEI ₁ ≤ 160, BEI ₂ ≤ 233, OR	8		
	BEI ₁ ≤ 150, BEI ₂ ≤ 212, OR	10		
	BEI ₁ ≤ 135, BEI ₂ ≤ 195, OR	12		
	BEI ₁ ≤ 120, BEI ₂ ≤ 175.	15		

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GREEN BUILDING INDEX ASSESSMENT CRITERIA FOR NREB: HOSPITAL

ITEM	AREA OF ASSESSMENT	DETAIL POINTS ALLOCATED	MAX POINTS	SCORE
DESIGN & PERFORMANCE				
EE5	ADVANCED OR IMPROVED EE PERFORMANCE			
	<p>OR</p> <p>II) Demonstrate Energy savings over the last 3 years from Existing Building historical BEI baseline, to improve by:</p>		15	
	≥ 20% AND with resultant BEI ₁ ≤ 267 or BEI ₂ ≤ 387	2		
	≥ 25% AND with resultant BEI ₁ ≤ 228 or BEI ₂ ≤ 324	3		
	≥ 30% AND with resultant BEI ₁ ≤ 200 or BEI ₂ ≤ 290	5		
	≥ 40% AND with resultant BEI ₁ ≤ 190 or BEI ₂ ≤ 270	8		
	≥ 50% AND with resultant BEI ₁ ≤ 175 or BEI ₂ ≤ 250	10		
	≥ 60% AND with resultant BEI ₁ ≤ 160 or BEI ₂ ≤ 233	12		
	≥ 70% AND with resultant BEI ₁ ≤ 150 or BEI ₂ ≤ 212	15		
COMMISSIONING				
EE6	ENHANCED COMMISSIONING/RE-COMMISSIONING/RETRO COMMISSIONING OF BUILDING ENERGY SYSTEMS			
	<p>Ensure building's energy related systems are properly commissioned so as to realise their full potential. Appoint a GBI recognised Commissioning Specialist (CxS) to perform the commissioning for all the building's energy related systems in accordance with ASHRAE Commissioning Guideline or other GBI approved equivalent standard by:</p> <p>a) Implementing improvements to ensure building's major energy using systems are repaired, operated and maintained effectively to optimize energy performance.</p> <p>b) Developing a commissioning or ongoing commissioning plan for the building's major energy-using systems.</p> <p>c) Providing training for management staff to build awareness and skills in a broad range of sustainable building operation topics, including energy efficiency and building, equipment and systems operations and maintenance.</p> <p>d) Updating the building operating plan as necessary to reflect any changes in the occupancy schedule, equipment runtime schedule, design set points and lighting levels.</p>	4	4	
EE7	ON-GOING POST OCCUPANCY COMMISSIONING			
	Carry out up-to-date on-going post occupancy commissioning for all occupied areas after fit-out changes are completed, if any:-		2	
	a) Professional Engineer shall review all fit-out plans to ensure original design intent is not compromised and sign off the completed works.	1		
	b) CxS shall carry out re-commissioning of the building's energy related systems for the affected areas.	1		
MONITORING, IMPROVEMENT & MAINTENANCE				
EE8	EE MONITORING & IMPROVEMENT			
	a) Use Energy Management System (or have a dedicated Energy Management Team) to monitor and analyse energy consumption including reading of sub-meters.	1	2	
	<p>b) Fully commission and activate Maximum Demand Limiting programme (where EMS is not provided and air-conditioned area is < 4,000m² the dedicated Energy Management Team to demonstrate EE operational strategy), AND</p> <p>Compile, summarise and submit BEI, Fuel and Water Consumption of the building to GBI on an annual basis during the 3-year validity period or earlier whenever requested by GBI. Submissions shall include monthly energy and water bills.</p>	1		
EE9	SUSTAINABLE MAINTENANCE			
	Ensure the building's energy related systems will continue to perform as intended with proper and sustainable maintenance:-		3	
	a) At least 75% of permanent building maintenance team to participate in the commissioning of all building energy services.	1		
	b) Provide for a designated building maintenance office that is fully equipped with facilities (including tools and instrumentation) and inventory storage.	1		
	c) Provide evidence of documented plan for at least 3-year facility maintenance and preventive maintenance budget (inclusive of staffing and outsourced contracts).	1		
EE SUB-TOTAL		38	38	

2

INDOOR ENVIRONMENTAL QUALITY (EQ)

AIR QUALITY | THERMAL COMFORT | LIGHTING, VISUAL & ACOUSTIC COMFORT | VERIFICATION

21 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS ALLOCATED	MAX POINTS	SCORE
AIR QUALITY				
EQ1	MINIMUM IAQ PERFORMANCE			
	Establish minimum indoor air quality (IAQ) performance on ventilation rate to enhance indoor air quality in building, thus contributing to the comfort and well-being of the occupants:-	1	1	
	Meet the minimum requirements of ventilation rate in ASHRAE Std 62.1 or the local building code, whichever is the more stringent.			
EQ2	IAQ TREATMENT OF RECIRCULATING CONDITIONED AIR			
	Provide Ultraviolet Germicidal Irradiation (UVGI) or equivalent enhanced treatment of recirculating conditioned air for healthcare environment to reduce concentration of microorganisms, thus contributing to the well-being of the occupants, patients and visitors:-	1	1	
	UVGI treatment to be installed for all AHUs serving clinical areas and public areas. Where FCUs are used, equivalent system as approved by GBI, is to be provided. <i>Equivalent system includes proven technology that can reduce concentration of microbial counts in the air or on surfaces.</i>			
EQ3	CARBON DIOXIDE MONITORING AND CONTROL			
	Provide response monitoring of carbon dioxide levels to ensure delivery of minimum outside air requirements:-	1	1	
	Install carbon dioxide (CO ₂) monitoring and control system with at least one (1) CO ₂ sensor at all main return points of each common AHU to facilitate continuous monitoring and adjustment of outside air ventilation rates to each zone, and ensure independent control of ventilation rates to maintain CO ₂ level ≤ 1,000 ppm. <i>Note that requirements of ASHRAE Std 170 shall take precedence for minimum OA settings to maintain required pressure differential for specific rooms.</i>			
EQ4	INDOOR AIR POLLUTANTS			
	Reduce detrimental impact on occupant health from finishes that emit internal air pollutants:-	1	2	
	Use low VOC paint and coating throughout the building. Paints and Coatings to comply with requirements specified in international labelling schemes recognized by GBI, AND			
	Use low VOC carpet or flooring throughout the building. Carpets to comply with requirements specified in international labelling schemes recognized by GBI. Other types of flooring to comply with requirements under FloorScore developed by Science Certification System or equivalent, AND			
	Use low VOC adhesive and sealant or no adhesive or sealant used.			
	Use products with no added urea formaldehyde. These include: a) Composite wood and agrifiber products defined as: particleboard, medium density fiberboard (MDF), plywood, wheatboard, strawboard, panel substrates and door cores, AND b) Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies, AND c) Insulation foam, AND d) Draperies	1		
EQ5	MOULD PREVENTION			
	Design system(s) which reduce the risk of mould growth and its associated detrimental impact on occupant health:-	1	1	
	a) For 24/7 airconditioned rooms: Where it is demonstrated that the mechanical air-conditioning ventilation system will maintain a positive indoor air pressure relative to the exterior and can actively control indoor air humidity to be no more than 60% RH, AND b) For non 24/7 airconditioned rooms: Where it is demonstrated that the mechanical air-conditioning ventilation system will maintain a positive indoor air pressure relative to the exterior and can actively control indoor air humidity to be no more than 70% RH without the use of active control that will consume additional energy. For both a) and b), ensure that excessive moisture in building is controlled during the Design, Construction and Operation stages by the consideration and the control of the following: i) Rainwater leakage through roof and walls ii) Infiltration of moist air iii) Diffusion of moisture through walls, roof and floors iv) Groundwater intrusion into basements and crawl spaces through walls and floors v) Leaking or burst pipes vi) Indoor moisture sources vii) Construction moisture viii) Wall/floor separating 24/7 airconditioned room and unconditioned space on the other side to be of appropriate insulating properties			

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GREEN BUILDING INDEX ASSESSMENT CRITERIA FOR NREB: HOSPITAL

ITEM	AREA OF ASSESSMENT	DETAIL POINTS ALLOCATED	MAX POINTS	SCORE
THERMAL COMFORT				
EQ6	THERMAL COMFORT: CONTROLLABILITY OF SYSTEMS			
	<p>Provide a high level of thermal comfort system control by individual occupants or by specific groups in multi-occupant spaces to promote the productivity, comfort and well-being of building occupants:-</p> <p>Provide individual comfort controls for $\geq 50\%$ of the building occupants to enable adjustments to suit individual task needs and preferences; and where each enclosed room shall be provided with its own control.</p> <p>AND</p> <p>Provide comfort system controls for all shared multi-occupant spaces to enable adjustments to suit group needs and preferences.</p> <p><i>Conditions for thermal comfort include the primary factors of air temperature, radiant temperature, air speed and humidity. Comfort system control for this purpose is defined as the provision of control over at least one of these primary factors in the occupants' local environment.</i></p>	2	2	
EQ7	AIR CHANGE EFFECTIVENESS			
	<p>Provide effective delivery of clean air through reduced mixing with indoor pollutants in order to promote a healthy indoor environment. Demonstrate that the Air Change Effectiveness (ACE) meets the following criteria for at least 50% of the NLA (excluding patient bedrooms and Back-of-the-House Areas):</p> <p>The ventilation systems are designed to achieve an ACE of ≥ 0.95 when measured in accordance with ASHRAE 129: Measuring air change effectiveness where ACE is to be measured in the breathing zone (nominally 1.0 m from finished floor level).</p> <p><i>Note: Displacement ventilation or task-air ventilation are deemed to meet ACE requirement without need for design simulation and measurement upon completion.</i></p>	1	1	
LIGHTING, VISUAL & ACOUSTIC COMFORT				
EQ8	DAYLIGHTING			
	<p>Provide good levels of daylighting for building occupants:-</p> <p>Demonstrate that $\geq 30\%$ of the NLA has a daylight factor in the range of 1.0 – 3.5% as measured at the working plane, 800mm from floor level, OR</p> <p>Demonstrate that $\geq 50\%$ of the NLA has a daylight factor in the range of 1.0 – 3.5% as measured at the working plane, 800mm from floor level.</p> <p><i>Note that rooms that require 'blackout' condition such as medical rooms and function rooms are exempted from Daylighting NLA computation.</i></p>	1 2	2	
EQ9	DAYLIGHT GLARE CONTROL			
	<p>Reduce discomfort of glare from natural light. Where blinds or screens are fitted on all glazing and atrium as a base building, incorporate provisions to meet the following criteria;</p> <p>a) Eliminate glare from all direct sun penetration and keep horizontal workspace lux level below 2000; AND</p> <p>b) Eliminate glare from diffuse sky radiation for occupant workspace at viewing angles of 15° to 60° from the horizontal at eye level (typically 1.2m from floor level);</p> <p><i>Note: Adjustable blinds or screens should be of the horizontal (not vertical) type especially at the E-W facades.</i></p>	1	1	
EQ10	ELECTRIC LIGHTING LEVELS			
	<p>Baseline building lighting not to be over designed:-</p> <p>Demonstrate that lighting design maintains a luminance level of no more than specified in MS1525 for 90% of NLA as measured at the working plane (800 mm above the floor level).</p>	1	1	
EQ11	HIGH FREQUENCY BALLASTS			
	<p>Increase workplace amenity by avoiding low frequency flicker that may be associated with fluorescent lighting:-</p> <p>Install high frequency ballasts in fluorescent luminaires over a minimum of 90% of NLA.</p>	1	1	

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GREEN BUILDING INDEX ASSESSMENT CRITERIA FOR NREB: HOSPITAL

ITEM	AREA OF ASSESSMENT	DETAIL POINTS ALLOCATED	MAX POINTS	SCORE
LIGHTING, VISUAL & ACOUSTIC COMFORT				
EQ12	EXTERNAL VIEWS			
	Reduce eyestrain for building occupants by allowing long distance views and provision of visual connection to the outdoor:-		2	
	Demonstrate that $\geq 60\%$ of the NLA has a direct line of sight through vision glazing at a height of 1.2m from floor level.	1		
	Demonstrate that $\geq 75\%$ of the NLA has a direct line of sight through vision glazing at a height of 1.2m from floor level.	2		
	<i>Note that rooms that require 'black out' conditions such as medical rooms and function rooms are exempted from this NLA computation.</i>			
EQ13	INTERNAL NOISE LEVELS			
	Maintain internal noise levels at an appropriate level. Demonstrate that 90% of the NLA do not exceed the following ambient internal noise levels:-		1	
	Within the entire baseline building general office, space noise from the building services does not exceed 40dB(Aeq).	1		
	OR Within the baseline building office space, the sound level does not exceed 45dB(Aeq) for open plan and not exceed 40dB(Aeq) for closed offices.			
	<i>Note that internal noise level thresholds for areas other than office space shall not exceed values stipulated in ASHRAE Standard or other GBI approved Standards, Code of Practice or Design Guides; e.g. CIBSE Guide.</i>			
VERIFICATION				
EQ14	IAQ BEFORE/DURING OCCUPANCY			
	Reduce indoor air quality problems resulting from the construction process (or inherent conditions) in order to improve and sustain the comfort and well-being of building occupants. Develop and implement an Indoor Air Quality (IAQ) Management Plan to effect this requirement as follows:-		2	
	a) Perform a building flush out by supplying outdoor air to provide not less than 10 airchanges/hour for at least 30 minutes operation and continuous minimum 1 ACH for the next 14 days	1		
	OR b) If low VOC materials and low formaldehyde composite wood are used, then building flush out can be performed by supplying outdoor air to provide not less than 10 airchanges/hour for at least 15 minutes operation or not less than 6 airchanges/hour for at least 30 minutes operation and continuous 1ACH for the next 7 days			
	OR c) Conduct IAQ testing to demonstrate maximum concentrations for pollutants are not exceeded according to the Indoor Air Quality Code of Malaysia or relevant authority which ever is more stringent.			
	Permanent Air Purging System: Where a permanent air flushing system of at least 10 airchanges/hour operation is installed and operated at least once a year during occupancy stage AND to conduct IAQ testing to demonstrate maximum concentrations for pollutants are not exceeded according to the Indoor Air Quality Code of Malaysia or relevant Authority whichever is more stringent.	1		
EQ15	OCCUPANCY COMFORT SURVEY: VERIFICATION			
	Provide for the assessment of comfort of the building occupants:-		2	
	Conduct an occupancy comfort survey of building occupants. This survey should collect anonymous responses about thermal comfort, visual comfort and acoustic comfort in a building. It should include an assessment of overall satisfaction with thermal, visual and acoustic performance and identification of thermal-related, visual-related and acoustic-related problems.	2		
	AND Develop a plan for corrective action if the survey results indicate that more than 20% of occupants are dissatisfied with the overall comfort in the building. This plan should include measurement of relevant environmental variables in problem areas.			
	<i>The relevant environmental variables include 1) Temperature, relative humidity, air speed and mean radiant temperature, 2) Lighting level and glare problem, 3) Background noise level, 4) Odour problem, CO₂ level, VOCs, and particulate concentration.</i>			
EQ SUB-TOTAL		21	21	

3

SUSTAINABLE SITE PLANNING & MANAGEMENT (SM)

FACILITY MANAGEMENT | TRANSPORTATION | REDUCE HEAT ISLAND EFFECT

10 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS ALLOCATED	MAX POINTS	SCORE
FACILITY MANAGEMENT				
SM1	GBI RATED DESIGN & CONSTRUCTION			
	If the building has been previously GBI (or other GBI approved Green Rating system) rated under any category, OR within the last 12 months a comprehensive Energy Efficiency Audit has been conducted.	1	1	
SM2	BUILDING EXTERIOR MANAGEMENT			
	Employ environmentally sensitive building exterior management plan to reduce pollution.	1	1	
	Use environmentally non-polluting methods and chemicals for cleaning of building exterior including maintenance equipment, chemicals, paint and sealants.			
SM3	INTEGRATED PEST MANAGEMENT, EROSION CONTROL & LANDSCAPE MGT			
	Employ environmentally sensitive management to preserve the site's natural components. Minimise harmful chemical use, energy waste, water waste, air pollution, solid waste and/or chemical runoff such as gasoline and oil. The following operational elements must be addressed:	1	1	
	a) Use of least toxic chemical pesticides, minimum use of chemicals and use only in targeted locations and only for targeted species. Conduct routine inspection and monitoring AND b) Erosion and sedimentation control for ongoing landscape operations including measures that prevent erosion and sedimentation, prevent air pollution from dust or particulate matter and restore eroded areas.			
TRANSPORTATION				
SM4	GREEN VEHICLE PRIORITY - LOW EMITTING & FUEL EFFICIENT VEHICLES			
	Encourage use of green vehicles:-	1	1	
	Provide preferred parking for low-emitting and fuel-efficient vehicles for 5% of the total car parking lots. "Preferred parking" refers to the parking spots that are closest to the main entrance of the project (exclusive of spaces designated for handicapped).			
SM5	PARKING CAPACITY			
	Discourage over-provision of car parking capacity:-	1	1	
	Size parking capacity to meet, but not to exceed the minimum local zoning requirements, AND provide preferred staff parking bays for carpools or vanpools for 5% of the total provided parking bays.			
REDUCE HEAT ISLAND EFFECT				
SM6	GREENERY & ROOF			
	Reduce heat island (thermal gradient difference between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat:-	2	4	
	A) HARDSCAPE & GREENERY APPLICATION: 1) Provide any combination of the following strategies for 50% of the site hardscape (including sidewalks, courtyards, plazas and parking lots); a) Shade (within 5 years of occupancy); b) Paving materials with a Solar Reflectance Index (SRI) of at least 29; c) Open grid pavement system.			
	B) ROOF APPLICATION: 1) Use roofing material with a Solar Reflectance Index (SRI) equal to or greater than the value in the table below for a minimum of 75% of the roof surface; OR 2) Install a vegetated roof for at least 50% of the roof area; OR 3) Install high albedo and vegetated roof surfaces that, in combination, meet the following criteria: <i>(Area of SRI Roof / 0.75) + (Area of vegetated roof / 0.5) ≥ Total Roof Area</i> Roof Type Slope SRI Low-Sloped Roof < 2:12 78 Steep-Sloped Roof > 2:12 29			
SM7	BUILDING USER MANUAL			
	Document Green building design features and strategies for user information and guide to sustain performance during occupancy:-	1	1	
	Provide (include updating) a Building User Manual which documents passive and active green features that should not be downgraded.			
SM SUB-TOTAL		10	10	

4

MATERIALS & RESOURCES (MR)

REUSED & RECYCLED MATERIALS | SUSTAINABLE MATERIALS & RESOURCES AND POLICY | WASTE MANAGEMENT | GREEN PRODUCTS

9 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS ALLOCATED	MAX POINTS	SCORE
REUSED AND RECYCLED MATERIALS				
MR1	MATERIALS REUSE AND SELECTION			
	Reuse building materials and products to reduce demand for virgin materials and reduce creation of waste. This serves to reduce environmental impact associated with extraction and processing of virgin resources. Integrate building design and its buildability with selection of reused building materials, taking into account their embodied energy, durability, carbon content and life cycle costs:-		1	
	Where reused products/materials constitutes $\geq 20\%$ of the project's total retrofit material cost value.	1		
MR2	RECYCLED CONTENT MATERIALS			
	Increase demand for building products that incorporate recycled content materials in their production:- <i>(Recycled content shall be defined in accordance with the International Organization of Standards Document)</i>		1	
	Where use of materials with recycled content is such that the sum of post-consumer recycled plus one-half of the pre-consumer content constitutes $\geq 20\%$ (based on cost) of project's total retrofit material cost value.	1		
SUSTAINABLE MATERIALS & RESOURCES AND POLICY				
MR3	SUSTAINABLE TIMBER			
	Encourage environmentally responsible forest management:-		1	
	Where $\geq 75\%$ of wood-based materials and products used in the retrofit works are certified. <i>These components include, but are not limited to, structural framing and general dimensional framing, flooring, sub-flooring, wood doors and finishes. To include wood materials permanently installed and also temporarily purchased for the project. Compliance with Forest Stewardship Council OR Malaysian Timber Certification Council requirements.</i>	1		
MR4	SUSTAINABLE PURCHASING POLICY			
	Develop a Sustainable Purchasing policy that must cover product purchases within the building and management's control.	1	1	
WASTE MANAGEMENT				
MR5	STORAGE, COLLECTION & DISPOSAL OF RECYCLABLES			
	Facilitate reduction of waste generated during retrofit construction and during building occupancy that is hauled and disposed off in landfills:-		3	
	Provide recycling facilities/infrastructure for sorting and separate collection of recyclable waste for recycling (consumables - glass, paper, metal, equipment, addition & alteration construction wastes).	1		
	Promote and encourage waste minimization and recycling among occupants, tenants and visitors through various avenues.	1		
	Promote waste sorting, collecting, quantifying, monitoring and recycling of a large range of waste generated in-house.	1		
GREEN PRODUCTS				
MR6	REFRIGERANTS & CLEAN AGENTS			
	Use environmentally-friendly Refrigerants and Clean Agents exceeding Malaysia's commitment to the Montreal & Kyoto protocols:-		2	
	Use zero Ozone Depleting Potential (ODP) products: non-CFC and non-HCFC refrigerants AND fire suppression clean agents;	1		
	Use non-synthetic (natural) refrigerants AND fire suppression clean agents with zero ODP and negligible Global Warming Potential of ≤ 10 .	1		
MR SUB-TOTAL		9	9	

5

WATER EFFICIENCY (WE)

WATER HARVESTING & RECYCLING | INCREASED EFFICIENCY

12 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS ALLOCATED	MAX POINTS	SCORE
WATER HARVESTING & RECYCLING				
WE1	RAINWATER HARVESTING			
	Encourage rainwater harvesting that will lead to reduction in potable water consumption:-		3	
	Rainwater harvesting that leads to ≥5% reduction in potable water consumption, OR	1		
	Rainwater harvesting that leads to ≥15% reduction in potable water consumption, OR	2		
	Rainwater harvesting that leads to ≥30% reduction in potable water consumption.	3		
WE2	WATER RECYCLING			
	Encourage water recycling that will lead to reduction in potable water consumption:-		2	
	Treat and recycle ≥10% wastewater leading to reduction in potable water consumption, OR	1		
	Treat and recycle ≥30% wastewater leading to reduction in potable water consumption.	2		
	<i>Note: Treatment of infected wastewater shall meet Authority's requirements.</i>			
INCREASED EFFICIENCY				
WE3	WATER EFFICIENT - IRRIGATION/LANDSCAPING			
	Reduce potable water consumption for landscape irrigation by:		2	
	a) 50%	1		
	b) 100%	2		
WE4	WATER EFFICIENT FITTINGS			
	Encourage reduction in potable water consumption through use of efficient devices:-		3	
	I) With reference to Utility calculations;			
	a) Reduce annual potable water consumption by ≥20%, OR	1		
	b) Reduce annual potable water consumption by ≥30%, OR	2		
	c) Reduce annual potable water consumption by ≥50%.	3		
	OR			
	II) From existing 3-year average water consumption record, reduce annual potable water use by:			
	a) ≥ 20%	1		
	b) ≥ 30%	2		
	c) ≥ 50%	3		
WE5	METERING & LEAK DETECTION SYSTEM			
	Encourage the design of systems that monitors and manages water consumption:-		2	
	Use of sub-meters to monitor and manage major water usage for clinical, cooling towers, irrigation, kitchens and tenancy use.	1		
	Link all water sub-meters to EMS to facilitate early detection of water leakage.	1		
WE SUB-TOTAL		12	12	

6

INNOVATION (IN)

INNOVATION & ENVIRONMENTAL INITIATIVES | GREEN BUILDING INDEX FACILITATOR

10 POINTS

ITEM	AREA OF ASSESSMENT	DETAIL POINTS ALLOCATED	MAX POINTS	SCORE
IN1	INNOVATION & ENVIRONMENTAL INITIATIVES			
	Provide Existing Buildings the opportunity to be awarded points for exceptional performance above the requirements set by GBI rating system:-			
	1 point for each approved innovation and environmental initiative (refer to GBI website for updates and details) up to a maximum of 9 points, such as; <ul style="list-style-type: none"> • Anti-Bacterial low VOC paint/coating; • Green healing garden; • Refrigerant leak detection and recovery facility; • Solar thermal technology/Solar Airconditioners (generating at least 10% of total required capacity); • Use of IBS - Industrialized Building System for the retrofit component (must achieve a minimum CIDB IBS score of 30). 	9	9	
IN2	GREEN BUILDING INDEX FACILITATOR			
	To support and encourage the integration required for Green Building Index rated buildings and to streamline the application and certification process:-		1	
	Engage the services of a Green Building Index Facilitator to assist in obtaining Green Building Index certification.	1		
IN SUB-TOTAL		10	10	